

A Revised Estimate of Italian Economic Growth, 1861-1989 *

Introduction

The most generally used procedure in measuring the growth of Italian GDP since 1861 is to link the postwar official series of the statistical office (ISTAT) for 1951 onwards, with the estimates back to 1861 which ISTAT published in 1957 or the modified version of these published in Fuà and Associates in 1969.

A major problem with the existing estimates for the nineteenth century is that they show virtually no advance in per capita GDP for the three decades before 1890, when all other West European countries were experiencing significant growth. These estimates have troubled historians trying to interpret Italian economic development (see Toniolo, 1990, chapter 1) and they have also worried analysts of comparative economic performance, who found the implied level of Italian GDP in 1861 (well above that in France and Germany) to be implausible (in the light of other indicators of comparative economic performance). Albert Carreras (1991) has pointed to the low growth bias which characterises the ISTAT (1957) estimates and Stefano Fenoaltea has published several important articles revising the Fuà (1969) estimates for four sectors, generally in a direction which suggests faster growth.

* I am grateful to Dirk Pilat for help in calculating the revised annual series, and to Albert Carreras, Stefano Fenoaltea, Roberto Golinelli, Gianni Toniolo and Vera Zamagni for comments on an earlier draft. I also received very helpful comments from Ornello Vitali, Guido Rey and other participants in a seminar on historical national accounts held in the Università degli Studi, Ca' Foscari, Venice in November 1990. As I did not always follow the advice I received, the responsibility for the present estimates and any errors they may contain, is mine alone.

I am grateful to the Cassa di Risparmio di Venezia and to the Economics Faculty in Ca' Foscari for making possible my sojourn in Venice.

Other significant problems arise with the official postwar estimates. ISTAT has made upward revisions of GDP on several occasions, but has not itself linked successive segments of its time series, because the methods it used to measure GDP changed over time. ISTAT's recent estimates of Italian GDP levels probably overstate performance to some extent by giving a fuller imputation of underground activity than is the case in other countries.

This paper examines these problems and puts forward revised estimates.

1. Revised estimates for 1861-1938

ISTAT (1957) provided estimates of major expenditure components of GDP for 1861-1957 in constant and current prices, and GDP by industry of origin, mostly in current prices. The estimates published in 1969 in Fuà and Associates are largely derived from the 1957 benchmark study of ISTAT but are easier to use because they provide constant price estimates and deflators for 11 branches by industry of origin which were prepared by Ornello Vitali. They show somewhat faster growth than the ISTAT series. For 1861-1913 Vitali shows a growth rate of 1.39 per cent per annum for GDP, compared with the 1.34 of ISTAT (see Vitali in Fuà, *op. cit.*, p. 475). Like ISTAT, the Vitali figures are at 1938 prices for the whole period from 1861 to the 1950s. Most long term national accounts for other countries involve some change in weights, and use of weights of this type is likely to understate growth (see Maddison, 1990 for an elaboration of this point and a comparison with techniques used in other countries).

If one reweights the Vitali estimates for 1861-1913 with 1870 weights, the growth rate for this period is raised from 1.39 to 1.47 percentage points a year. In addition, one can amend Vitali for 1861-1913 by using the new Fenoaltea estimates for mining, utilities and construction, and an amended version of his earlier (1967) estimates for manufacturing (including the silk industry which he previously excluded, and deducting the electricity and gas industries which he included in his 1967 estimates). Three of the Fenoaltea series show faster growth than Vitali, his utilities index shows slightly smaller growth.

As is clear from table 1, this double amendment to Vitali raises the 1861-1913 growth rate to 1.79 percent a year. The effect of these revisions can be seen in graph 1.

TABLE 1

VITALI'S GDP AT FACTOR COST, AMENDED USING 1870 WEIGHTS AND FENOALTEA'S INDICATORS FOR 4 OF THE 11 BRANCHES

	Vitali amended with 1870 weights million 1870 lire	Col. 1 further amended using Fenoaltea indicators million 1870 lire	Original Vitali index	Reweighted Vitali	Reweighted and substituting Fenoaltea indicators
1861	8,151	8,193	90.9	90.4	90.9
1870	9,016	9,016	100.0	100.0	100.0
1913	17,417	21,606	186.2	193.2	228.4

Source: See note and tables in Appendix.

For 1913-38, I have reweighted the Vitali estimates using 1913 weights instead of 1938 weights and this change raises the growth rate for this period by 0.06 points a year. The effect of this revision can be seen in graph 2. For 1938-51 I have accepted the Vitali estimates with 1938 weights.

2. Linking the official ISTAT figures for 1951-89

In 1987 ISTAT published a major upward revision of the national accounts for 1980-6 (see ISTAT 1987c). Two years later these revisions were carried back to 1970 (ISTAT 1989). Table 2 below compares these revised results with the previous estimates (see ISTAT 1987a).

