

Volume LXV N. 2
Aprile-Giugno 2011

Rivista Italiana di Economia Demografia e Statistica

2



SIEDS

SOCIETÀ ITALIANA DI
ECONOMIA
DEMOGRAFIA
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Organo della
Società italiana
di Economia Demografica
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Poste Italiane S.p.A.
Spedizione in abbonamento postale -70% DCB Roma

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RIVISTA ITALIANA DI ECONOMIA DEMOGRAFIA E STATISTICA



Volume pubblicato con il contributo dell'Istituto Nazionale di Statistica
e l'Istituto Banco di Napoli



VOLUME FUORI COMMERCIO – DISTRIBUITO GRATUITAMENTE AI SOCI

VOLUME LXV – N. 2



APRILE-GIUGNO 2011

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IN THIS ISSUE

This issue contains the guest papers of the XLVIII Scientific Meeting of the Italian Society of Economics, Demography and Statistics held in Rome on 26-28th May, 2011. The Meeting, entitled "150 Years of Statistics for the Territorial Development: 1861-2011", was organized jointly with the Italian National Institute of Statistics and "Sapienza" University of Rome for the 150th anniversary of Italian unity.

The Meeting was opened by Professor Giovanni Maria Giorgi who underlined the relevance of a renewed collaboration between Istat and SIEDS.

The issue first begins with a paper by Luigi Di Comite that focuses on the Italian transition from emigration to immigration country from 1880 to the present.

Jean-Guy Prévost investigates the specific contest and the confluence of particular independent events that made possible the great development of Italian Statistics in the interwar period.

The paper presented by Andrea Mancini shows several innovations planned for the Census 2011 in order to achieve important goals, such as improve timeliness and level of quality and costs reduction.

Elena Barcena-Martin and Jacques Silber, inspired by a Bonferroni's work on the measurement of income inequality, propose a segregation measure that takes into account the degree of feminization of each profession.

Conchita D'Ambrosio deals with the theme of Economic Insecurity and provides a survey of the contributions in social science literature that are devoted to defining and measuring it.

The work by Gianni Betti, Achille Lemmi, Giulio Tarditi and Vijay Verma develops an approximate procedure based on the decomposition of variances and design effects in order to improve the sampling precision for EU regions using the cumulation of data over rounds of regularly repeated national surveys.

Maria Grazia Pittau, Shlomo Yitzhaki and Roberto Zelli illustrate the potential use of an old/new methodology which combines the use of concentration curves for investigating the components that make up a regression coefficient and apply it for examining gender differences in the effect of age on labor market participation in Italy.

The work by Alessandra De Rose and Daniele Vignoli traces in broad terms the evolution over time of definitions, data sources, conceptual frameworks and strategies of analysis that document changes in family structures and behaviours from 1861 onwards.

The main object of the paper written by Carlo Filippucci, Mario Mazzocchi and Alessandro Viviani is to give a contribution to overcome the lack of studies on consumption structure dynamics analyzing changes in consumption behavior, composition and lifestyles of Italian households by looking at the expenditure levels and budget allocations over time.

The aim of the work by Elena Pirani and Silvana Schifini D'Andrea is to provide an overall picture of the life conditions – lifestyle – of Italians during the last 150 years, in terms of standard of living, habits, behavioral models, and life situations.

Paolo Dell'Olmo and Antonino Sgalambro focus on the concept of spatial equity in terms of the distribution of the negative outcomes of transportation activities with respect to the environment, the land and the related population. The goal of the paper is to summarize some modeling and architectural approaches underlying an integrated Advisory System oriented to the definition of local policies, analysis functions and solution design on this specific field.

Giovanni Palmeiro describes the Italian transition from an agricultural country of emigration to an industrialized country of immigration and the territorial imbalance between the Centre-North and the South of the country. He also deals with the privatization of banks and almost all public enterprises run by the Italian governments from 1990s.

Alessandro Rinaldi, Giacomo Giusti and Carlo Massaccesi, using census data, suggest a reconstruction of the economic history of Italy from 1861 to nowadays in terms of active population employed in macro-economic sectors and value added by province.

Claudio Ceccarelli
RIEDS Editor

INTRODUCTION TO THE XLVIII SCIENTIFIC MEETING OF THE ITALIAN SOCIETY OF ECONOMY, DEMOGRAPHY AND STATISTICS

Giovanni Maria Giorgi
SIEDS President

Three years ago, at the beginning of my term as President of the Italian Society of Economics, Demography and Statistics, the XLVI Scientific Meeting was held at the University of Florence, where our Society was founded by the will of eminent statisticians, economists and demographers, among them Livio Livi.

On that occasion I met Prof. Enrico Giovannini who, at that time, was the OECD Chief statistician. During the brief conversation we had I realized that he was willing to work without preconceptions on operational issues of interest both for academia and for Official Statistics. Today, our Scientific Meeting is a clear signal of collaboration between Istat and SIEDS.

It is as going back to origins. In fact, the first Scientific Meeting of our Society was held on 27-28th May 1939 at Istat and the inaugural address was by Prof. Franco Savorgnan – Istat President of those years and Corrado Gini successor at the top of the National Institute of Statistics – while the opening talk was by the Academician of Italy Rodolfo Benini and other lectures were by Felice Vinci, Livio Livi, Libero Lenti, Lanfranco Maroi, Mario De Vergottini and Silvio Vianelli.

The foundation for a renewed partnership between Istat and scientific societies has been recently pursued by Prof. Giovannini – who in the meantime became President of Istat – in the meeting held on 18th February 2008. Since that meeting a clear need for closer collaboration between scientific societies and the National Institute of Statistics emerged.

In order for this cooperation to take off, the scientific societies did not ask – as in the past – what Istat could do for them, but, above all, what they could do for Istat.

It is in this frame that our Scientific Meeting starts today and will continue over the next two days at the new Department of Statistical Sciences of "Sapienza" University.

For sealing a renewed cooperation many communications will be submitted, in the coming days, by Istat researchers in collaboration with university researchers on various topics concerning Demography, Statistics, Social and Economic Statistics.

Much water has passed under the bridge since the Scientific Meeting held 72 years ago. Many things have changed. In particular, the institution strongly supported and created at the University of Rome by Corrado Gini – the first President of Istat – does not exist anymore. I refer to the Faculty of Statistical Sciences that he founded in 1936 with the aim of pursuing his old project to link a good theoretical training to a solid applicative profile, in the belief that all public bodies should recruit statisticians able to assist them in their decisions. In this way he also thought to support the process of osmosis between academia and public administration and his presidency of Istat was a clear example. In that Faculty, that Corrado Gini also defended from the intrusions of Nazis and Fascists after 8th September 1943, he taught not only Statistics and other disciplines, but also the way statisticians would maintain their cultural and scientific independence. Generations of statisticians from the Faculty of Statistics populated not only Istat but also many other public and private bodies. Well, that Faculty does not exist anymore since 1st November 2010.

The renovation of the Italian university system has required this sacrifice that with many other colleagues I did not share, but the awareness of the need to manage change led me to think positive, trying to see a "new" horizon. "New" not in opposition to the "past", but as a synthesis of past and new knowledge for laying the foundations for a better future. I hope, I want to hope that this will be precisely the goal of the new Faculty of Information Engineering, Computer Science and Statistics, our Faculty of Statistical Sciences has been merged with.

Now, I wish to thank the President Prof. Enrico Giovannini for having allowed our Scientific Meeting to be part of the celebrations for 150 years of Italian unity, and that it took place at Istat.

I also thank all the speakers who, with their scientific contributions, help to make the point on many issues of great relevance both in Demography and in Economic and Social Statistics. Special thanks are for the foreign guests, who honour us with their presence and give our Society a more international visibility. I refer to Jean-Guy Prévost, Jacques Silber and Shlomo Yitzhaki. Jean-Guy Prévost is Professor at University of Quebec in Montreal and has recently written an excellent and original monograph on Statistics in Italy from early 20th Century to the end of the World War II. Jacques Silber is Professor of Economics at Bar-Ilan University and currently he is President-elect of the Society for the Study of Economic Inequality. Shlomo Yitzhaki is Government Statistician at the Bureau of Statistics of Israel and Professor Emeritus at the Hebrew University of Jerusalem.

I have strongly supported the presence of these leading scholars not only for the originality of their researches but also for the ties of their studies with the Italian statistical tradition. In particular Silber and Yitzhaki have developed, extended and interpreted from new point of views some of the most important results reached by

Italian statisticians and in particular by Corrado Gini. If it was possible to interview the latter today, I would like to ask him what scientists have most contributed to the development and diffusion of his researches. As far as I know Gini through his writings and stories of those who were his collaborators like Vittorio Castellano and Carlo Benedetti, I have no doubt that his answer would surely include Shlomo and Jacques.

This Scientific Meeting, which marks the beginning of a renewed - but never appeased - cooperation with the National Institute of Statistics wishes to be a stimulus to address studies on main socio-economic topics for our country.

Thus, recalling the spirit of the founding fathers of our Society and with the hope that the prospects for research in our country will improve in the near future, I declare open the XLVIII Scientific Meeting of the Italian Society of Economics, Demography and Statistics.

Rome, 26th May 2011.

FROM EMIGRATION TO IMMIGRATION: THE ITALIAN EXPERIENCE

Luigi Di Comite

1. Introduction

Over the 150 years from the Italian Kingdom unification to nowadays – as already done in a previous occasion (Di Comite L., 1981) – the main features of the Italian migratory reality can be summed up as follows:

- up to 1880, the above-mentioned phenomena had a small importance and most of all involved Northern Italy regions;
- from 1880 to the First World War, the migratory flows towards extra-European countries had an relevant role;
- between the 2 World Wars, there was a policy for a limited and selected migration;
- from 1945 to the beginning of the 70s, migrations towards the most economically advantaged European countries and domestic migrations had a relevant role, also for the internal re-distribution of the population;
- from the 70s, there has been a new assessment of the migratory phenomena and it is within this frame that Italy becomes an immigration country for the first time in its history.

The transition from the first stage – i.e. that of a strong emigration – to the current one, with a massive foreign presence, has occurred along a century, even if in different ways from region to region¹ and, at least from our point of view, the starting moment (the massive emigration occurred from 1880 and the outbreak of the First World War) and the last one (supposed to begin during the first years of the 80s) were the most relevant aspects of this process.

¹ This situation can be ascribed to the dualism which traditionally opposes Central Northern Italy to the South, not only in the economic field: in the migratory field, this dualism had its peak during the 50s and 60s of last century with the great migratory flows, which originated from the South to find a place above all in the regions of the so-called “industrial triangle”.

2. Population territorial mobility and the Italian experience

Within the framework of demographic orders presenting the coexistence of peoples with a different progression in the demographic transition processes, the migratory flows play a role among population territorial re-distribution, in the sense that – due also to the so-called “differential demographic pressure” – they generally move the population from areas with a moderate economic development and a strong demographic growth towards areas in demographic stagnation but with a remarkable development in the social-economic² field.

Over the years, the territorial orders of migrations have undergone different transformations so that:

- a) most of the countries with an ancient immigration tradition – for example USA, Canada, Australia, France and Germany – have maintained that role;
- b) emigration areas have remarkably widened, including some countries which had previously adopted, sometimes unconsciously, the so-called “policy of closed doors” (a near example is Albania since the 90s of last century);
- c) some countries have undergone a process of transition from emigration to immigration areas (an example: Italy, above all with its South, and Spain);
- d) some other countries have undergone, at least in part, an opposite process: for example, Argentina has changed from a traditional immigration country into an emigration country (above all transoceanic towards Spain and Italy) and at the same time into an immigration country, above all towards near Bolivia and Paraguay.

The Italian case, with all its specificities, places itself within this frame. As to population territorial mobility, manifold situations have interested Italy for the last 150 years, concerning both international migrations – as we will deal with it next on – and domestic migrations, topic that will be not considered in this particular occasion.

