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**RECONSTRUCTING ITALIAN LABOUR MARKET STATISTICS:
THE RATE OF UNEMPLOYMENT**

The purpose of this note is to provide consistent annual time series for the Italian employment and unemployment statistics throughout the 1951-96 period and to explain the procedure followed in this reconstruction. While ISTAT begun only in 1959 to carry out regular quarterly labour force surveys, annual labour force surveys had taken already place in 1952, 1954, 1955, 1956, 1957 (actually, *two* labour force surveys took place in that year) and 1958. These data have been utilised in order to reconstruct for the 1951-58 period employment and unemployment series comparable with those available after 1959. Moreover, in order to obtain consistent series, care was also taken of some methodological changes that have occurred in the 1959-96 period. In illustrating the reconstruction procedure, it is convenient to deal separately with the 1951-58 and the 1959-96 periods.

- *The 1951-58 Period.*

The series for employment and unemployment available before 1959 relate to male and female total employment and unemployment (the latter being divided in laid-off workers and in first-job seekers). These series are based on surveys sampled on September 1952, May 1954, May 1955, April 1956, May 1957, November 1957,

October 1958. Aside from minor changes in definition, the post-1959 series differ from the previous ones because:

- they are based on four quarterly labour force surveys (taking place in January, April, July and October),
- they include among the unemployed a share of the labour force that can be broadly defined as secondary-labour force unemployment,¹
- they offer rather different estimates of the number of first-job seekers.

Hence, there are four main problems in providing 1951-58 employment and unemployment series comparable with the post-1959 ones. First of all, a 1951-58 series for (male and female) secondary-labour force unemployment must be provided, consistently with the post-1959 definition of these aggregates. Second, estimates must be given for the missing years 1951 and 1953 (since the final aim of this reconstruction is to provide 1951-96 annual series). Two more problems must be faced in order to extract *annual* estimates from the pre-1959 available estimates. Allowance must be made for the seasonal component of these estimates (by definition absent in annual series), and with the fact that they are perforce more erratic than the post-1959 annual estimates (which are based on four-term averages of quarterly surveys).

It is convenient to describe first the procedure adopted in dealing with the seasonal component of the pre-1959 series. As recalled above, the post-1959 series are based on four quarterly labour force surveys taking place in January, April, July and October. On the other hand, the pre-1959 series are based on surveys taking place in April, May, September, October and November. From the methodological notes

¹ The Italian definition is *altre persone in cerca di lavoro*, and relates to those respondents to surveys that had denied to be looking for a job to a first (and direct) question and had subsequently revealed their true attitude through their responses to other (and less direct) questions. As will be made clearer below, direct

contained in ISTAT (1958) it is possible to deduce that seasonality in May was very close to that in April, and that seasonality in September was very close to that in October. On the other hand, mainly to keep the informational content of 1957 as close as possible to that of the other pre-1959 years, it was decided not to take into account the observations for November 1957. Then, seasonality from 1951 to 1958 was supposed by assumption to be equal to seasonality throughout 1959-63. The latter period was chosen because of its closeness with the pre-1959 period (there is *prima-facie* evidence of changing seasonality, especially for the unemployment series, over the 1959-96 period) and because the Italian labour market underwent profound structural changes after 1963.

The robust median-polish procedure suggested by Vitale (1992)² was adopted to estimate seasonality. In fact, over such a short time period, the danger that the estimates might be affected by outliers is particularly serious. The 1959-63 seasonal factors measured through this procedure were applied to the pre-1959 series for employment, laid-off workers and first-job seekers, obtaining deseasonalised values.

In order to make the definitions (and hence the values) of the pre-1959 aggregates consistent with those of the post-1959 ones, the methodological notes contained in ISTAT (1958), as well as in some pre-1959 issues of *Annuario di Statistiche del Lavoro* and of *Annuario Statistico Italiano* (ISTAT, various years), were compared with those relating to the post-1959 series (essentially from ISTAT, 1979). The results of this comparison can be summed up by the following considerations:

(a) residents temporarily employed abroad (*occupati temporaneamente all'estero*) had to be taken off the old employment series;

estimates for these series are only available from 1977 onwards. However, indirect estimates for the 1959-76 period have long been made available by ISTAT. See ISTAT (1979).