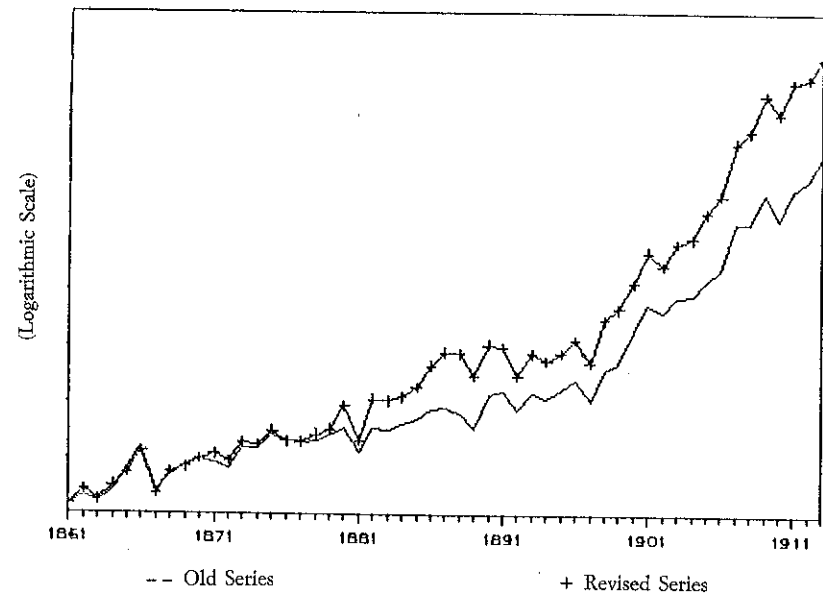
TABLE 2

CONFRONTATION OF NEW AND PREVIOUS AGGREGATES 1970-85 (billion lire)

	New GDP at current market prices	Previous GDP at current market prices	Ratio new/previous	New GNP at current market prices	Previous GNP at current market prices	Ratio new/previous
1970	67,178	62,883	1.068	67,489	63,127	1.069
1985	812,751	684,843	1.187	807,373	678,953	1.189

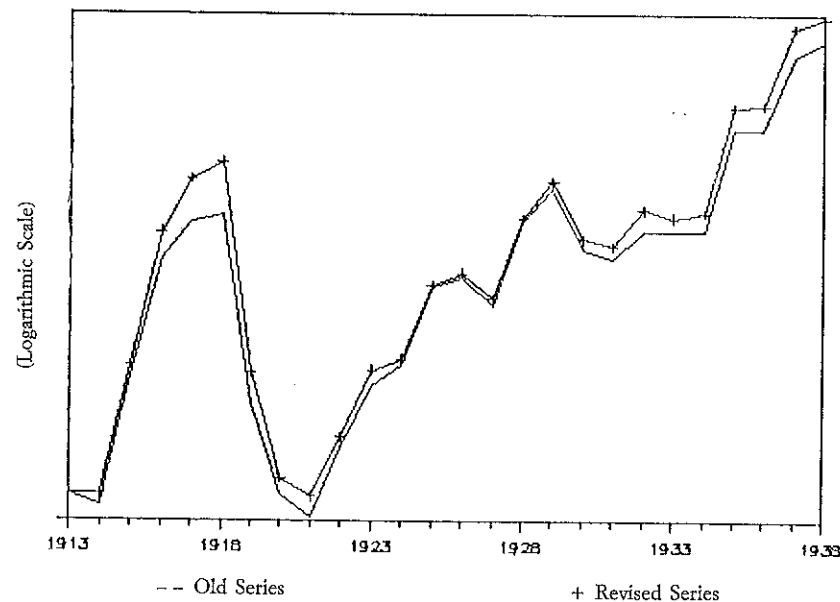
GRAPH 1

REVISION OF ITALIAN GDP ESTIMATES
(volume indices, 1870 = 100)



GRAPH 2

REVISION OF ITALIAN GDP ESTIMATES
(volume indices, 1913 = 100)



The revision is very striking in two respects. For 1985 the upward revision is 18.9 per cent which is much bigger proportionately than revisions made by any other OECD country (the biggest elsewhere, as I recall, were a Dutch upward revision of about 7 per cent for 1969-81, and a Japanese upward revision of about 8 per cent in the 1960s). The second unusual feature is that the proportionate upward revision rises very sharply over time, from 6.8 per cent in 1970 to 18.9 per cent in 1985. In real terms, the new rate of GDP growth for 1970-85 is 3.042 per cent per annum compared with 2.387 per cent in the previous estimates.

There were earlier upward revisions in the level of the official accounts. I shall call the successive series Mark I (the figures which appeared in the ISTAT estimates in ISTAT 1957); Mark II for 1951-70; Mark III for 1960-85 (*i.e.* what I call the "previous" series in my Table 2) and Mark IV for 1970-89 which are the latest estimates. It is not possible to compare GDP throughout as Mark I and Mark II are presented only for GNP by ISTAT. Table 3 shows the revisions necessary if one is to link Mark I with Mark IV.