3. Italian emigration between the end of XIX and the beginning of XX century

After the territorial expansion of the Italian Kingdom was completed with the acquisition of Venice and it was pacified in the South with the end of the brigandage – alias, the Bourbon loyalist Resistance –, at the beginning of

² At an international level, it concerns the typical migratory flows originating from the so-called “developing countries” and going towards the so-called “developed countries”.

1880s, in the continental South there were the first signs of national demographic orders, with a remarkable heterogeneity, characterized above all by the beginning of the (unitary) process of demographic transition and by the constant widening of migration towards continental and transoceanic countries.

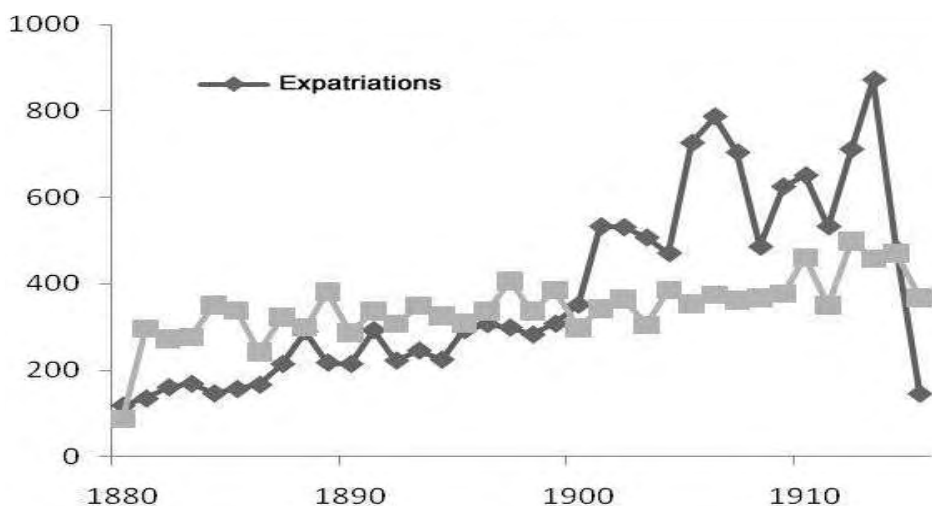
Table 1– *Expatriations according to big geographic areas of destination, 1880-1915.*

Years	European countries and Mediterranean Basin	America	Other countries	World
1880	86,643	33,080	178	119,901
1881	94,768	40,871	193	135,832
1882	101,736	59,695	131	161,562
1883	104,818	63,388	895	169,101
1884	90,698	55,467	852	147,017
1885	83,712	72,490	991	157,193
1886	84,952	82,166	711	167,829
1887	85,363	129,463	839	215,665
1888	86,036	204,264	436	290,736
1889	94,823	123,181	408	218,412
1890	102,295	113,027	532	215,854
1891	106,056	186,472	1,103	293,631
1892	109,421	113,807	439	223,667
1893	107,769	138,299	683	246,751
1894	113,425	111,459	439	225,323
1895	108,664	183,919	598	293,181
1896	113,235	192,998	1,249	307,482
1897	127,777	171,294	784	299,855
1898	147,803	135,193	719	283,715
1899	167,572	139,934	833	308,339
1900	186,279	165,627	876	352,782
1901	253,571	278,176	1,498	533,245
1902	246,855	282,586	2,068	531,509
1903	225,541	280,413	2,022	507,976
1904	218,825	249,574	2,792	471,191
1905	279,248	444,724	2,359	726,331
1906	276,042	509,348	2,587	787,977
1907	288,774	414,303	1,598	704,675
1908	248,101	237,405	1,168	486,674
1909	226,355	397,666	1,616	625,637
1910	248,696	400,852	1,927	651,475
1911	271,065	260,372	2,047	533,844
1912	308,140	399,713	3,593	711,446
1913	313,032	556,325	3,241	872,598
1914	245,938	230,765	2,449	479,152
1915	79,502	65,877	640	146,019

The migratory flow³, as it is clear from both Table 1 and Figure 1, starts quietly; at the beginning it concerns above all Northern regions as origin areas and Northern European countries as destination areas (and/or receiving areas) and it increasingly develops, almost reaching 900 thousand units in 1913, with a more and more prevailing influence of transoceanic destinations.

There is an important gap between the aggregate amount in expatriations and the net migratory loss – i.e. the balance between the number of immigrants and emigrants⁴ – because the migratory deficit, of about 4 million-units (see Table 2), is lower than the global amount of expatriations, which overcomes 13 million-units (see Table 4).

Figure 1 – *Expatriations and population natural balance (in thousands), Italy, 1880-1915.*



All this means that the amount of repatriations, with possible following expatriation, was high with reference also to transoceanic migrations, which totally (see Table 4) reached 8 million-units. Despite the difficulties of the transportation system of that period, the coming-and-going was recurrent and systematic also for long and very long distant displacements.

³ This exodus is considered in terms of expatriations, according to the data given by a statistical system, adequate to the needs of the time (cf.: Bonarini F., 1976).

⁴ The net migratory balance is quantifiable by the use of demographic census data and those about the amount of births and deaths.

Moreover, from Figure 1, presenting both expatriations data and population natural balance data, it is clear that emigration was less massive than later on; until 1899, the expatriation amount had never exceeded three hundred thousand units, apart in the last year of the considered period of time. Among them, there was a minimum of balance between Europe and America as destinations.

As to origin countries, from Table 2 it can be stated that until the end of XIX century, the flows had originated from Northern regions (first of all Veneto), while in the XX century the South prevailed; anyway, Basilicata had always been the region with the highest global migratory loss – both towards the rest of the world and in relative terms – with annual average rates higher than 11,0‰ both for XIX and XX century. Veneto region played the same role for Northern regions.

Table 2 – Migratory balances, 1881-1911.

Regions	Annual average balances			
	absolute		relative (in ‰)	
	1881-1901	1901-1911	1881-1901	1901-1911
Piemonte	-14,991	-15,096	-4.70	-4.48
Liguria	1,851	3,112	1.89	2.74
Lombardia	-11,237	-3,887	-2.83	-0.86
Veneto	-24,190	-19,553	-8.14	-5.88
Emilia-Romagna	-9,118	-9,144	-3.95	-3.57
Toscana	-5,949	-12,428	-2.51	-4.74
Marche	-4,608	-9,485	-4.62	-8.81
Umbria	-1,780	-5,265	-2.88	-7.78
Lazio	4,952	-1,955	4.76	-1.57
Abruzzo e Molise	-8,462	-16,304	-6.14	-11.35
Campania	-15,653	-16,128	-5.17	-4.99
Puglia	-856	-7,393	-0.49	-3.62
Basilicata	-5,989	-6,231	-11.81	-12.92
Calabria	-9,239	-13,434	-7.04	-9.69
Sicilia	-8,854	-20,119	-2.75	-5.59
Sardegna	-516	-3,457	-0.70	-4.21
Italy	-114,639	-156,767	-3.77	-4.67

Once again, the dualism between the North and the South of the country is more than evident. Thus, in the northern regions – with the exception of Liguria – systematically prevailed (see Table 4) the expatriation to Europe, while in the south of Italy there was a clear dominance of the Americas. Finally, it is clear that – in terms of transoceanic destinations – a predominant role was first played by

Argentina and later by the U.S. (see Table 3 and Fig 2)⁵, which together accounted during the twentieth century $\frac{3}{4}$ of the expatriation to America.

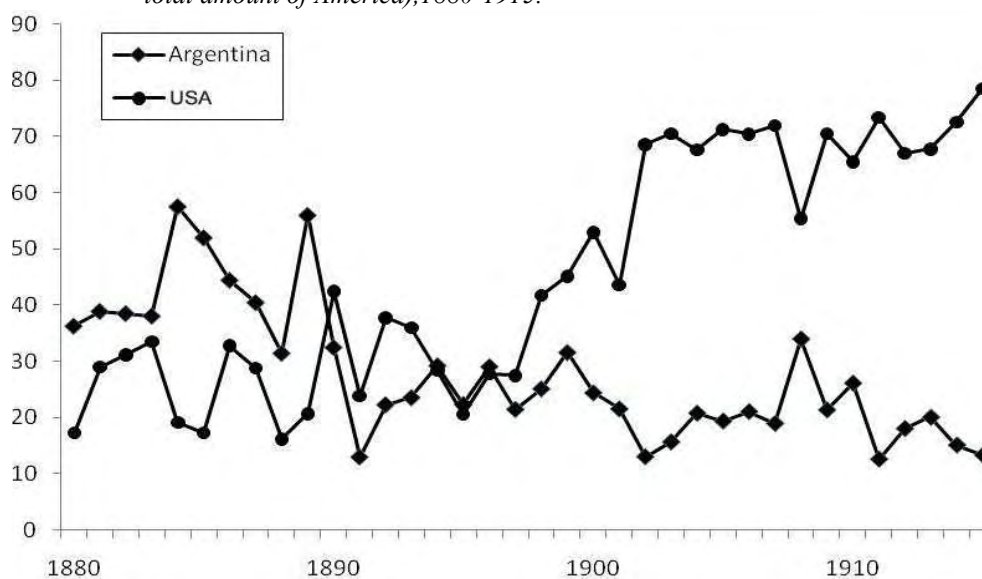
Table 3 – *Expatriation towards America by selected destination countries, 1880-1915.*

Years	Destination countries					America
	Argentina	Brazil	Canada	U.S.A.	Other countries	
1880	12,003	6,080	45	5,711	9,241	33,080
1881	15,899	6,766	26	11,842	6,338	40,871
1882	22,997	9,074	76	18,593	8,955	59,695
1883	24,127	7,590	81	21,256	10,334	63,388
1884	31,927	6,116	265	10,582	6,577	55,467
1885	37,710	12,311	611	12,485	9,373	72,490
1886	36,534	11,334	1,720	26,920	5,658	82,166
1887	52,383	31,445	1,632	37,221	6,782	129,463
1888	64,223	97,730	1,347	32,945	8,019	204,264
1889	69,008	16,953	447	25,434	11,339	123,181
1890	36,695	16,233	67	47,952	12,080	113,027
1891	24,125	108,414	163	44,359	9,411	186,472
1892	25,331	36,448	211	42,953	8,864	113,807
1893	32,541	45,324	382	49,765	10,287	138,299
1894	32,557	41,628	805	31,668	4,801	111,459
1895	41,029	98,090	783	37,851	6,166	183,919
1896	56,026	76,665	397	53,486	6,424	192,998
1897	36,712	80,984	139	47,000	6,459	171,294
1898	33,938	38,659	328	56,375	5,893	135,193
1899	44,168	26,574	1,021	63,156	5,015	139,934
1900	40,393	27,438	1,686	87,714	8,396	165,627
1901	59,881	82,159	3,497	121,139	11,500	278,176
1902	36,778	40,434	2,951	193,772	8,651	282,586
1903	43,915	27,707	2,528	197,855	8,408	280,413
1904	51,779	19,724	4,748	168,789	4,534	249,574
1905	86,158	30,079	5,930	316,797	5,760	444,724
1906	107,227	27,808	10,032	358,569	5,712	509,348
1907	78,493	21,298	10,436	298,124	5,952	414,303
1908	80,699	15,558	5,988	131,501	3,659	237,405
1909	84,949	19,263	8,786	280,351	4,317	397,666
1910	104,718	19,331	10,209	262,554	4,040	400,852
1911	32,719	22,287	9,094	191,087	5,185	260,372
1912	72,154	35,562	18,991	267,637	5,369	399,713
1913	111,500	31,952	30,699	376,776	5,398	556,325
1914	34,822	14,017	11,589	167,481	2,856	230,765
1915	8,762	3,604	761	51,720	1,030	65,877

⁵ As to our country, also Uruguay played a relatively important role: because of its very small dimension, the migratory flow Italy-Uruguay was considered small in terms of Italian emigration and remarkable in terms of Italian presence in Uruguay.

Overall, during the interval considered while studying migration, both domestic and international, have played in Italy an important role equilibrating the imbalances of growth determined by the heterogeneity of the regional processes of the demographic transition.