(b) employees below working age (that is employees between 10 and 13 years of age, *occupati non occasionali dai 10 ai 13 anni*) had to be taken off the old employment series;

(c) secondary-labour force employees above working age (that is from 14 years of age upwards) not permanently belonging to the labour force (*occupati occasionali non appartenenti alle forze di lavoro*) had to be added to the old employment series;

(d) laid-off workers with a temporary job (*disoccupati con attività lavorativa occasionale*) had to be added to the old employment series and taken off the old unemployment series.

Measures for the (a)-(c) items could be found in the above quoted sources, although more frequently for total (male plus female) series than for series disaggregated by gender. This, alongside with some considerations to be reported below, suggested that consistent series could only be obtained disregarding the disaggregation by gender.

As far as item (d) was concerned, no pre-1959 series could be found, making it necessary to use the following extrapolation procedure. The ratio of laid-off workers with a temporary job to total laid-off workers was calculated on the annual data for the 1959-63 period. Then, the median of this ratio, 5.55% (note that the relationship between male plus female aggregates was found to be more stable than those for series disaggregated by gender), was applied to the pre-1959 series for laid-off workers, yielding an estimate for pre-1959 item (d).

Still, a 1951-58 series for secondary-labour force unemployment had to be provided, and the 1951-58 series for first-job seekers had to be adjusted to the greatly

² See also Destefanis *et al.* (1995) for an application of this procedure.

different values available after 1959. In both cases, lack of data suggested to follow extrapolation procedures. As explained in ISTAT (1979), the 1959-76 values for this aggregate are indirect estimates calibrated on the actual values found after the 1977 methodological change. Hence, the simple procedure adopted for obtaining pre-1959 first-job seekers consistent with the following values was to calculate the median ratio between "pre-1977" and "post-1977" values for first-job seekers in the 1959-63 period (which was equal to 80.48%) and to apply it to the ("pre-1977") 1951-58 first-job seeker series. Similarly, secondary-labour force unemployment was found to be for the 1959-63 period a rather stable percentage of first-job seekers; then, the pre-1959 series was calculated applying the median 1959-63 ratio between these two aggregates (91,57%) to pre-1959 first-job seekers.

After having obtained these pre-1959 series for employment, laid-off workers, first-job seekers and secondary-labour force unemployed, estimates had to be provided for the missing years 1951 and 1953 (as the final aim of this reconstruction is to yield *annual* series for 1951-96). Here, advantage was taken of the trends present in the data, obtaining 1953 as the average of 1952 and 1954. Then, the 1952-53 growth rate was applied backwards to get the 1951 observation.

Finally, allowance had to be made for the fact that these data were perform more erratic than the post-1959 annual observations (based on four-term averages of quarterly surveys). Hence, a smoothing filter had to be chosen for these series. Essentially, this filter had to smooth once-in-a-year observations so as to make them as close as possible to (unknown) annual averages. The adopted solution was to assess the relationships among annual averages and linear combinations of contiguous once-in-a-year observations (Daniel- and Hanning filters) over the years immediately following 1958,

and to choose the filter that was closest to the annual averages. Given that four pre-1959 once-in-a-year observations out of six could be considered as April observations, the relationships between annual averages and linear combinations of contiguous April observations were assessed over the 1959-72 and 1959-66 periods (longer time spans than 1959-63 seemed to be more appropriate in this case). Experimentation with various alternatives showed that the following centred Hanning filter always gave the best results:

$$\frac{a(t+1) + 3a(t) + a(t-1)}{5}$$

where $a(t+1)$, $a(t)$ and $a(t-1)$ refer to the April observations of three contiguous years. Note that the correlation among annual averages and filtered April observations was always close to 0.99 for employment and laid-off workers, while being lower for first-job seekers (0.96 for 1959-72 and 0.75 for 1959-66).

These filtered series for employment, laid-off workers and first-job seekers (as well as the series for secondary-labour force unemployment that could be derived from the latter) were the ones that were actually utilised in calculating the rates of unemployment in the 1951-58 period.

- *The 1959-96 Period.*

In order to obtain consistent labour force data over 1959-96, care had to be taken of some methodological revisions that have occurred in this period. In carrying out this procedure the *a priori* choice was taken to make definitions and measures as consistent as possible with those reported in ISTAT (1979) and utilised in *Annuario di Statistiche del Lavoro* and *Bollettino Mensile di Statistica* (ISTAT, various years). The reasons for this choice are that these definitions and measures are relevant for the labour force

aggregates over a longer period (1959-85) than any other competing criteria. This point is strengthened by the consideration that these definitions and measures were (quite naturally) those to which the pre-1959 data were adjusted.