TABLE 3

SUCCESSIVE REVISIONS OF GNP LEVEL BY ISTAT
(billion lire at current market prices)

	Mark IV	Mark III	Mark II	Mark I	Ratio Mark IV/III	Ratio Mark III/II	Ratio Mark II/I
1951			10,748	9,751 ^a			1.102
1960		23,267	21,828			1.066	
1970	67,489	63,127	58,261		1.069		
1985	807,373	678,953					

^a Figure derived from ISTAT, 1957, p. 250. ISTAT 1987a, p. 356 gives only per capita GNP and population, which when multiplied gives a GNP of 9851, but this difference is probably rounding rather than revision. Source: Mark I from ISTAT 1957, Mark II and Mark III from ISTAT 1987a, Mark IV from ISTAT 1989.

The analysis so far has been in terms of current prices, and it is more difficult to compare the constant price series as Mark IV is in 1980 prices, Mark III in 1970 prices, Mark II in 1963 prices and Mark I in 1938 prices. However, a comparison of the deflators suggests that the problem is the same in constant as in current prices. The Mark IV deflator for 1970-85 was 14.6 per cent per annum,

Mark III 14.5 per cent for the same period. The Mark III deflator for 1960-70 was 4.52 per cent a year and the Mark II deflator was 4.45 per cent a year for the same period.

From table 3 we can see that a reader who wanted to link the latest series with 1957 ISTAT, and who used the orthodox linking procedure which OECD uses, would have to make an upward adjustment of 25.6 per cent to the figures of 1951 and earlier years, *i.e.* $1.102 \times 1.066 \times 1.069$.

The new benchmark estimates for 1911 by Giovanni Federico, Stefano Fenoaltea and Vera Zamagni (FFZ) show a total gross value added (GDP) at factor cost of 20,516 million lire compared with the 18,437 million of ISTAT (1957), *i.e.* a mark up ratio of 1.113, which is very close to the Mark II revision for 1951, and may therefore be considered some sort of validation of it.

TABLE 4

CONFRONTATION OF 1911 ESTIMATES OF GDP AT CURRENT FACTOR COST
OF FFZ WITH ANNALI 1957 AND ERCOLANI 1969
(million lire)

	FFZ	ISTAT	Ercolani
Agriculture, Forestry and Fishing	7,796	7,823	8,059
Mining	224	133	133
Manufacturing	3,842	3,565	3,612
Construction	697	393	394
Utilities	193	209	208
Transport and Communication	1,126	998	1,000
Trade	2,738	1,543	1,683
Finance and Insurance	344	382	381
Miscellaneous Services	1,180	1,141	1,085
Public Administration	1,114	1,183	1,099
Housing	1,262	1,067	1,217
GDP	20,516	18,437	18,871

Source: Columns 1 and 2 derived from the Federico, Fenoaltea and Zamagni manuscript. Column 3 derived from Ercolani's tables 1.1A and 1.1B in G. Fuà and ASSOCIATES, *Lo Sviluppo Economico in Italia*, vol. III, pp. 402 and 404.

However, I have more serious reservations about linking the Mark III and Mark IV estimates in the orthodox way. The steadily increasing upward revision in the years 1970-85 where Mark IV and

Mark III overlap, suggests that it might be better to link the earlier segments by a tapered adjustment, *e.g.* one could make a graduated allocation of the 1951 and 1970 discrepancy in levels.

So far we have considered the problem of linking successive ISTAT estimates only on the aggregative level, but the discrepancies between the successive segments are more acute on a disaggregated level. The Mark IV figures for investment in 1980 were 41 per cent higher than in the Mark III estimate for the same year. This created a major problem of reconciliation for Prometeia (University of Bologna) in using their econometric model. In the process of consistentising the time series for investment, Golinelli and Monterastelli (1990) were led to make a tapering adjustment, which leads to a gradual rise in the rate of investment between 1951 and 1970 as compared with earlier ISTAT figures. The result of this is that their estimate of total product, from the expenditure side of the accounts (and excluding their inventory movement – which they used as a reconciliation item), shows faster growth than one would get from the orthodox linkage procedure. Linking ISTAT II and III for 1951-70 by orthodox procedures shows a real GDP growth rate of 5.64 per cent a year, whereas the Prometeia real expenditure variant (which I have adopted) shows a GDP growth of 5.84 per cent a year.

3. Adjustment to the benchmark level of GDP for purpose of international comparison

For purposes of international comparison it is better to use the purchasing power parities (PPP) published periodically by Eurostat/OECD/UN, rather than exchange rates. I have used the latest round of such PPP estimates for 1985 in my benchmark. These were then applied to the various countries' GDP estimates at national prices to convert them into 1985 dollars. Individual country time series can then be compared by linking them to the 1985 benchmark.

One of the problems with this procedure in the Italian case, is that the recent ISTAT revisions of GDP probably involve a more comprehensive coverage of the underground economy than other countries manage to capture – for the 1982 benchmark some output was imputed to 28 million people as compared with the 22.2 million in the official labour force statistics (see ISTAT 1987b and 1987c).