Figure 2 – *Expatriations towards Argentina and USA (percentage values compared to the total amount of America), 1880-1915.*



During the period considered the migratory phenomena, both domestic and international, have rebalanced the growth rate, influenced by the difference in the development of the demographic transition regional processes ⁶.

⁶ Make reference to a previous work (Di Comite L., 1980) as to the development of the demographic transition regional processes and the case of Piedmont and Liguria, presenting a French model of transition.

Table 4 – *Expatriations by origin countries and destination countries, 1880-1915.*

Regions	Destination			World
	Europe and Mediterranean countries	America	Other countries	
Piemonte	876,602	537,581	17,672	1,431,855
Liguria	40,011	163,024	3,269	206,304
Lombardia	830,633	420,762	18,743	1,270,138
Veneto	2,507,535	580,433	10,257	3,098,225
Emilia-Romagna	463,998	197,981	12,702	674,681
Toscana	444,722	271,047	19,374	735,143
Marche	126,665	259,703	2,577	388,945
Umbria	113,463	50,226	728	164,417
Lazio	29,654	172,122	3,006	204,782
Abruzzo e Molise	117,432	776,587	5,025	899,044
Campania	106,945	1,324,594	24,524	1,456,063
Puglia	57,046	311,714	12,332	381,092
Basilicata	19,280	353,891	2,088	375,259
Calabria	24,220	822,265	24,458	870,943
Sicilia	35,688	1,243,296	70,030	1,349,014
Sardegna	27,989	38,877	30,806	97,672
<i>South</i>	388,600	4,871,224	169,263	5,429,087
Italy	5,821,883	7,524,103	257,591	13,603,577

Table 5 – *Expatriations towards America by origin region and destination country, 1880-1951.*

Regions	Destination countries					America
	Argentina	Brazil	Canada	U.S.A.	Others	
Piemonte	319,071	39,805	5,353	150,209	23,143	537,581
Liguria	81,396	8,569	360	49,091	23,608	163,024
Lombardia	202,668	103,777	4,664	86,733	22,920	420,762
Veneto	106,469	357,762	23,190	85,089	7,923	580,433
Emilia-Romagna	45,784	59,318	843	84,510	7,526	197,981
Toscana	52,126	78,239	2,437	126,332	11,913	271,047
Marche	144,811	24,867	7,986	79,653	2,386	259,703
Umbria	5,545	11,754	496	31,617	814	50,226
Lazio	7,585	15,824	2,521	143,303	2,889	172,122
Abruzzo e Molise	110,445	92,212	31,290	534,352	8,288	776,587
Campania	139,983	162,269	23,930	938,417	59,995	1,324,594
Puglia	46,426	34,120	5,065	220,616	5,487	311,714
Basilicata	75,836	49,704	4,429	205,154	18,768	353,891
Calabria	224,124	124,680	26,450	426,839	20,172	822,265
Sicilia	184,474	43,644	8,812	975,428	30,938	1,243,296
Sardegna	18,137	6,095	645	12,077	1,923	38,877
<i>South</i>	799,425	512,724	100,621	3,312,883	145,571	4,871,224
Italy	1,764,880	1,212,639	148,471	4,149,420	248,693	7,524,103

4. Immigration in Italy between the end of XX century and the beginning of XXI century (alias, 100 years later)

One hundred years later, after the end of its (own national) process of demographic transition, Italy became an immigration country. At the end of the first decade of XXI century, the foreign presence exceeded 4 million-units (see Table 6).

Table 6 – Total amount of foreign presence and first twenty nationalities (in %) during the last three demographic censuses and at the beginning of 2010.

Countries	1981	Countries	1991	Countries	2001	Countries	2010
France	10.9	Morocco	11.2	Morocco	13.5	Romania	21.0
USA	8.8	Germany	6.4	Albania	13.0	Albania	11.0
Switzerland	8.2	Yugoslavia	4.8	Romania	5.6	Morocco	10.2
West Germany	7.0	Tunisia	4.7	Philippines	4.0	China	4.4
United Kingdom	5.3	France	4.4	Yugoslavia	3.7	Ukraine	4.1
Tunisia	3.9	Philippines	4.3	Tunisia	3.6	Philippines	2.9
Belgium	3.3	USA	4.2	China	3.5	India	2.5
Greece	2.9	United Kingdom	3.9	Germany	2.6	Poland	2.5
Yugoslavia	2.4	Senegal	3.0	Senegal	2.3	Moldova	2.5
Iran	1.9	Albania	3.0	Peru	2.2	Tunisia	2.4
Austria	1.8	Switzerland	2.9	France	2.2	Macedonia	2.2
Libya	1.6	Romania	2.7	Macedonia	2.1	Peru	2.1
Canada	1.6	Egypt	2.7	Egypt	2.0	Ecuador	2.0
Venezuela	1.6	China	2.1	Poland	2.0	Egypt	1.9
Argentina	1.5	Argentina	2.1	India	2.0	Sri Lanka	1.8
Netherlands	1.5	Spain	1.8	Sri Lanka	2.0	Bangladesh	1.7
Egypt	1.4	Brazil	1.7	Ghana	1.6	Senegal	1.7
Ethiopia	1.2	Ghana	1.7	U.K.	1.5	Pakistan	1.5
Japan	0.8	Poland	1.6	Croatia	1.4	Serbia	1.3
Philippines	0.7	Sri Lanka	1.3	Brazil	1.4	Nigeria	1.1
World	210,937		356,159		1,334,889		4,235,059

Along 30 years, there has been an upheaval in the migratory field; not only Italy has passed from two thousand foreigners in 1981 to more than 4 million at the beginning of 2010, but a different “ethnic picture” can be traced from the data in Table 6.

On the occasion of 1981 census, the first 5 nationalities all belonged to heap of the so called developed countries and Tunisia was at the 6th place; ten years later, Morocco and Tunisia were among the first five positions; in 2001 Morocco, Albania, Romania, Philippines, Yugoslavia, Tunisia and China were at the first 7 places and none of them was part of the developed countries; nowadays, none of

the developed countries is in the first 20 positions. During less than 30 years, a moderate foreign presence, the most part of which made up by people from the most developed European countries and USA, has changed: now, there is a strong presence of people originating from the South-North and East-West migratory flows, as it is evident from the data in Table 7.

Table 7– *Changes of the foreign presence in Italy between the late XX and early XXI century, 1994-2010.*

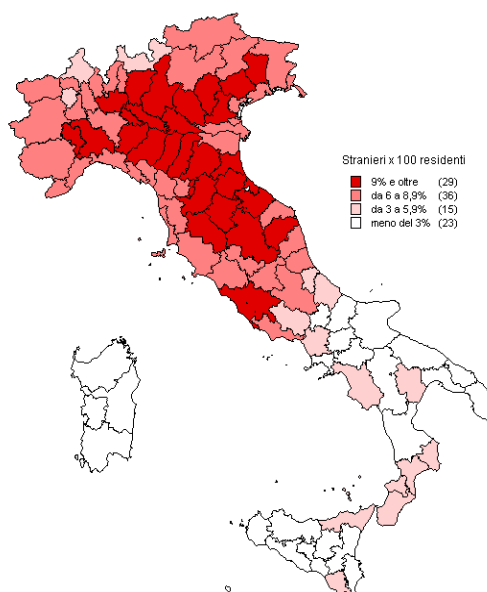
Years	List					First 5 (in %)	World
	1	2	3	4	5		
1994	Morocco 12.49	Serbia 5.99	Tunisia 5.67	Germany 4.69	Philippines 4.18	33.02	629,165
1995	Morocco 12.56	Serbia 6.43	Tunisia 5.45	Germany 4.53	Philippines 4.32	33.29	685,469
1996	Morocco 12.59	Serbia 6.62	Tunisia 5.24	Albania 4.50	Philippines 4.36	33.31	737,793
1997	Morocco 13.28	Albania 6.29	Serbia 5.59	Tunisia 4.99	Philippines 4.72	34.88	884,555
1998	Morocco 13.38	Albania 7.25	Serbia 5.02	Philippines 4.83	Tunisia 4.79	35.27	991,678
1999	Morocco 13.24	Albania 8.38	Philippines 5.31	Serbia 4.63	Tunisia 4.54	36.10	1,116,394
2001*	Morocco 13.49	Albania 12.96	Romania 5.61	Philippines 4.04	Yugoslavia 3.69	39.81	1,334,889
2002	Morocco 13.29	Albania 11.19	Philippines 4.93	Romania 4.25	Tunisia 4.13	37.79	1,464,589
2003	Albania 13.98	Morocco 13.90	Romania 6.13	China 4.49	Philippines 4.19	42.70	1,549,373
2004	Albania 13.59	Morocco 12.73	Romania 8.93	China 4.36	Philippines 3.64	43.25	1,990,159
2005	Albania 13.18	Morocco 12.28	Romania 10.36	China 4.65	Ukraine 3.89	44.36	2,402,157
2006	Albania 13.06	Morocco 11.97	Romania 11.14	China 4.79	Ukraine 4.01	44.97	2,670,514
2007	Albania 12.79	Morocco 11.68	Romania 11.64	China 4.93	Ukraine 4.09	45.13	2,938,922
2008	Romania 18.22	Albania 11.71	Morocco 10.66	China 4.56	Ukraine 3.87	49.01	3,432,651
2009	Romania 20.47	Albania 11.34	Morocco 10.37	China 4.38	Ukraine 3.96	50.52	3,891,295
2010	Romania 20.96	Albania 11.02	Morocco 10.19	China 4.45	Ukraine 4.11	50.73	4,235,059

*Census data

Particularly, from about fifteen years there has been a trend to a progressive expansion of the top five nationalities. In 1994 (Morocco, Serbia, Tunisia,

Germany and the Philippines) absorbed slightly more than 33.0% of the total. Currently, in 2010, over 50.0% of the total are represented by Romania, Albania, Morocco, China and Ukraine. What should be highlighted is the change of four nationalities over five, while the only remaining (Morocco) passed from first to third on the ranking.

Figure 3 – Incidence of foreign population at the beginning of 2010.



Analyzing the current situation appear, then, evident (Figure 3) the significant differences observed in terms of foreigners' territorial distribution throughout the country (from north to southern Italy): the higher incidence of the foreign presence is in fact observed on the north-central provinces of Italy, including Rome; meanwhile the lowest is observed on the southern provinces of mainland and islands. When considering the entire country, there is a considerable level of heterogeneity in immigration regarding the origins, the temporal rhythms of the arrivals and its distribution throughout the country. The process of their integration into the Italian society, although influenced by many factors related to specific ethnic issues – given that the propensity to integrate varies greatly when switching from one nationality to another – and territorial ones (Italian), is progressing fast enough, even in the presence of certain degree of rejection which is, generally, not very diffuse. In order to evaluate both the nature and the speed that characterize such a phenomenon, we consider data related to the acquisition of citizenship (see Table 8) and data related to the births of not Italian citizen mother's (see Table 9),

which allows us to develop an approach to the integration's degree of foreigners in the Italian society, albeit brief, as it does not take into account a variety of heterogeneous conditions.

Table 8 – *Acquisition of citizenship and foreign presence, 1994-2008.*

Years	Acquisition of citizenship (a)	Resident foreigners (b)	(b)/(a) * 100
1994	4,925	629,165	0.78
1995	6,002	685,469	0.88
1996	8,931	737,793	1.21
1997	11,633	884,555	1.32
1998	10,780	991,678	1.09
1999	13,648	1,116,394	1.22
2000	11,566	1,334,889	0.87
2001	10,575	1,464,589	0.72
2002	12,267	1,549,373	0.79
2003	17,205	1,990,159	0.86
2004	19,140	2,402,157	0.80
2005	28,659	2,670,514	1.07
2006	35,266	2,938,922	1.20
2007	45,485	3,432,651	1.33
2008	53,696	3,891,295	1.38

Table 9 – *Children of Italian and foreign mothers, 1996-2008.*

Years	Citizenship			(a)/(c)*100
	foreign (a)	Italian (b)	whole (c)	
1996	21,160	506,943	528,103	4.01
1997	22,927	511,534	534,461	4.28
1998	23,387	492,052	515,439	4.53
1999	29,134	508,108	537,242	5.42
2000	35,001	508,143	543,144	6.44
2001	38,451	496,831	535,282	7.18
2002	43,011	495,187	538,198	7.99
2003	46,221	497,842	544,063	8.50
2004	63,466	499,133	562,599	11.66
2005	67,694	486,328	554,022	12.22
2006	75,361	484,649	560,010	13.46
2007	82,461	481,472	563,933	14.62
2008	91,781	484,878	576,659	15.92

As shown in Table 8, in the course of fifteen years (from 1994 to 2008) the amount of citizenship acquisitions has experienced a notable increase, more than ten-folding itself, passing from just less than five thousand to over fifty-three thousand.