Given this premise, the work of producing consistent labour force data was much simpler than it had been for the pre-1959 data, and can be split in four steps:

(a) the data from 1972 to 1983 were multiplied for some adjustment coefficients available from ISTAT (see also *Annuario di Statistiche del Lavoro*, ISTAT, 1984) in order to make them compatible with the post-1984 data. In fact from that date onwards (until 1990), inference from the labour force surveys is based on the population data from the 1981 Census.

(b) in 1984 a change in the definition of unemployment occurs, aiming to include among the unemployed only those actively looking for a job (see ISTAT, 1987). As a consequence the number of laid-off workers, first-job seekers and secondary-labour force unemployed undergoes a reduction of 3-4%. Since data for 1984 and 1985 are available under both the old and the new definition, they were compared, finding that the relative and even more the absolute fall was almost the same in both years for all aggregates. As a consequence it was decided to adjust the data available from 1986 onwards by adding to them the mean 1984-85 absolute difference between old and new definition (12 000 units for laid-off workers, 33 000 units for first-job seekers and 42 000 units for secondary-labour force unemployed). This option seemed preferable to the alternative one of subtracting this difference to all unemployment aggregates previous to 1983.

(c) from 1991 onwards, labour force estimates are calculated from survey data using a different inferential procedure (see Di Pietro, 1993). As 1990 data obtained

through both the old and the new inferential method are reported by ISTAT, post-1990 data were divided by the splicing coefficients obtained by comparing the 1990 "old" and "new" data (1.0043 for employment, 1.0321 for laid-off workers, 1.0719 for first-job seekers and 1.0270 for secondary-labour force workers).

(d) finally, in 1992 labour force surveys experienced some rather major changes. First of all, from October 1992 a rather novel questionnaire is adopted in the surveys, implying a rather drastic change in the notion of unemployed person (which is now closer to the one used by EUROSTAT) as well as some other minor changes, foremost among which is the rise of working age from 14 to 15 years (see Di Pietro, 1993). Furthermore, from this date, inference from the labour force surveys begins to be based on the population data from the 1991 Census, revealing some previous overestimation of the labour force aggregates.

For the October 1992 survey, unemployment data are available from ISTAT both for the new and the old definition of unemployed person. For this quarter and for January 1993, employment and unemployment estimates based on the 1981 Census are also available from ISTAT. Then, inference from the labour force surveys begins to be based only upon the population data from the 1991 Census, and data consistent with the old criteria are no longer available. Mainly relying on the considerations made in Casavola (1994, Appendix) and in Banca d'Italia (1994, pp. 245-246), it was deemed that these methodological revisions were relevant for the levels rather than for the variations of labour force aggregates. Hence, given the existence of some data consistent both with the old and the new criteria, the following procedure was adopted in order to link the old and new series.

First of all, all aggregates were corrected for the overestimation previous to inference being based on the population data from the 1991 Census, using an adjustment coefficient calculated from ISTAT's October 1992 and January 1993 double releases. As data closer to the 1981 Census are less likely to be overestimated, this adjustment coefficient was assumed to move linearly from a value of 1 in October 1983 to a value of 0.9798 in October 1992 (see Casavola, Appendix, pp. 3-4, for a similar procedure). Then, splicing coefficients for the unemployment aggregates were obtained comparing the (corrected) old data for October 1992 with the new data for the same quarter.

- *The 1951-96 Annual Data.*

The 1951-96 consistent labour force series obtained through the above described procedures were utilised to compute the following two measures of labour slack (all annual series are reported in the Data Appendix):

UR = rate of unemployment. It is the ratio relating the total of unemployed workers (*persone in cerca di occupazione*) to the labour force (*forze di lavoro*).

IR = ratio of laid-off workers (*disoccupati in senso stretto*) over the sum of employment and laid-off workers. IR may be thought of as a *rate of insider unemployment*.