Vincenzo Siesto (1987), director of ISTAT, has indicated that the irregular economy represented 20.2 per cent of the new official GDP estimate for 1982. The current wisdom in OECD national accounts circles (see Blades, 1982, p. 39), is that underground activities which escape the net of official national accounts statisticians in other countries are typically about 3 per cent of GDP. If one is using Italian statistics for purposes of international comparison, it is therefore reasonable to make a 3 per cent downward adjustment to the level of ISTAT Mark IV figures to enhance comparability.

Table 5 below shows the level of Italian GDP using the orthodox indicators and PPPs derived from the OECD/UN/Eurostat ICP V. The table shows clearly what the problem is with the existing series, because it shows Italy in 1870 with a higher per capita real product than France or Germany which is not very plausible given the bigger relative size of Italian agriculture, and other available indicators of relative development levels.

TABLE 5

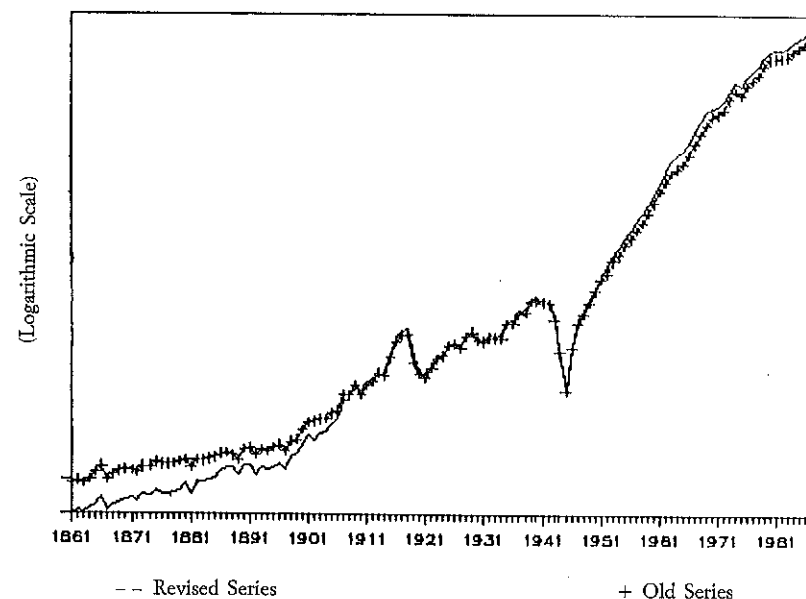
GROSS DOMESTIC PRODUCT PER HEAD OF POPULATION, 1820-1989
(\$ at 1985 US relative prices)

	1820	1870	1913	1950	1973	1989
Australia	1,242	3,123	4,523	5,931	10,331	13,584
Austria	1,041	1,433	2,667	2,852	8,644	12,590
Belgium	1,024	2,087	3,266	4,228	9,416	12,999
Canada		1,347	3,560	6,113	11,866	17,576
Denmark	988	1,555	3,037	5,224	10,527	13,514
Finland	639	933	1,727	3,480	9,072	13,934
France	1,052	1,571	2,734	4,149	10,323	13,837
Germany	937	1,300	2,606	3,339	10,110	13,987
Italy		1,608	2,250	3,017	8,833	13,356
Japan	588	588	1,114	1,563	9,237	15,101
Netherlands	1,307	2,064	3,178	4,706	10,267	12,737
Norway		1,190	2,079	4,541	9,346	16,500
Sweden	947	1,316	2,450	5,331	11,292	14,912
Switzerland		1,848	3,086	6,556	13,167	15,396
UK	1,405	2,610	4,024	5,651	10,063	13,469
USA	1,048	2,247	4,854	8,611	14,103	18,317
Arithmetic average	1,108	1,680	2,953	4,707	10,412	14,488

Source: A. MADDISON, *Dynamic Forces in Capitalist Development*, Oxford University Press, 1991. The estimates for Italy in this table link the original Vitali figures for 1861-1951 with the three official ISTAT series for 1951-60, 1960-70 and 1970-89 without any of the adjustments mentioned above. The numeraire used here at "US relative prices" involved use of the "Paasche" variant of Eurostat's PPPs.

GRAPH 3

OLD AND NEW ITALIAN GDP ESTIMATES
(volume index, 1913 = 100)



What should one do in the present state of knowledge?

Pending further work by ISTAT and the FFZ Group, those engaged in comparing long term growth rates have a choice. They can either link the 1861-1951 Vitali estimates with the latest available components of Marks I, II, III and IV and ignore the discrepancies in level, which is what I did in constructing the Italian estimates in table 5, or they can cobble together a compromise estimate which keeps in mind the various bits of evidence available.