Figure 4 – *Impact of people under eighteen (in %) on the total amount of foreign population at the beginning of 2010.*

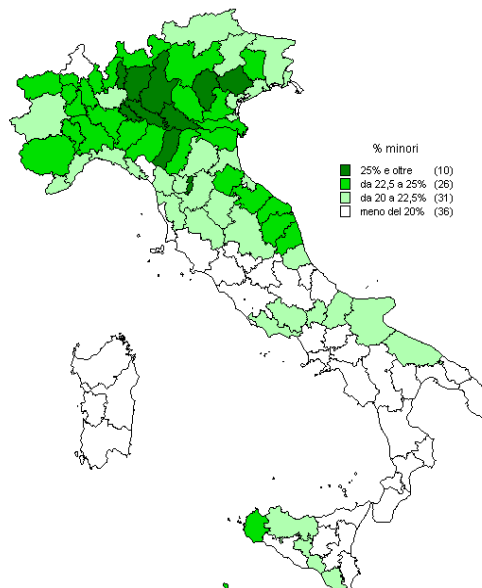


Figure 5 – *Impact (in %) of people born in Italy on the total amount of foreign population at the beginning of 2010.*

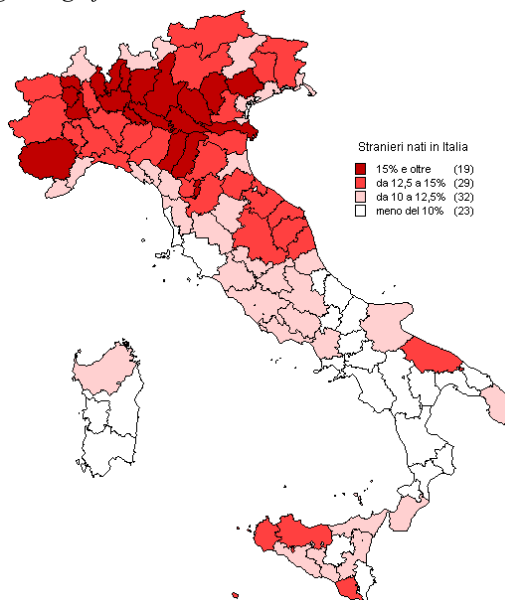
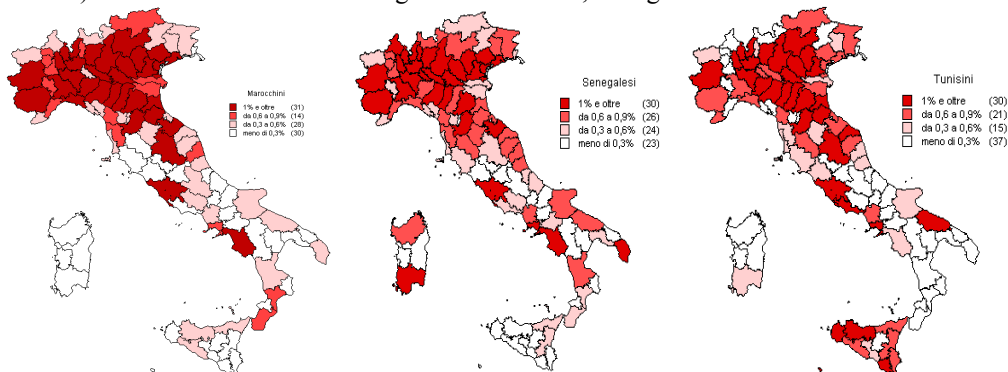
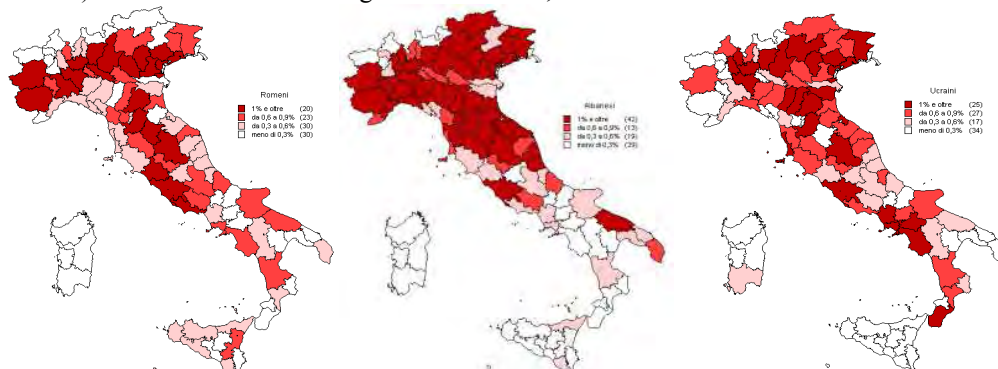
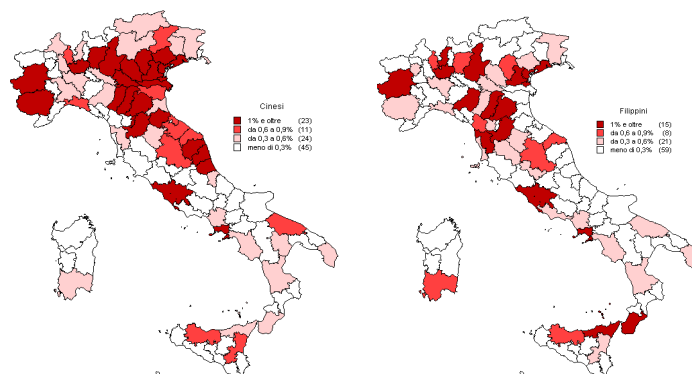


Figure 6 – Territorial distribution of some communities immigrated to Italy.**a) South-North ancient immigration: Morocco, Senegal and Tunisia****b) East-West recent immigration: Romania, Albania and Ukrainian****c) average period community: China and Philippines**

As for births, Table 9 and Figure 4 show very clearly the progressive root-process of the foreign population in the country.

In less than a decade the amount of foreign born mothers has risen steadily, so that today it accounts for nearly 16.0% of all births that took place in Italy in 2008: in other words, one out of each six newborns in Italy is born from a foreign mother. Even more spectacular is their incidence within the total foreign presence, which with ups and downs, grew from less than 0.90% (1994-95) to the recent more than 1.30% (2007-08) despite the significant and continuing expansion of foreign presence. Considering the last-mentioned and proceeding to the paradoxes we could question ourselves: "How many years may be needed before the foreign presence in Italy decreases when the further acquisitions of citizenship will be greater than the balance between new arrivals and withdrawals, due to return migration, deaths and emigration of foreign citizens to other countries?"

As a concluding remark is presented this brief analysis of the salient features of the foreign presence in Italy (Figure 6), where we considered data on three different "types" of immigration, namely: a) the stock of the oldest immigration, which was essentially a South-North migration; b) those of more recent immigration, which is primarily an east-west migration; c) and, finally, the medium term, which in this case would be the Chinese and Philippine.

For the South-North migration is not surprising that given their typically Mediterranean origin these immigrants – most of all, depending on the territorial proximity, as the Tunisians in Sicily – were also present in southern regions. All this, however, does not occur for the East-West migration and the medium term, which basically show quite different territorial distributions when passing from one nationality to another.

5. Conclusions

Along one hundred years – from the out-break of World War I to nowadays – the migratory framework of our country has changed: from a migratory deficit of 4 million-units (from 1881 to World War I) the situation turned into an increase (during 30 years) in the foreign presence just higher than the same number. Even if the numbers are the same, the balance turned from negative into positive.

Putting aside the heterogeneity of the situations causing the transition from emigration to immigration country, it is very remarkable to stress the multiethnic aspect of the communities now living in Italy. In a not far future, the problems of this situation will no longer interest integration but the coexistence of different and heterogeneous ethnic groups in the same areas.

Acknowledgements

As to the drafting and final version of this work, I have to thank: a) dr Stefania Girone, Department for the Study of the Mediterranean Societies (DSSM) – University of Bari; b) Dott. Raffaele Ferrara, National Institute of Statistics (Istat) – Rome; c) dr Giuseppe Lollo, doctorate student in “Economia della popolazione e dello sviluppo” at the DSSM – University of Bari; d) dr Luisa D’Aniello, University of Bari, who has supervised the translation.

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SUMMARY

This paper is a concise record of the Italian transition from emigration to immigration country in the period from 1880 to nowadays. Particular attention has been given to the starting moment – i.e. that of emigration – from 1880 to the out-break of World War I and the last one – i.e. that of immigration – when the population living in Italy has acquired multiethnic features and different religions, that could not even be imagined until less than 50 years ago.

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THE ITALIAN EXCEPTION: STATISTICIANS AND STATISTICS IN THE INTERWAR YEARS

Jean-Guy Prévost

1. Introduction

The history and development of Italian statistics during the first half of the twentieth century have been the object of much scholarly attention over the last two or three decades. At least three lines of inquiry may usefully be distinguished here. The first one belongs to what we may call the “internal” history of the discipline. In statistics as in other scientific domains, this kind of intellectual pursuit generally takes the present state of the discipline as its normative horizon, and the past is envisioned as a series of steps leading to it. The distinction between formalized models and empirical subject matters, as acknowledged by present-day statisticians, is for instance built in these narratives, of which Giovanni Maria Giorgi’s monograph on the Gini coefficient offers a remarkable example (Giorgi, 1992). Journals such as *Metron* and the meetings of bodies such as the *Società Italiana di Statistica* (SIS) are the main venues for this kind of contribution. The existence of such a genre, i.e. history as the rational reconstruction of the genesis and development of a set of concepts, techniques, and devices – a history of science by and for scientists –, testifies to the autonomy and maturity of a discipline. Yet, it obviously limits itself to a narrower definition of what corresponded once to a much more encompassing ambition. A second line of inquiry has focused on the history of institutions devoted to statistics understood as an activity dedicated to the collection and classification of numerical data for the purpose of government. Giuseppe Leti’s authoritative monograph on the *Istituto centrale di statistica* (ISTAT) and the *Consiglio Superiore di Statistica* (CSS) between 1926 and 1945 is of course the foremost example of this kind of “official” narrative, of which comparable instances can be found in other countries (Leti, 1996). Professional historians have also made significant contributions in this regard, generally with a more obviously interpretive streak (see, for instance: Marucco, 1996; D’Autilia and Melis, 2000). An interesting connection with the previous line of inquiry is provided by the fact that Leti, a first-rate statistician in his own right, has also documented the prehistory and history of the SIS, which he

chaired between 1980 and 1988 (Leti, 1989; Leti and Gastaldi, 1989). A third line of historical inquiry has concerned itself with the social and political dimensions of statistics, thereby insisting on the overall environment in which scientific and institutional developments have taken place. The late Anna Treves's monograph on demographic analysis and population policies during the twentieth century (2001) illustrates this trend, as does work done by Silvana Patriarca (1996), Giovanni Favero (2001) or Francesco Cassata (2006), respectively for the periods of the Risorgimento, Liberal Italy and the Fascist ventennio. Scientific autonomy, which appears obvious from the perspective of statistics as a present-day set of tools, becomes here an issue, in a context where statistics as a scientific discipline, statistics as an activity of the State, and statistics as a "culture of numeracy" providing an intellectual framework for the understanding and management of social and political problems had not yet been neatly disentangled.