An attempt was also made to correct the labour slack measures for the number of workers covered by the temporary lay-off scheme known as *Cassa Integrazione Guadagni* (CIG). These workers are included by ISTAT among the employed, but it

seems more appropriate to consider them as unemployed. Estimates for the **number of CIG workers, NCIG**, have been obtained through the following formula (taken from Barbone *et al.*, 1981):

$$\text{NCIG} = \frac{\text{HCIG}}{\frac{\text{HND} + \text{HCIG}}{\text{ND}}}$$

where HCIG is the number of CIG hours in industry (INPS, various years), H is the number of workhours in industry and ND is the dependent employment in industry (from *Annuario di Statistiche del Lavoro* and *Bollettino Mensile di Statistica*, ISTAT, various years). As far as employment in construction is concerned, the data prior to 1978 have been linked with the rest of the series adopting the procedure suggested in ISTAT (1979). Since no data on workhours are available before 1959, estimates for the number of CIG workers cannot precede this year, and NCIG was made equal to zero by assumption. This rough-and-ready solution should not have serious consequences, as the resort to the CIG scheme in industry was almost negligible before 1963.

Finally, the 1951-96 consistent labour force data and the NCIG series were were utilised to compute the following two *corrected* measures of labour slack:

URC = rate of unemployment (adjusted for CIG workers). It is given by the ratio relating the total of unemployed workers (*persone in cerca di occupazione*) plus NCIG, to the labour force (*forze di lavoro*).

IRC = ratio of laid-off workers (*disoccupati in senso stretto*) plus NCIG, over the sum of employment and laid-off workers.

References

- Banca d'Italia (1994), *Relazione generale*.
- Barbone L., Bodo G., Visco I. (1981), Costi e profitti nell'industria in senso stretto, *Bollettino*, Banca d'Italia, pp. 465-510.
- Casavola P. (1994), *Occupazione e disoccupazione: è mutato il mercato del lavoro italiano?*, mimeo, Banca d'Italia.
- Destefanis S., La Rocca M., Vitale C. (1995), *Forecasting Train Ticket Sales with Linear Model-Based Approaches and with EDATS*, DP n. 21, Centro di Economia del Lavoro e di Politica Economica, Università di Salerno.
- Di Pietro E. (1993), La nuova indagine ISTAT sulle forze di lavoro, *Economia & Lavoro*, 27 (1), pp. 57-64.
- INPS (various years), *Bollettino Statistico Quadrimestrale*.
- ISTAT (1958), Alcuni principali risultati delle rilevazioni delle forze di lavoro negli anni 1954-1957, *Note e Relazioni*, n. 1.
- ISTAT (1979), Una metodologia di raccordo per le serie statistiche sulle forze di lavoro, *Note e Relazioni*, n. 56.
- ISTAT (1987), Rilevazioni delle forze di lavoro, *Collana di Informazioni*.
- ISTAT (various years), *Annuario di Statistiche del Lavoro*.
- ISTAT (various years), *Annuario Statistico Italiano*.
- ISTAT (various years), *Bollettino Mensile di Statistica*.
- Vitale C. (1992), *Analisi esplorativa delle serie storiche*, CUD, Cosenza.