This is what I have done in table 6 for benchmark years. For 1861-1913 I used the double adjusted version of Vitali presented in the last column of table 1 above, *i.e.* using 1870 weights derived from ISTAT 1957, the Fenoaltea indicators for 4 branches and Vitali's indicators for the 7 other branches. For the 1913-38 segment I amended Vitali, using 1913 ISTAT weights; for this period I also tested to see what difference it would make to use the new FFZ

TABLE 6

A REVISIONIST VIEW OF ITALIAN ECONOMIC GROWTH
(present territory)

	Revised GDP Index 1913=100	Revised GDP levels ^a 1985 million \$	Resident Population ^b 000s	Per Capita GDP in 1985 \$
1820	23.6	18,164	19,000	956
1861	39.8	30,605	26,239	1,166
1870	43.8	33,663	27,888	1,207
1890	55.4	42,558	31,702	1,342
1913	100.0	76,873	37,248	2,064
1929	131.1	100,778	40,469	2,490
1938	150.8	115,914	43,419	2,670
1950	172.8	132,802	47,105	2,819
1951	185.7	142,781	47,418	3,011
1960	311.1	239,160	50,198	4,764
1970	546.3	415,926	53,661	7,826
1973	610.6	469,348	54,779	8,568
1985	856.3	658,258	57,128	11,523
1987	904.2	695,081	57,331	12,124
1989	969.4	745,235	57,525	12,955

^a These are derived by converting the 1985 benchmark GDP level in line with the Paasche version of ICP V's PPP estimate as supplied by Hugo Krijnse Locker of Eurostat. The benchmark in lire was reduced by 3 per cent for the reasons shown above. The time series in \$ are derived by merging the benchmark and the index.

^b Resident population from ISTAT, 1976, adjusted to mid year.

weights for 1911 and found it had a negligible effect on the results. For 1938-51 I used Vitali's results (with his 1938 weights). For 1951-70 I used the aggregate GDP estimates of Prometeia (from the expenditure side excluding inventories). Finally, to enhance international comparability, I reduced the GDP level throughout by 3 per cent, to bring the coverage of the underground economy in line with what I think is normal in other countries. I have added a guesstimate for 1820 assuming that GDP per capita grew at the same pace from 1820-61 as from 1861-90.

Groningen

ANGUS MADDISON

APPENDIX A

Annual GDP estimates and sources used

Table 7 shows the derivation of the 1861-1913 annual estimates. I have restated each of the 11 sector indices in 1870 prices and each sector is given its 1870 weight in the total. However, the weighting system within each of the 7 Vitali sectors was at 1938 prices, and within each of Fenoaltea's 4 sectors (mining, manufacturing, utilities and construction) it was at 1911 prices, so my measure is a hybrid one. If 1870 weights had been used within each sector as well as for weighting the sectors together it is likely that the resultant GDP growth would have been even faster. One snag in my eclectic approach is that ISTAT's 1870 sectors valuations may be inappropriate as weights for Fenoaltea's sectors, but it is not clear from ISTAT (1957) whether their current price valuations are independent from their constant price valuations. Fenoaltea's indicators for mining, manufacturing, utilities and construction are from the following sources:

a) Mining: Fenoaltea, 1988(a).

b) Manufacturing: Fenoaltea, 1967, Tables 24, 25 and 27, presents estimates for output in 37 industries which are combined using 1911 value added weights. Value added is derived by applying value added - gross output ratios from the 1899 US census of manufacturing. He made further adjustments to deal with the problem that his indicator availability for these sectors changed over time. I deducted three of Fenoaltea's industries, *i.e.* hydro-power, thermal power and lighting gas, as they are covered in his new index for utilities. I added his new results for the silk industry, which was not included in his 1967 estimates [see Fenoaltea, 1988(b)]. Including silk and excluding utilities, the total value added in Fenoaltea's sample is 2028 million lire in 1911, *i.e.* 52.8 per cent of his new (FFZ) estimates of value added.

c) Utilities: Fenoaltea, 1982.

d) Construction: Fenoaltea, 1987.

Table 8 is derived by using Vitali's growth indicators with 1913 weights.

Table 9 uses the Prometeia measure for GDP for 1951-70 linked to ISTAT's Mark IV figures for 1970-1989. It also incorporates the results shown in Tables 7 and 8. 1985 US dollars (converted by Eurostat PPPs) are used as the numeraire throughout.

TABLE 7

REVISED ITALIAN GDP GROWTH FIGURES
(1870 Prices, million lire, present territory)