The following paper seeks to go back to a period when all these things still "held together", more precisely to the interwar years, during which much effort was exerted in order to develop statistics as an architectonic body of theoretical and practical knowledge, under which three dimensions – (a) statistics as a set of formal, methodological and technical devices, (b) statistics as a numerical data-gathering activity, (c) statistics as a method, a model and a logic for social sciences – could be coherently pursued. The intent is to illustrate how this specifically Italian intellectual project (hence the *exception* of the title), for which conditions were not ripe before the Great War and which more or less rapidly faded away after World War II, became possible during the 1920s and the 1930s, in a very specific context, and at the confluence of particular independent events. The most emblematic embodiment of this architectonic ambition is surely provided by Corrado Gini, prolific inventor of indexes, coefficients and other ratios, first President of ISTAT under whose impulse Italian official statistics underwent their rebirth, and masterful academic entrepreneur extending his "tentacles" over many a domain of social science (Giorgi, 2011). Yet, it is important to observe that other statisticians shared such an ambition and that it structured the whole understanding of statistics in Italy at that time. It is also essential to understand that the intellectual and material conditions of possibility of this project cannot be ascribed to the "genius" of a single individual and must be connected to processes and relationships that far outreach such individual dispositions.

The concept of a "field", defined as a structured and multidimensional set of positions governed by specific criteria of legitimacy, provides a useful tool for the description and analysis of the interactions through which agents accumulate material and symbolic resources, seek to delimit a territory over which they can claim a monopoly of expertise, develop networks and alliances, both within and outside this territory (Bourdieu, 1997; Ringer, 1990). From the perspective of the

field, issues of content, theoretical or methodological, cannot be divorced from issues of power and prestige, since an object of the ongoing struggles within the field is that of imposing what counts as legitimate theory and methodology or, for that matter, as the definition and extent of statistics as a body of knowledge. Part II of this paper will provide a picture of how Italian statistics underwent a spectacular development as an academic or scientific pursuit during the 1920s and 1930s by relating it to an accumulation of “scientific capital” during the 1905-1915 decade and to the diffusion of an academic-entrepreneurial model that allowed for a new division of scientific labor. Part III will move on to statistics as an activity of the State, and examine how an another significant accumulation, this time of “bureaucratic capital”, on the part of the same group of individuals, could lead, in the peculiar context of the passage of Fascism to an outright authoritarian regime, to a remarkable reorganization of official statistics. One of the net results of these combined events and processes was an obvious consolidation of Italian statistics as a distinct and encompassing field, yet tainted with the stigmas of its troubled advent.

2. Materializing intellectual capital: statistics in the academy from the 1920s to the 1940s

In order to chart the institutionalization of Italian statistics as a scientific discipline, the year 1920 appears as a useful benchmark. With the creation of *Metron*, the first journal exclusively devoted to statistical methodology to be published in Italy, the science of statistics now had its own mouthpiece. And it was one of international stature, since it spoke not only in Italian, but also in English, German and French, in other words the main languages of modern science at that time. Before 1920, statistical literature, of a methodological and empirical character alike, had been dispersed in various outlets, the most important being the *Giornale degli economisti*. In 1911, to be sure, a segment – *e rivista di statistica* – had been added to its title, when Giorgio Mortara joined its board of directors. At the annual meetings of the *Società Italiana per il Progresso delle Scienze*, whose activities had restarted on a regular basis in 1907, statisticians also cast their lot with economists, in section 14. The launching of *Metron*, however, was not an isolated event, but the first in a series of editorial ventures that would result in a rich panorama of statistical periodical publications, as illustrated in Table 1.

Table 1 – Italian statistical periodicals, 1909-47.

Title	Editor (s)	First issue and location
<i>L'Italia Economica</i>	R. Bachi	1909 Roma
<i>Giornale degli Economisti e Rivista di Statistica</i> ¹	G. Mortara	1911
<i>Metron</i>	C. Gini	1920 Padua, Then Rome
<i>Prospettive Economiche</i>	G. Mortara	1921 Milan
<i>Economia</i>	L. Livi P. Luzzatto Fegiz	1923 Trieste
<i>Bollettino Dell'istituto Statistico-Economico</i>	L. Livi	1925 Trieste
<i>Contributi del Laboratorio di Statistica</i>	M. Boldrini	1926 Milan
<i>Indici del Movimento Economico Italiano</i>	C. Gini M. Saibante	1926 Padua, Then Rome
<i>Annali dell'Istituto di Statistica</i>	V. Castrilli	1927 Bari
<i>Il Barometro Economico Italiano, 1929</i>	G. Colombo L. Livi F. Vinci	1929 Florence
<i>Rivista Italiana di Statistica, 1929</i>	L. Amoroso A. De Stefani	1929 Bologna
<i>Annali di Statistica e di Economia</i>	F. Chessa	1933 Genoa
<i>Genus</i>	C. Gini N. Federici	1934 Rome
<i>Supplemento Statistico a Nuovi Problemi di Politica, Storia ed Economia</i>	G. Pietra P. Fortunati	1935 Padua And Ferrara
<i>Statistica</i> ²	P. Fortunati	1941 Bologna, Padua, Ferrara, Palermo
<i>Index</i>	L. Livi	1946 Florence
<i>Rivista Italiana di Demografia e Statistica</i>	L. Livi A. Niceforo L. Maroi	1947

This table calls for a number of remarks. First, it is obvious that, besides statistical methodology, the measurement of economic trends had become a

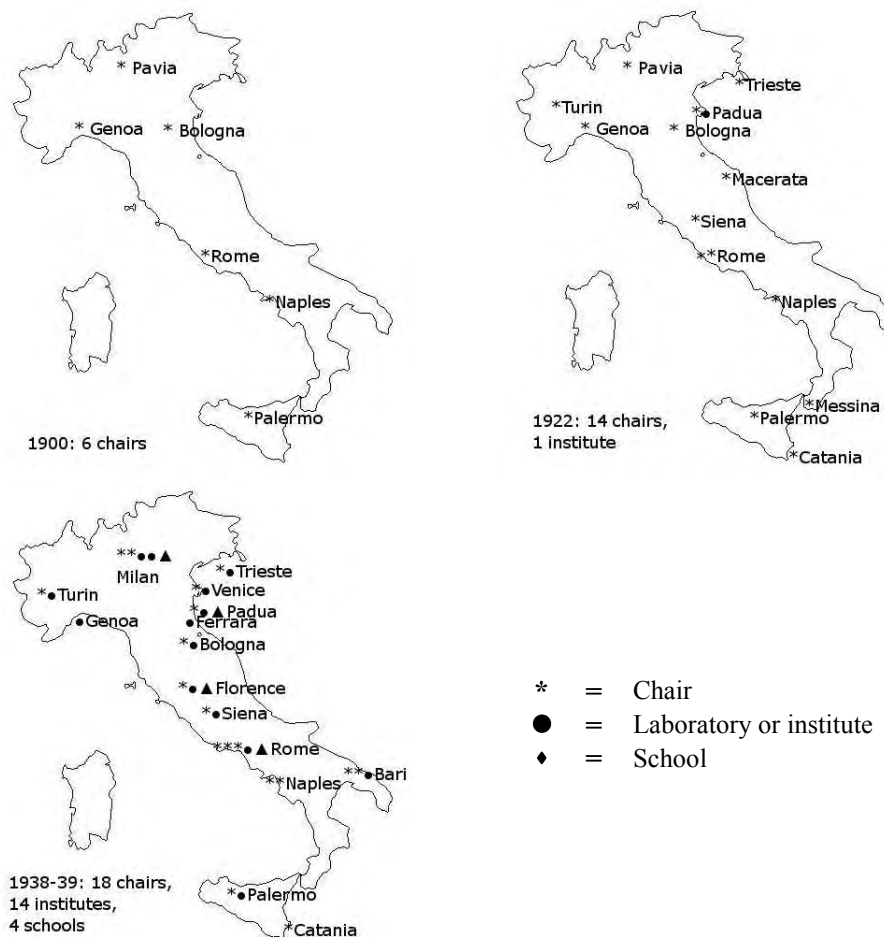
¹ The GDERS would become the *Giornale degli economisti e Annali di economia* in 1939.

² Succeeded the previous title to become an autonomous journal.

significant focus for statisticians, who were generally geared towards inductive inquiry rather than towards the deductive reasoning characteristic of Italian marginalists. Mortara's *Prospettive economiche, Indici del Movimento Economico Italiano* (which became *La Vita Economica Italiana* in 1931), *Il Barometro Economico Italiano*, notably, were basically compendiums of statistical data on production, trade and other dimensions of the economy. There surely was a degree of theoretical pluralism here: Vinci, Amoroso and de Stefani's *Rivista Italiana di Statistica* was much more committed to neo-classical mathematical economics, as the composition of its board and subsequent changes in its title indicate (it became the *Rivista italiana di statistica, economia e finanza* in 1932, and then the *Rivista italiana di scienze economiche* in 1934). The main point, however, is that, in the Italy of the 1920s and 1930s, a language rival to that of *bona fide* economists had emerged to describe and assess the state of the economy, and its users would invoke credentials that were independent of economics as a discipline.

A second observation is that most of these periodicals were tied not only to individuals, but also to structures such as institutes or schools of statistics. As Figure 1 shows, the academic – and not only editorial – panorama of Italian statistics had undergone a remarkable development during the same period. It is not so much the growth in the number of university chairs that is important here than that of laboratories or institutes, which go up from one in 1922 to fourteen in 1938-39. Whereas in the 19th and early 20th century, holding a chair in statistics was an individual undertaking, the laboratory – when of a consequent size, it generally became an institute – was a collective venture, that allowed for an effective division of scientific labor, took into account the labor-intensive character of empirical research, pooled together various resources (books, machines, etc.), and facilitated the search for external funding. The archetype was provided by the Turin *Laboratorio di economia politica*, created in 1893, whose model was reproduced by Corrado Gini, when he set up a *laboratorio di statistica* upon his nomination to the Cagliari chair of statistics in 1910. When Gini moved to the celebrated chair of Padua in 1914, he brought with him his laboratory model; in 1921, it became the Padua Institute of Statistics. From there, institutes began to sprout, in Trieste, Rome, Milan (which had two), Bari, Genoa, Palermo, Ferrara, and elsewhere. By 1938-39, the existence of a chair of statistics alone, i.e. without a more complex structure gathered around it, had become almost unthinkable.

Figure 1 – Chairs, laboratories, institutes and schools of statistics: 1900, 1922 and 1938.



A further development in the statistical field was the quasi-simultaneous creation in 1938-39, of the *Società Italiana di Demografia e statistica* and the *Società Italiana di statistica*, which would hold regular meetings and which also had their own editorial outlets. This was a significant institutional move towards autonomy (the *Società Italiana degli Economisti* would be created only in 1959) as well as a reflection of the strength of the groups respectively gathered around leading figures such as Corrado Gini and Livio Livi. At the same time, Mortara's dismissal from his academic positions following the enactment of racial laws led to the *Giornale degli economisti* returning completely to the fold of liberal economists (it became the *Giornale degli economisti e Annali di economia* under

the leadership of Giovanni Demaria, who thwarted an attempt by Alberto De Stefani and Felice Vinci to gain control over it and thereby “fascistize” it).

Table 2 – The birth of statistical methodology (1906-1915).