Data Appendix

<i>Year</i>	Employment	Laid-off workers	First-job seekers	Secondary-labour force unemployed	Number of CIG workers
1951	18161.86	804.9348	800.0662	701.9545	0
1952	18390.04	824.8543	896.5372	786.5793	0
1953	18618.22	844.877	993.1154	871.3068	0
1954	18953.05	862.3196	1020.77	895.544	0
1955	19394.54	927.445	914.3307	802.1897	0
1956	19484.52	1076.067	909.8287	798.1844	0
1957	19872.99	1027.352	824.2911	723.1107	0
1958	20299.01	868.409	656.2172	575.7362	0
1959	20437.25	738.2095	494.4139	363.558	2.782
1960	20416.41	541.8525	384.5441	339.937	2.09425
1961	20515.59	426.2573	373.8251	355.342	1.671
1962	20424.7	336.4646	362.3022	313.235	1.26725
1963	20130.44	275.8287	302.0078	264.966	2.51075
1964	20051.85	321.7572	326.1256	295.5193	52.6485
1965	19585.11	479.6685	341.9361	335.0588	123
1966	19257.95	483.2808	399.8187	361.504	40.845
1967	19484.68	397.3585	405.1782	351.234	18.6615
1968	19467.1	370.0079	453.4137	401.3003	15.6307
1969	19291.6	313.7584	492.0021	407.4623	10.192
1970	19407.85	277.8929	481.2831	403.3543	12.7618
1971	19378.47	287.9559	466.0085	406.4353	61.5978
1972	19077.68	270.4102	608.8392	478.582	49.3903
1973	19267.75	255.9608	552.0285	554.58	29.9708
1974	19685.54	200.2274	523.0872	440.583	50.2793
1975	19800.53	252.8645	545.5971	484.744	156.563
1976	19943.64	262.1534	644.2119	580.255	110.568
1977	20148.77	216.741	739.611	655.226	99.5063
1978	20246.19	216.741	843.5853	578.201	135.308
1979	20464.37	231.1904	920.7621	619.281	110.993
1980	20763.4	217.7731	945.4158	606.957	132.528
1981	20840.73	221.9015	1060.109	709.657	271.97
1982	20766.66	290.0201	1239.116	631.605	310.738
1983	20793.28	363.2992	1384.895	636.74	375.413
1984	20647.25	491.6521	1249.691	765.5811	415.598
1985	20754.97	494.9064	1334.713	756.9187	351.663
1986	20822.65	526.3608	1416.161	874.4237	312.028
1987	20756.08	571.7608	1474.617	992.4084	252.115
1988	20855.29	558.2183	1517.982	994.0014	200.365
1989	20828.61	528.6762	1521.178	1010.504	158.408
1990	21078.2	487.8212	1371.206	940.9278	154.113
1991	21223.06	472.7971	1302.849	924.1973	189.46
1992	21044.15	552.3135	1375.865	901.4593	218.41
1993	20467	857.9281	1484.038	885.4387	267.835
1994	20120	999.0547	1547.534	965.7672	208.095
1995	20009	1019.361	1698.153	1040.619	135.198
1996	20088	1016.315	1777.892	1000.454	108.048

<i>Year</i>	UR	IR	URC	IRC
1951	0.1127	0.0424	0.1127	0.0424
1952	0.1200	0.0429	0.1200	0.0429
1953	0.1270	0.0434	0.1270	0.0434
1954	0.1279	0.0435	0.1279	0.0435
1955	0.1200	0.0456	0.1200	0.0456
1956	0.1250	0.0523	0.1250	0.0523
1957	0.1147	0.0492	0.1147	0.0492
1958	0.0938	0.0410	0.0938	0.0410
1959	0.0724	0.0349	0.0726	0.0350
1960	0.0584	0.0259	0.0585	0.0260
1961	0.0533	0.0204	0.0534	0.0204
1962	0.0472	0.0162	0.0473	0.0163
1963	0.0402	0.0135	0.0403	0.0136
1964	0.0449	0.0158	0.0474	0.0184
1965	0.0558	0.0239	0.0617	0.0300
1966	0.0607	0.0245	0.0627	0.0265
1967	0.0559	0.0200	0.0568	0.0209
1968	0.0592	0.0187	0.0599	0.0194
1969	0.0592	0.0160	0.0597	0.0165
1970	0.0565	0.0141	0.0571	0.0148
1971	0.0565	0.0146	0.0595	0.0178
1972	0.0664	0.0140	0.0689	0.0165
1973	0.0660	0.0131	0.0675	0.0146
1974	0.0558	0.0101	0.0582	0.0126
1975	0.0609	0.0126	0.0683	0.0204
1976	0.0694	0.0130	0.0745	0.0184
1977	0.0741	0.0106	0.0786	0.0155
1978	0.0749	0.0106	0.0811	0.0172
1979	0.0797	0.0112	0.0846	0.0165
1980	0.0786	0.0104	0.0844	0.0167
1981	0.0872	0.0105	0.0991	0.0234
1982	0.0942	0.0138	0.1078	0.0285
1983	0.1029	0.0172	0.1191	0.0349
1984	0.1083	0.0233	0.1262	0.0429
1985	0.1108	0.0233	0.1259	0.0398
1986	0.1192	0.0247	0.1324	0.0393
1987	0.1277	0.0268	0.1383	0.0386
1988	0.1283	0.0261	0.1367	0.0354
1989	0.1281	0.0248	0.1347	0.0322
1990	0.1173	0.0226	0.1237	0.0298
1991	0.1129	0.0218	0.1208	0.0305
1992	0.1185	0.0256	0.1277	0.0357
1993	0.1362	0.0402	0.1475	0.0528
1994	0.1486	0.0473	0.1574	0.0572
1995	0.1581	0.0485	0.1638	0.0549
1996	0.1589	0.0482	0.1634	0.0533