	Agriculture, Forestry Fishing	Mining	Manufacturing	Construction	Electricity, Gas & Water	Transport & Communication	Trade	Finance & Insurance	Miscellaneous Services	Housing	Public Administration	Total GDP	GDP Index (1870=100)
1861	4,471	37	1,322	168	8	135	566	12	658	425	395	8,197	90.9
1862	4,628	39	1,312	205	8	142	560	15	670	428	439	8,446	93.7
1863	4,452	42	1,315	209	8	154	562	22	656	430	429	8,280	91.8
1864	4,647	43	1,300	208	8	139	565	18	706	433	439	8,525	94.6
1865	4,901	43	1,249	208	9	166	568	32	712	436	434	8,758	97.1
1866	5,057	43	1,293	165	9	164	571	35	756	438	632	9,163	101.6
1867	4,452	45	1,357	143	10	135	563	39	798	443	414	8,399	93.2
1868	4,842	49	1,360	139	10	142	539	51	772	446	428	8,778	97.4
1869	4,940	52	1,404	136	10	180	554	46	670	450	428	8,870	98.4
1870	4,901	51	1,483	145	11	192	571	48	706	452	456	9,016	100.0
1871	4,979	51	1,518	155	12	171	562	55	728	456	428	9,115	101.1
1872	4,842	57	1,546	171	12	166	576	58	716	458	378	8,980	99.6
1873	5,077	62	1,609	202	13	168	579	59	718	461	383	9,331	103.5
1874	4,979	61	1,641	213	13	178	607	57	720	464	367	9,300	103.1
1875	5,194	55	1,679	172	14	185	613	67	758	466	364	9,566	106.1
1876	5,018	60	1,644	160	14	178	631	68	752	469	370	9,364	103.9
1877	5,018	61	1,660	165	15	164	640	66	752	471	348	9,360	103.8
1878	5,096	64	1,692	165	15	183	628	73	768	476	339	9,498	105.3
1879	5,194	70	1,679	170	16	190	615	81	776	479	339	9,608	106.6
1880	5,448	73	1,866	187	17	204	594	85	776	484	334	10,067	111.7
1881	4,510	75	2,027	199	17	209	661	91	780	489	330	9,388	104.1
1882	5,194	84	2,144	238	18	209	600	94	790	493	347	10,210	113.2
1883	4,940	87	2,283	258	19	213	626	103	798	499	354	10,181	112.9
1884	4,921	86	2,292	269	21	225	639	119	812	503	367	10,254	113.7

1885	4,881	88	2,504	280	23	244	684	134	816	509	303	10,467	116.1
1886	5,233	87	2,650	285	25	249	637	145	796	515	309	10,931	121.2
1887	5,038	84	3,051	270	27	288	668	160	802	521	323	11,232	124.6
1888	4,940	85	3,067	263	29	311	650	157	816	526	350	11,195	124.2
1889	4,471	87	3,001	249	30	325	687	160	816	529	358	10,713	118.8
1890	5,233	89	2,868	249	32	327	689	155	818	534	404	11,398	126.4
1891	5,526	89	2,549	243	34	341	677	158	800	539	397	11,352	125.9
1892	4,979	91	2,428	223	36	361	693	163	804	542	394	10,714	118.8
1893	5,389	90	2,514	214	38	364	666	182	814	538	397	11,205	124.3
1894	4,979	87	2,685	212	39	384	690	165	814	549	444	11,047	122.5
1895	5,038	82	2,745	167	41	384	703	161	820	553	525	11,218	124.4
1896	5,311	84	2,773	154	44	414	699	164	808	556	518	11,526	127.8
1897	4,667	92	2,865	154	46	407	726	168	814	561	515	11,016	122.2
1898	5,428	95	3,036	151	51	460	697	181	818	565	515	11,998	133.1
1899	5,311	103	3,320	155	55	500	721	193	830	570	520	12,278	136.2
1900	5,721	103	3,447	166	58	525	740	193	838	576	595	12,962	143.8
1901	6,444	107	3,488	182	62	553	722	197	856	583	611	13,803	153.1
1902	5,838	112	3,551	208	66	573	777	212	899	589	593	13,418	148.8
1903	6,229	117	3,782	227	74	569	780	219	893	595	575	14,058	155.9
1904	6,034	119	3,991	244	83	596	806	234	895	603	586	14,189	157.4
1905	6,151	124	4,449	270	90	654	827	253	905	611	648	14,981	166.2
1906	5,994	128	5,012	293	99	746	869	266	896	619	661	15,543	172.4
1907	7,029	128	5,587	316	112	757	890	283	899	627	667	17,296	191.8
1908	6,502	129	6,286	342	126	840	946	293	925	634	689	17,713	196.5
1909	7,166	133	6,492	414	140	1,091	946	304	1,035	641	698	19,081	211.6
1910	6,033	143	6,662	483	154	1,153	970	338	1,049	648	734	18,389	204.0
1911	6,932	149	6,808	511	172	1,294	982	338	955	654	792	19,586	217.2
1912	6,697	156	6,884	521	191	1,420	1,038	331	991	659	857	19,745	219.0
1913	7,498	156	6,751	510	210	1,545	1,008	338	1,033	666	873	20,589	228.4

TABLE 8

REVISED ITALIAN GDP GROWTH FIGURES
(1913 Prices, million lire, present territory)