Topic	Author	Title	Year	
Probability	Gini	<i>Contributo alle applicazioni statistiche del calcolo delle probabilità</i>	1907	
		<i>Che cos'è la probabilità</i>	1908	
		<i>Sul concetto di probabilità</i>	1908	
		<i>Considerazioni sulle probabilità a posteriori</i>	1911	
Correlation	Bresciani	<i>Sui metodi per la misura della correlazione</i>	1909	
		<i>Sul significato logico del coefficiente di correlazione</i>	1914	
		<i>Sull'impiego del coefficiente di correlazione nella semiologia economica</i>	1914	
Law of small numbers	Gini	<i>La legge dei piccoli numeri</i>	1907	
		<i>La regolarità dei fenomeni rari</i>	1908	
Index numbers	Bresciani	<i>A proposito della 'Legge dei piccoli numeri'</i>	1908	
	Benini	<i>La semiologia economica a base statistica</i>	1909	
	Mortara	<i>Sintomi statistici delle condizioni economiche d'Italia</i>	1914	
Concentration	Gini	<i>Il diverso accrescimento delle classi sociali e la concentrazione della ricchezza</i>	1908	
		<i>Indici di concentrazione e di dipendenza</i>	1911	
		<i>Variabilità e mutabilità</i>	1912	
		<i>Sulla misura della concentrazione e della variabilità dei caratteri</i>	1914	
	Bresciani	<i>Di un indice misuratore della disuguaglianza</i>	1910	
	Mortara	<i>Metodi elementari per lo studio delle distribuzioni dei caratteri</i>	1910	
		<i>Note di economia induttiva – Sulla distribuzione dei redditi</i>	1911	
	General	Pietra	<i>Delle relazioni tra gli indici di variabilità</i>	1914-15
		Benini	<i>Principii di statistica metodologica</i>	1906
		Bresciani	<i>Sul carattere delle 'leggi statistiche'</i>	1910
<i>Il fondamento logico della statistica come scienza e come metodo</i>	1914			
Empirical applications	Gini	<i>Il sesso dal punto di vista statistico</i>	1908	
	Mortara	<i>Le popolazioni delle grandi città italiane</i>	1908	
	Gini	<i>L'ammontare e la composizione della ricchezza delle nazioni</i>	1912	

To understand how this remarkable institutional development was made possible, one has to go back to an earlier period, the 1906-1915 decade, which can be defined as that during which Italian statistics emerged as a modern scientific discipline. In the late 19th and very early 20th century, academic Italian statistics was still by and large a humanistic discipline, often couched in a classical literary form, and almost devoid of mathematical forms. Probability calculus, notably, did not fall within its purview, except in the most general terms. A clear junction between probability and statistics occurred only in 1906, with Rodolfo Benini's *Principii di metodologia statistica*. Then, over a span of a few years (1907-1911), Gini presented a series of path-breaking papers in which he developed a global and original theoretical understanding of the whole subject, as well as innovative empirical applications. In 1907-1908, an extended discussion of Bortkiewicz's "law of small numbers", that opposed Gini to the German statistician and to the latter's Italian pupil, Costantino Bresciani, exhibited a technical nature and a degree of esotericism that made it inaccessible to statisticians of the older mould. The Anglo-Saxon contributions of Karl Pearson and others were first disseminated in Italy during the same period, thanks notably to the efforts of Bresciani and Mortara. Pioneering work regarding the measurement of wealth and the elaboration of index numbers also occurred at that time. Finally, a series of thorough and systematic contributions by Gini established an area of statistics to which Italian statistics would devote much energy, that of the indexes of variability and concentration; this investment culminated in 1914 with the famous concentration ratio, which ensured to its author a lasting fame. Over a decade, a whole new subfield, statistical methodology, had emerged, which would give Italian statistics a distinctive and sound basis. Table 2 illustrates this outburst of creativity, by presenting a selection of papers evoked in this paragraph, arranged by topics.

The institutional development that characterized the Italian statistical field during the 1920s and 1930s can therefore be seen as the "materialization" or "conversion" of the outstanding intellectual capital earned throughout the 1906-1915 decade. A "revolution" in the content of statistics – it becoming more technical, more outwardly scientific – was matched, with a delay due to the war and its rocky aftermath, by an expansion of positions and resources available to agents engaged in its defense and illustration: more chairs, more journals, more structures in which the presence and image of the discipline could be strengthened. Despite the disruption of ordinary academic and scientific life it provoked, the war was not, however, as we shall see, lost time to Italian statisticians.

3. Realizing bureaucratic capital: the reorganization of official statistics from 1926

In Italy as in many other belligerent countries, the Great War was an experience of “total” mobilization: besides conscription, this meant putting all resources, economic and industrial, in the service of the war effort. This could be done only, at least in the view of those who were not outright “liberists”, by introducing a significant degree of command into economic activity and setting up a set of powerful ad hoc “parallel administrative bodies” (Melis, 1988). The most important of these was the *Sottosegretariato per le Armi e Munizioni*, headed by General Alfredo Dallolio, and entrusted with coordinating all relevant industrial activity. From the start, members of the new generation of statisticians would be involved in work that put their specific skills to use.

Among the bodies that would benefit from their expertise were: the Army’s Supreme Command, where Mortara acted as chief statistician and established the procedures for correctly assessing military losses; the Ministry of War, where Gini was put in charge of the Bureau of health statistics and of defining the norms for all relevant inquiries; the *Sottosegretariato per le Armi e Munizioni*, with Gini as chief of its statistical bureau and conducting inquiries on a variety of topics ranging from infant mortality during the war to the value of cattle; *Provital*, the office in charge with buying and distributing commercial and food supplies, with Gaetano Pietra as the head of two of its subsections; the Interallied Scientific Food Commission, where Gini, Pietra, Livi, Vinci, and Marcello Boldrini were active in elaborating and defending scientifically-couched arguments in support of Italy’s position with regard to sharing food supplies among allies; the *Ufficio Storiografico della Mobilitazione*, whose purposes of documenting various aspects of the war effort were somewhat more ideological, and where Gini again was active, together with Gaetano Zingali. This involvement in public affairs continued on the aftermath of the war, when the same group were busy participating as experts in various inquiry commissions (on postwar problems [Gini, Benini, and Lanfranco Maroi: 1918-1919]; on the taxation of patrimonies [Benini and Gini: 1919]; on fiscal reform [the same: 1920-1921]; on the settlement of the Austrian public debt [Franco Savorgnan: 1921]; on industry [Gini and Mortara: 1922]; on the problems of great banks [Mortara: 1922]) and delegations to international conferences (on the Peace Treaty [Bresciani, 1919]; on war reparations [Bresciani, 1920]; on international finance and trade [Pietra, 1919]; on labor [Benini, 1921]; on raw materials [Gini, 1922]). The most significant of these was probably the Italian delegation for the settlement of the war debt to the United States, for which Gini acted as chief of experts, and, besides putting up his own analytical contributions, coordinated work done notably by Pietra, Savorgnan, Mortara, Livi, Benini, Maroi, Boldrini, Zingali,

and others. The documents this group produced obviously had a significant impact on the course of negotiations that led to a remarkably favorable agreement and, at a critical juncture, provided the new Fascist government with an undeniable foreign policy success.

From the perspective of statistics as a field, we can describe the 1915-1925 decade as one of “primitive accumulation of bureaucratic capital” on the part of “young” statisticians whose presence had been largely confined to the academy during the previous decade. After establishing their scientific credentials through theoretical and methodological debates, they were suddenly summoned to put their intellectual and technical skills to practical use. In terms of consolidating Italian statistics not only as a scientific and academic discipline but also as a kind of knowledge relevant to the art of government, the war and postwar experiences of statisticians were paramount in a number of ways. First, working together in the various war and postwar bodies, commissions and delegations meant establishing closer links between statisticians, on the one hand, and the political and bureaucratic elites intent on modernization, on the other. Besides, against the depressing example of the Central Bureau of Statistics, the wartime model of ad hoc parallel administrative bodies offered a kind of blueprint for statistical reorganization: a culture of administrative command based on the values of “efficiency and productivity” rather than on the traditional strictures of “legality and form” (Melis, 1988). Thirdly, war and postwar statistical pursuits played a role in rallying its practitioners around a loose yet coherent ideological outlook. As can be expected in the context, nationalism was the core content here. From Mortara’s comparative work on Allied military losses, which may be viewed as the statistical version of Italy’s complaint of a “mutilated victory”, to Savorgnan’s and Francesco Coletti’s pamphlet’s on the country’s territorial claims, and to Gini’s League of Nations’ controversial report on raw materials, Italian statisticians were indeed active in supplying the nationalist camp with numbers and elaborate arguments. Finally, the war and postwar experience also showed that statistics did matter, on a symbolic level (the “mutilated victory”) as well as in a reality (the debt settlements). The new generation of statisticians were thus uniquely positioned when reorganization of official statistics became the order of the day.

What characterized the relations between academic and official statistics during the period that starts off with the creation of ISTAT in 1926, as compared to the so-called “golden age” of Luigi Bodio’s *Statistica Generale del Regno*, is precisely the closing of a gap between two cultures. During the last third of the 19th century, “the academic dignity of statistics had asserted itself (...) against a *practical* conception of statistics” (Favero, 2001, 80). And, conversely, Bodio, who considered that most of these *statistici della cattedra* had insufficient mathematical or technical competence, preferred filling the ranks of his office with graduates

from engineering, business or technical schools (Marucco, 1996, 213). The *Consiglio Superiore di Statistica* (CSS), which was supposedly the meeting point between those two groups and on which a number of professors of statistics were present, practically ceased all activity and meetings between 1884 and 1912, a period of nearly three decades. The new structure that was set up in 1926 changed all that. The composition of the CSS as defined by the 1926 law insured a strong presence of university professors, five out of eleven – and, from 1929 on, eight out of fourteen.

Table 3 – *Members of the CSS with academic connections (1926-1943).*

Names	Length of tenure
Luigi Amoroso	1926-1943
Rodolfo Benini	1926-1943
Marcello Boldrini	1929-1943
Francesco Coletti	1926-1940
Alberto De Stefani	1939-1943
Corrado Gini	1926- 1932 (president)
Livio Livi	1926-1929/1931-1943
Alfredo Niceforo	1929-1943
Gaetano Pietra	1929-1943
Franco Savorgnan	1926-1932/1932-1943 (president)
Arrigo Serpieri	1926-1943
Pietro Sitta	1926-1943
Felice Vinci	1939-1943
Gaetano Zingali	1929-1943

Some of these people were nominated to the council not only because of their academic credentials. This was the case of Amoroso, who, being much involved as an administrator in the insurance industry, sat as a representative of parastatal agencies from 1929 on (Sitta followed the inverse path). Serpieri and De Stefani both held university chairs, but had been directly involved in political activity, as, respectively, undersecretary of state and member of the Fascist Grand Council: both were also in the CSS as representatives of parastatal bodies. Together, all these professors combined a degree of competence that allowed them to far outweigh other members who came from public administration and whose presence on the council was far less stable. These academic statisticians, and a host of others who were not members of the CSS, were much active in the various ad hoc study

commissions that were set up to examine specific issues (thirty-five of them were active during the year 1929)³.

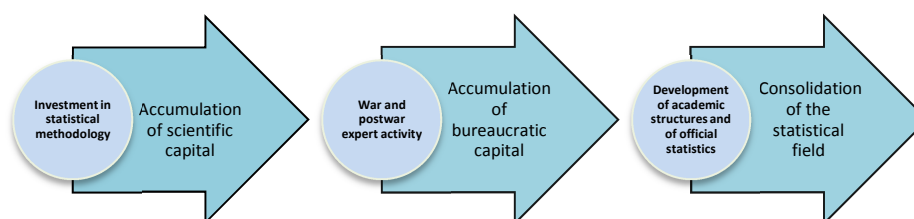
More importantly perhaps, the new position of President of the CSS was quite different from what it had been under the previous structure. Up to 1926, the presidency of the CSS was no more than an honorary chairmanship, with real power resting in the hands of the director general of state statistics, as was the case with Benini and Alessandro Aschieri in the early 1920s. In 1926, it was decided – first in practice, before it was spelled out in the 1929 law – to concentrate the effective overall scientific guidance of the statistical bureau as well as that of the advisory body under the authority of a single individual while entrusting the day-to-day administrative duties to a director general with a more narrowly defined mandate was defined. This ran against the established principle of non-concurrent holding of civil service positions (professors being civil servants), but it somewhat removed any obstacle for a complete circulation of various forms of “capital” across the statistical field. Gini was of course the main individual beneficiary of this situation, since he was allowed to keep all his academic positions and thus combine scientific credit and bureaucratic power without any hindrance. At the overall level, the strong presence of academics in the CSS also meant the possibility of transferring resources back and forth, for the benefit of “promoting statistical studies and the dissemination of statistical culture” (Leti, 1996, 249): thus, statistical schools were set up to train all those considering a career in public statistical service; personnel already at ISTAT were enjoined to attend courses at the Faculty of statistics; prizes and grants, often by parastatal or private bodies represented in the CSS, were offered to students completing statistical degrees. And, reciprocally, groundbreaking methodological studies – such as that by Gini and Luigi Galvani on purposive sampling or that of Gini and De Finetti on population forecasting – were conducted within ISTAT, thereby rising the scientific profile of official statistics.