	Agriculture, Forestry & Fishing	Mining	Manufacturing	Construction	Electricity, Gas & Water	Transport & Communication	Trade	Finance & Insurance	Miscellaneous Services	Housing	Public Administration	Total GDP	Revised GDP Index (1913=100)
1913	8,717	152	3,890	465	249	1,181	1,838	392	1,185	1,180	1,342	20,591	100.0
1914	7,991	150	3,696	470	295	1,040	1,911	466	1,252	1,191	2,113	20,575	99.9
1915	7,287	157	4,805	300	336	1,163	2,020	416	1,277	1,197	4,057	23,015	111.8
1916	7,832	154	4,876	204	436	1,220	2,056	372	966	1,201	6,506	25,822	125.4
1917	7,809	150	4,277	178	452	1,005	2,002	364	909	1,202	8,691	27,038	131.3
1918	7,991	152	4,084	147	468	982	2,093	350	826	1,202	9,147	27,440	133.3
1919	7,468	143	4,013	295	428	618	2,056	453	1,180	1,205	4,993	22,854	111.0
1920	7,945	154	3,890	355	440	720	2,220	477	1,167	1,209	2,288	20,865	101.3
1921	7,786	141	3,556	348	432	760	2,166	539	1,132	1,216	2,473	20,548	99.8
1922	8,240	131	4,013	453	460	855	2,293	537	1,183	1,224	2,221	21,610	104.9
1923	9,012	149	4,348	530	540	1,042	2,348	530	1,171	1,237	2,009	22,915	111.3
1924	8,603	151	4,805	593	612	1,121	2,348	563	1,183	1,252	1,911	23,141	112.4
1925	9,148	161	5,474	625	723	1,188	2,439	574	1,187	1,270	1,880	24,669	119.8
1926	9,171	163	5,474	663	799	1,237	2,493	554	1,153	1,288	1,933	24,927	121.1
1927	8,331	162	5,263	633	871	1,361	2,621	583	1,291	1,300	1,973	24,388	118.4
1928	9,035	157	5,791	670	963	1,478	2,657	637	1,305	1,314	2,125	26,132	126.9
1929	9,375	164	5,932	763	999	1,566	2,693	675	1,263	1,336	2,228	26,994	131.1
1930	8,394	161	5,597	795	1,123	1,491	2,712	716	1,295	1,361	2,060	25,664	124.6
1931	8,672	148	5,069	700	1,091	1,420	2,602	828	1,408	1,380	2,197	25,515	123.9
1932	9,466	139	5,069	653	1,099	1,343	2,639	887	1,410	1,394	2,240	26,339	127.9
1933	8,538	141	5,404	700	1,199	1,345	2,748	876	1,484	1,422	2,285	26,161	127.1
1934	8,104	139	5,263	795	1,291	1,633	2,712	977	1,575	1,449	2,353	26,271	127.6
1935	8,831	143	5,668	950	1,431	1,813	2,730	1,038	1,555	1,477	3,337	28,801	139.9
1936	8,013	154	5,668	973	1,439	1,843	2,693	861	1,484	1,504	4,249	28,851	140.1
1937	9,035	184	6,583	878	1,527	1,813	2,821	869	1,408	1,532	4,177	30,827	149.7
1938	9,103	207	6,583	788	1,623	1,813	2,930	885	1,429	1,560	4,129	31,048	150.8

TABLE 9

REVISED ANNUAL ITALIAN GDP SERIES, 1861-1989
(1985 million US\$, converted by Eurostat PPP, present territory)

1861	30,605	1894	41,247	1926	93,061	1958	213,542
1862	31,535	1895	41,885	1927	91,048	1959	226,860
1863	30,917	1896	43,036	1928	97,559	1960	239,160
1864	31,832	1897	41,131	1929	100,778	1961	259,308
1865	32,700	1898	44,798	1930	95,814	1962	279,504
1866	34,214	1899	45,843	1931	95,257	1963	299,440
1867	31,361	1900	48,395	1932	98,331	1964	311,099
1868	32,776	1901	51,537	1933	97,668	1965	318,098
1869	33,118	1902	50,100	1934	98,078	1966	334,704
1870	33,663	1903	52,487	1935	107,523	1967	358,512
1871	34,032	1904	52,977	1936	107,711	1968	388,525
1872	33,529	1905	55,933	1937	115,087	1969	410,705
1873	34,838	1906	58,035	1938	115,914	1970	419,926
1874	34,723	1907	64,577	1939	124,358	1971	426,673
1875	35,716	1908	66,135	1940	125,126	1972	438,134
1876	34,964	1909	71,243	1941	123,590	1973	469,348
1877	34,947	1910	68,660	1942	122,055	1974	494,791
1878	35,463	1911	73,131	1943	110,540	1975	481,704
1879	35,874	1912	73,723	1944	89,814	1976	513,324
1880	37,588	1913	76,873	1945	70,316	1977	530,719
1881	35,053	1914	76,813	1946	92,117	1978	550,228
1882	38,123	1915	85,924	1947	108,238	1979	583,149
1883	38,013	1916	96,403	1948	114,379	1980	608,023
1884	38,286	1917	100,941	1949	122,823	1981	613,713
1885	39,079	1918	102,444	1950	132,802	1982	615,664
1886	40,813	1919	85,320	1951	142,781	1983	622,655
1887	41,936	1920	77,896	1952	153,436	1984	641,350
1888	41,799	1921	76,712	1953	164,529	1985	658,258
1889	40,000	1922	80,675	1954	173,065	1986	675,003
1890	42,558	1923	85,551	1955	183,111	1987	695,081
1891	42,385	1924	86,393	1956	191,413	1988	722,393
1892	40,002	1925	92,096	1957	202,740	1989	745,235
1893	41,837						

APPENDIX B

Adjustment of the estimates for changes in geographic boundaries

The estimates I have so far presented are adjusted to offset changes in geographic boundaries, and refer to Italy within its present frontiers. This is true of the Vitali estimates, and I have also assumed it to be true of the Fenoaltea estimates which I used as the basis for the 1861-1951 estimate.