³ In 1929, all academic members of the CSS were present in at least one of these thirty-five study commissions (with Livi in sixteen of them, Benini in eleven, and Amoroso in seven). Among members of these study commissions who were not members of the CSS, we may mention: Riccardo Bachi, Giorgio Mortara, Francesco Paolo Cantelli, Paolo Medolaghi, Lanfranco Maroi, Costantino Bresciani Turrone.

4. Conclusion

Italian statistics has undergone a spectacular development during the first half of the 20th century. Absent as a scientific discipline at the turn of the century – it was largely an intellectual-*cum*-political pursuit until then –, it had become an extended and ramified field on the eve of World War II. Throughout the 1920s and 1930s, the Italian statistical field existed as an extended space filled with a variety of intellectual constructs (from means, index numbers, coefficients, and other technical devices to wide-ranging theories about empirical subject-matters such as fertility, raw materials or social change) and institutional positions (from journals, learned societies, university chairs, and statistical institutes to ISTAT or the statistical research units of organizations such as Confindustria or the Bank of Italy). The process through which this has occurred is summarized in the following figure.

Figure 2 – *Development of the Italian statistical field*



Interestingly enough, as we have seen, we can pin a clearly demarcated chronology on this development. A very significant investment in statistical methodology was made during the 1905-1915 decade. This accumulation of scientific capital on the part of an essentially new generation of statisticians led to their being entrusted with a number of administrative-scientific tasks during the war and immediate postwar years (1915-1925). In the 1920s, the combined accumulation of scientific and bureaucratic capital favored an overall consolidation and expansion of the statistical field, with the creation of ISTAT (1926) and the concomitant flourishing of scientific bodies and journals (1920 - ...). Statistics now stood as an autonomous discipline, endowed with prestige, a network of institutions and material resources.

A final remark needs to be made. Given the authoritarian/totalitarian character of Italy's regime during the 1920s and 1930s, the issue of scientific and professional autonomy, in the academy as well as in government statistics, cannot

be avoided. Significant research has been produced in this regard, dealing for instance with ISTAT (D'Autilia, 1992; Leti, 1996) or with population policy (Ipsen, 1996; Treves, 2001), yet final judgment demands further investigation and it will obviously be qualified. From the perspective of Italian statistics as a field, the situation of statisticians has been prosperous overall and may be described, using Solingen's typology, as one of "happy convergence" (1994). Politically, most of them held nationalist positions, and indeed put their talent and skills in the service of nationalist causes, which meant convergence with a significant dimension of the Fascist regime's outlook. They had also proven through war and postwar service that the knowledge and tools they had developed could be of practical use for any regime. And, with the conjunction of a decaying statistical system and of the advent of a government intent on renovating the State through authoritarian intervention, there was a remarkable occasion for enlarging the opportunities available to this small group of scientists. This required ideological conformity and adaptation to the regime's turns. But it does not mean that the work done by statisticians was purely "instrumentalized" in the service of the regime: it seems indeed that a general distinction can be maintained between, on the one hand, methodological devices and empirical research, and, on the other hand, the social-philosophical or ideological constructions the same individuals elaborated (De Sandre and Favero, 2003). This attitude of statisticians as a group – which of course allows for variation among individuals – may in this regard be usefully contrasted with that of political economists, who were always a more diverse crowd, many of them much more uneasy with the regime's political and economic orientations. And when the regime collapsed, it was the latter – not the statisticians – who would emerge after World War II as the new social-scientific elite, delivering what would become known as the Italian "economic miracle".

Acknowledgments

An earlier version of this paper was presented at the 2011 Annual meeting of the Società Italiana di Economia Demografia e Statistica. The author would like to thank Giovanni Maria Giorgi for his useful comments.

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SUMMARY

This paper seeks to understand how interwar Italian statistics developed as an architectonic body of theoretical and practical knowledge, under which three dimensions – (a) statistics as a set of formal, methodological and technical devices, (b) statistics as a numerical data-gathering activity, (c) statistics as a method, a model and a logic for social sciences – could be coherently pursued. The intent is to illustrate how this specifically Italian intellectual project (hence the *exception* of the title), for which conditions were not ripe before the Great War and which more or less rapidly faded away after World War II, became possible during the 1920s and the 1930s, in a very specific context, and at the confluence of particular independent events, namely a significant investment in statistical methodology and a thorough involvement, on the part of statisticians, in war and postwar expert duties.

LATEST INNOVATION OF ITALIAN POPULATION CENSUS

Andrea Mancini

1. Introduction

Several innovations have planned for the next Census aiming to achieve the following important goals:

- improvement of the consistency between demographic information coming from population registers and Census at municipal level, in view of intercensal statistics production;
- improvement of timeliness in order to comply with Eurostat data dissemination date (March, 31, 2014);
- reduce of response burden for both private and institutional households.

The most important innovation is the evolution from the traditional Census to one assisted by local population registers (LAC) updated to December, 31st of 2010. Essential tools for these improvements are archives of addresses which have to be constantly updated, computationally manageable, standardized and flexible enough to be shared with other administrative sources. Moreover a sub-municipal territorial partition, less fine than enumeration areas, was considered in order to produce sample estimates not only for Census purposes but also during intercensal period.

The use of population registers instead of the classical *door to door* enumeration led to the adoption of different survey techniques such as mail-out of census questionnaires, web and mail-back data collection. These instruments, together with data collection points set on the municipal territory, can reduce the amount of field work required to enumerators and allow them to concentrate their efforts on remind of non-respondents and search and contact of usual residents which are still not included into population registers.

People living in dwelling different from their official address (i.e. the address recorded into the local population register) are in fact a fairly elusive sub-populations, possibly causing a severe downward bias of census counts (undercoverage), and for this reason have to be properly handled. The method adopted in order to control undercoverage in census consists in a multiple way

approach based on signals coming from the following sources and to be used by enumerators:

- LIFA (*Liste Integrative da Fonti Ausiliarie*) entailing information coming from 'permits to stay' for foreigners, fiscal register and other archives for economic purposes¹;
- LIAC (*Liste Integrative Ausiliarie Comunali*) including information on enrollments and cancelations to population registers between January, 1st and October, 8th of 2011;
- RNC (*Rilevazione dei Numeri Civici*) consisting in a set of indicators on dwellings possibly inhabited by usual residents still not enrolled in the local population register.

In the next paragraphs the most important features of the new census set up is going to be described.

2. Collection and treatment of population registers

One of the most important innovations of the Italian Census is based on the use of population registers. In order to simplify their capture from 8094 Italian municipalities Istat carried out an "Experimental survey on the municipal population registers - 2010", involving a sample of 1850 municipalities designed so to maximize the probability of observing procedural and substantive errors, reducing in this way the risk to come across not previously observed errors during the acquisition of registers at Census.

Thanks to the experimental survey it was possible to obtain a wealth of information crucial in order to improve as much as possible many aspects of the early phases of the next census round. More than 93% of the whole sample municipalities joined the trial by sending their registers via the web application STARLAC (System of Transmission, Acquisition and Report of LAC), and summing up a total of 31,079,573 individual records.

The trial evidenced the sustainability of the process by municipalities, regarding the provision of data with the requested track record. All the key variables needed to mail out census forms to households substantially met the required accuracy as well as the identification variables necessary so to maintain the relationship among records (i.e. people belonging to the same households). On the basis of the experience learnt through the experimental data collection, the procedure has been successfully refined.

¹ Casellario dei Pensionati, Registro dei lavoratori autonomi, Archivio dei lavoratori dipendenti, Anagrafe degli studenti, Archivio statistico delle imprese attive, etc.

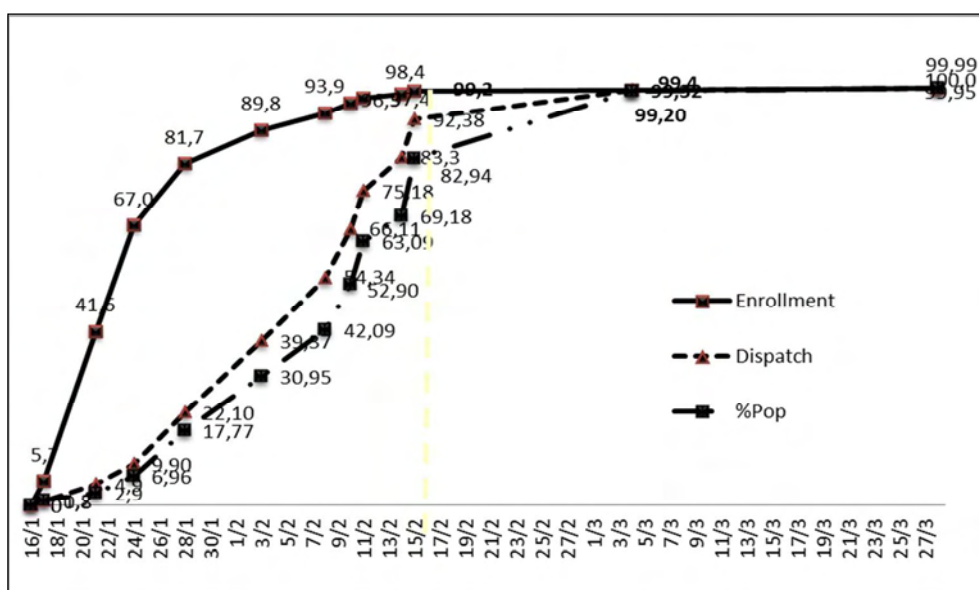
Starting from 16th of January until the end of March 2011 Italian municipalities submitted their population registers to Istat in order to create the LACs for the census.

The reference date of the LACs was December 31th of 2010, and February, 15th, 2011 the dead line for their transmission to Istat. All the technical activities needed for preparing and sending the relevant information contained into the population registers were ruled out by Istat.

The web application STARLAC is the tool to manage all technical and managerial aspects with a secure https protocol. The STARLAC web-service, developed thanks to the previously managed experimental phase, has been proven to be very useful for the main operations. Two functions are supported by the system: management utilities for forwarding LAC data and for classification of relevant variables; functions for displaying the result of data transmission and quality monitoring of the submitted LACs.

In Figure 1 is summarized the trends of acquisition process for registration of municipalities to the web service system, the dispatch of the LACs and the percentage of population sent.

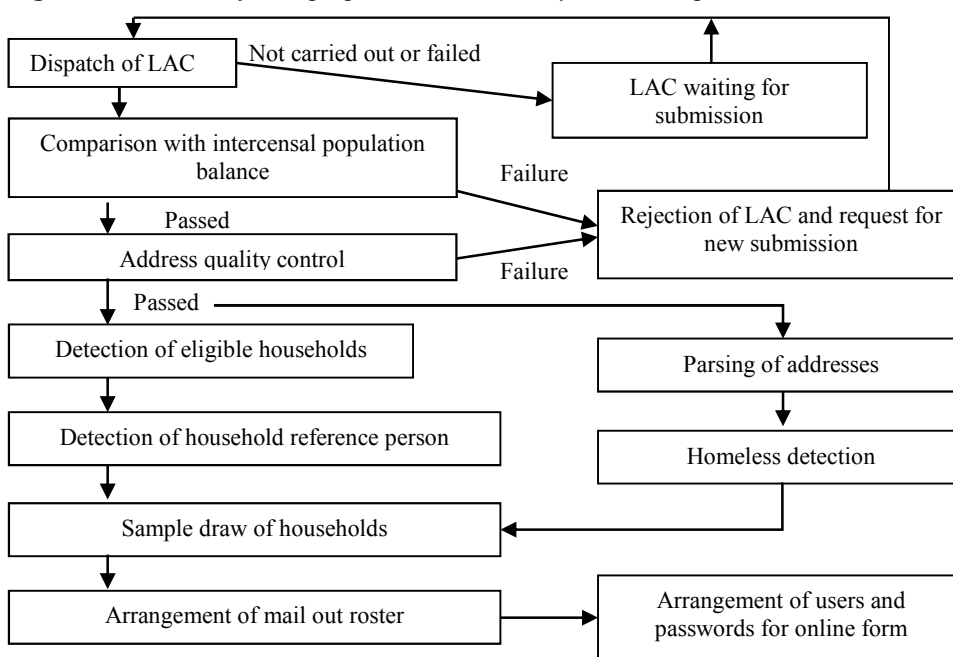
Figure 1– Process of dispatching LCAs from municipalities.