Table 10 presents estimates for Italy within the boundaries of the years specified. In 1866, after the war with Austria, the Venetian territories became part of Italy, and after 1870 the Papal states were added. In 1919 South Tirol, the old Austrian Kustenland provinces and the port of Zara were acquired. Fiume was added in 1922. In 1945, Zara, Fiume and part of Venezia-Giulia were ceded to Yugoslavia. Until the settlement of 1954 Trieste was in dispute and under international occupation; thereafter the city and a strip of coast went to Italy and the hinterland to Yugoslavia. In 1947, Tenda and Briga were added to France.

TABLE 10

REVISED ESTIMATES OF GDP, POPULATION AND PER CAPITA GDP
(within boundaries of years cited)

	GDP Level (1985 million \$)	Resident Population (000s)	Per Capita GDP in 1985 \$
1861	25,775	22,154	1,163
1870	31,785	26,262	1,210
1890	41,736	30,866	1,352
1913	75,477	36,167	2,087
1929	102,116	41,076	2,486
1938	117,548	44,026	2,670

The figures for GDP in column 1 of table 10 were estimated by using the territorial adjustment coefficients (former/present territory for GDP in current market prices) which can be derived from ISTAT 1957, pp. 247-50 to the corresponding figures in column 2 of table 6. ISTAT 1957 is the only one of our sources which makes such a comparison, and it is not clear how the adjustment was made.

The midyear population figures in column 2 of table 10 are derived from table 10 of ISTAT 1976. Column 3 of table 10 is derived from columns 1 and 2.

REFERENCES

- D. BLADES, "The Hidden Economy and the National Accounts", in OECD, *Occasional Studies*, Paris, June 1982.
- A. CARRERAS, "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*, Alianza, Madrid, 1991.
- G. FEDERICO, S. FENOALTEA and V. ZAMAGNI, *Il valore aggiunto per settore nel 1911*, mimeographed, 1990.
- S. FENOALTEA, "Public Policy and Italian Industrial Development 1861-1913", Ph.D. thesis, Harvard University, September 1967.
- S. FENOALTEA, "The Growth of the Utilities Industries in Italy, 1861-1913", *Journal of Economic History*, September 1982.
- S. FENOALTEA, "Construction in Italy, 1861-1913", *Rivista di Storia Economica*, 4 (international issue), 1987.
- S. FENOALTEA, "The Extractive Industries in Italy, 1861-1913: General Methods and Specific Estimates", *Journal of Economic History*, Spring 1988(a).
- S. FENOALTEA, "The Growth of Italy's Silk Industry, 1861-1913: A Statistical Reconstruction", *Rivista di Storia Economica*, October 1988(b).
- G. FUÀ and Associates, *Lo sviluppo economico in Italia*, vol. III, Angeli, Milan, 1969.
- R. GOLINELLI and M. MONTERASTELLI, *Un metodo per la ricostruzione di serie storiche compatibili con la nuova contabilità nazionale (1951-1989)*, Prometeia, Bologna, 1990 (with accompanying data diskette).
- ISTAT, *Indagine statistica sullo sviluppo del reddito nazionale dell'Italia dal 1861 al 1956*, Annali di Statistica, Rome, 1957.
- ISTAT, *Sommario di statistiche economiche dell'Italia 1861-1975*, Rome, 1976.
- ISTAT, *Annuario di contabilità nazionale, Serie 1960-1985*, Rome, 1987(a).
- ISTAT, "Nota tecnica sulla revisione della contabilità nazionale", Appendix to *Relazione generale sulla situazione economica del paese*, Rome, 1987(b).
- ISTAT, *Conti economici nazionali, Anni 1980-86*, Collana d'Informazione, 1987, No. 3, Rome, 1987(c).
- ISTAT, *Conti economici nazionali 1970-1988*, Collana d'Informazione, Rome, 1989.
- A. MADDISON, "Measuring European Growth: The Core and the Periphery", in E. Aerts and N. Valerio eds., *Growth and Stagnation in the Mediterranean World*, Leuven, 1990.
- A. MADDISON, *Dynamic Forces in Capitalist Development*, Oxford University Press, 1991.
- V. SIESTO, "Statistiche macroeconomiche ed economia irregolare", *Economia Italiana*, January-April 1987.
- G. TONIOLO, *An Economic History of Liberal Italy 1850-1918*, Routledge, London, 1990.
- O. VITALI, *Aspetti dello sviluppo economico italiano alla luce della ricostruzione della popolazione attiva*, Istituto di Demografia, Rome, 1970.