By March, 28th of 2011 almost all the LACs were submitted to Istat, with 7530 municipalities, out of 8094, which succeeded at first attempt whereas others 554 needed two or three attempts.

In Figure 2 it is sketched the complex set of activities to be accomplished after LACs achievement by Istat through the procedure (TRASLAC) employed so as to make them ready for census purposes.

Figure 2 – Scheme of LAC preparation activities by TRASLAC procedure.



3. Mailing of census forms and multi-mode data collection

Mailing of census forms to households will allow the reduction of the number of enumerators and their use for field actions of late respondents data retrieval and LAC under-coverage inspection. The shipping activity is allowed by acquisition of LAC, the check of their quality and the process of geocoding addresses to Enumeration Areas (EA) mainly based on the RNC. Respondents will chose to return questionnaires according to their preferences among various options: web, delivery to the municipal data collection centres or at Post Offices. Finally,

enumerators will collect remaining census forms directly from the late respondent households during their inspection activity.

An important innovation connected to this plan concerns the use of Web as data collection tool through the online census form. It is distinguished by a web platform which helps respondents in their online activity of completion of form by letting them the highest freedom as well as employing a fairly light system of quality control on mistakes. The online census form has been conceived so to not require any special technology knowledge or apparel for households with an Internet access. It guarantees respondents with confidential access of their personal data through an advanced systems of security and confidentiality of data (taking standard SSL - Secure Sockets Layer).

Pilot survey carried out during 2009 gave a fairly positive result with a rate of use of about 10% of households; that makes reasonable the goal of a 20% online respondents at next census which, in addition, can be expected to take its main effect on classical difficult-to-contact sub-populations such as young and workers.

4. Auxiliary sources for under-coverage adjustment

In order to amend for under-enumeration caused by people and households dwelling on the municipal area but not already enrolled into the LAC, a list named LIFA (Lista Integrativa da Fonti Ausiliarie) was built from a auxiliary sources. The essential information to get by these auxiliary sources was an alternative address where people not (yet) registered in LAC can be searched.

The two most important auxiliary sources are:

1. the "Tax Code" archive (TC), got from Revenue offices with reference to the 31st of December 2010, which is also joined with other minor archives related to the Italian system of welfare;
2. the "Permits to Stay" archive (PS), collected and managed by the Ministry of Interior and mainly used to track the presence on Italian territory of foreigners coming from outside of the Schengen Area; updated as of November 2010, it is built on more than 10 different and partially overlapping databases.

A de-duplication process was initially carried out on PS records in order to exclude people belonging to more than one of the component databases. The analogous action was conducted on TC record even though it was less essential, since the process of enrolment of people into the TC records does not allow the presence of duplicated records (still remaining with an order of magnitude of 0.01%).

After this preliminary work the two sources were joined each other and then linked to the LAC. As result of the linkage, each individual was classified by the correspondence between its LAC and alternative address, and namely as:

1. already enrolled into the LAC at the same address;
2. already enrolled into the LAC at a different address of the same municipality;
3. enrolled into the LAC of a different municipality;
4. not enrolled in either municipal LAC.

The subset 1, much higher of the others, was discarded from LIFA being the information already available in LAC not updated by those provided by the auxiliary sources. The subset 2 was retained and will be used by field organization as alternative address in case a person is not found at his LAC address. The subsets 3 and 4 will be used to search people at their alternative address and eventually consider them in the Legal Population after the enumerator check. It is worth to note that people belonging to the 3rd subset are at risk of double enumeration, given that they could answer both at their LAC address and at the alternative one. For this reason, an ex-post control task is planned for these people.

In 2nd and 3rd columns of Table 1 are reported the percentages of people belonging to subset 2 and to the sum of the subsets 3 and 4 on the amount of people of the corresponding LAC, for each of 18 categories of municipal population.

Table 1 – *Percentage of LIFA on LAC, and rate of citizenship of people included in LIFA, by class of municipal population.*

Class of municipal population	LIFA 1	LIFA2_3	LIFA ITA	LIFA UE	LIFA Not_UE
Up to 500	1.5	3.9	39	14.2	25.7
501 - 1,000	1.6	3.4	40.8	13.7	29.3
1,001 - 2,000	1.7	3.3	41.4	13	31.4
2,001 - 3,000	1.5	3.2	40.2	12.7	34.5
3,001 - 4,000	1.6	3.3	38.8	12.6	35.4
4,001 - 5,000	1.7	3.4	36.6	12.2	38.8
5,001 - 10,000	1.8	3.4	37.2	11.4	39.9
10,001 - 15,000	1.8	3.5	37.0	10.7	40.3
15,001 - 20,000	2.0	3.5	35.8	10.9	41.7
20,001 - 30,000	2.6	3.2	41.2	10.1	37.2
30,001 - 40,000	2.4	3.2	44.0	9.2	35.0
40,001 - 50,000	1.6	3.3	35.8	11.1	41.2
50,001 - 65,000	3.1	3.1	46.9	8.9	32.2
65,001 - 80,000	2.9	3.2	43.4	10.4	34.0
80,001 - 100,000	2.3	3.2	36.8	10.8	42.6
100,001 - 250,000	3.0	4.1	30.4	9.9	50.2
250,001 - 500,000	3.7	4.9	31.0	6.7	52.4
More than 500,000	4.7	4.5	40.2	9.0	42.6
Italy	1.7	3.4	39.4	12.5	34.1

4th, 5th and 6th columns report the percentage composition of the LIFA given the citizenship of the people. The sum of percentages of these columns does not sum up 100 because of lack of citizenship information for some people.

5. The survey for detection of addresses (RNC)

The survey aims to build up a complete archive of addresses to be constantly maintained up to date by municipalities and freely accessible by public institutions, citizens and firms. The survey was carried out during the period of January-March 20001 in municipalities with at least 20,000 inhabitants whereas in smaller municipalities it will be achieved in October, during the main census field operations, taking also advantage of the National Street Directory managed by “Agenzia del Territorio” (AdT).

RNC allows standardization and geocoding of the addresses to the EAs for all the Italian administrative archives, and namely:

- postal and municipal databases of addresses;
- *aerophotogrammetry*;
- enumeration areas of Census 2011;
- commercial Vectorial road graphs;
- building cadastre database by AdT.

RNC will also greatly improve the control of the fieldwork, simplifying the enumerator intervention on late respondent households and the recovery of the undercount coming from LAC deficiencies. It gives also useful information regarding those dwellings possibly inhabited by people not yet enlisted in LAC.

Beyond its direct importance for the census achievements, the RNC will provide a permanent and standardized infrastructure able to empower the information encompassed by the various administrative sources concerning territorial data.

6. Long-Short Form sampling strategy

In order to simplify the data collection by enumerators and reduce response burden, in the larger municipalities a sampling strategy has been planned for a subset of census topics. Samples of households were considered for 486 municipalities larger than 20,000 inhabitants. A 33% sampling rate of households is supplied with a long form, given that the remaining households will receive a short form. Samples will be chosen at random from LAC so as to ensure

representativeness for homogenous sub-municipal areas (ACE, standing for *Aree di Censimento*) between 13,000 and 18,000 inhabitants.

Instead, in municipalities with less than 20,000 inhabitants as well as in the Enumeration Areas (EA) not belonging to ACEs considered eligible for sampling in municipalities with at least 20,000 inhabitants, only long form will be mailed to households.

ACEs were settled out in 508 municipalities larger than 20,000 inhabitants by subdividing 'built-up areas' into sets of contiguous EAs, taking in account already existing administrative partitions. Data of 2001 Census by enumeration areas were used for ACEs settlement, bringing to 1,767 ACEs distributed among municipalities as follows:

- 22 municipalities without ACEs and excluded from sample strategy;
- 151 municipalities with only one ACE;
- 169 municipalities with two ACEs;
- 166 municipalities with at least 3 ACEs and an average number of ACEs of 7.64 (1278 ACEs in the whole).

Short form are designed so to include only the topics requested by Eurostat at NUTS3 and LAU2 territorial detail with the addition of few extra questions regarding *educational attainment*, *current activity status* and *location of place of work*. In Table 2 the number of topics included into the census questionnaires are compared for short and long form with respect to part I (households information) and part II (personal information for each household component).

Table 2 – Number of questions for type of form and section of questionnaire.

Type of Questionnaires	Questionnaires part		
	Part I	Part II(*)	Total
Short	5	30	35
Long	25	59	84

(*) Questions regarding a single household component

In order to evaluate the expected quality of sample estimates, a number of experiments and simulation tests were conducted by using 2001 population census data regarding 40 municipalities. They were chosen among different population size and Italian geographical areas, all of them representing 10.3% of national private households and 9.8% of inhabitants.

Simple Random Sampling (SRS) of households from population registers against Area Frame Sampling² (AFS) were tested for different sampling rates (10%, 20% and 33%).

Table 3 – Indicators of average cell variability for multiple tables at municipal level

Sampling Fraction (%)	Cell frequency estimate with CV=12.5%	Class of Municipal Population Size	Index (%)	Current Activity Status		Industry		Status in Employment
				T_CAS1 (12 cells)	T_CAS2 (30 cells)	T_Ind1 (6 cells)	T_Ind2 (15 cells)	T_SiE (25 cells)
10	500	10,000 †20,000	I1	58.3	77.8	66.7	73.3	87.0
			I2	4.2	14.2	6.6	11.3	17.1
		20,000 †50,000	I1	50.0	65.0	66.7	73.3	83.3
			I2	1.7	8.4	3.5	9.6	14.4
		50,000 †150,000	I1	41.7	48.3	33.3	53.3	68.0
			I2	0.9	2.5	0.4	3.6	5.6
≥150,000	I1	20.8	33.9	16.7	36.7	54.0		
	I2	0.2	0.8	0.2	0.8	2.3		
20	250	10,000 †20,000	I1	50.0	66.1	50.0	69.1	84.0
			I2	1.5	7.8	3.3	7.7	13.2
		20,000 †50,000	I1	50.0	52.7	55.0	66.7	77.8
			I2	0.8	3.3	2.8	4.9	9.3
		50,000 †150,000	I1	37.5	39.7	16.7	36.7	58.0
			I2	0.5	1.3	0.2	0.9	3.0
≥150,000	I1	8.3	21.7	16.7	23.3	28.0		
	I2	0.1	0.3	0.1	0.2	0.3		
33	100	10,000 †20,000	I1	41.7	48.2	50.0	65.5	75.0
			I2	0.8	2.3	0.9	5.0	6.6
		20,000 †50,000	I1	41.7	41.1	33.3	50.0	62.3
			I2	0.6	1.4	0.7	2.3	3.5
		50,000 †150,000	I1	16.7	22.0	16.7	26.7	32.0
			I2	0.1	0.3	0.1	0.4	0.5
≥150,000	I1	0.0	11.8	8.3	20.0	24.0		
	I2	0.0	0.0	0.0	0.1	0.2		

T_CAS1: Individuals age > 14 by citizenship (2 classes) and current activity status (6);

T_CAS2: Individuals age > 14 by citizenship (2), marital status (5) and current activity status (6);

T_Ind1: Employed by marital status (5) and industry (3);

T_Ind2: Employed by citizenship (2) and industry (3);

T_SiE: Employed by marital status (5) and status in employment (5).

The expected accuracy of relative frequency estimates of the variables included only by long form were evaluated thorough simulations of the sampling space. Coefficient of variation (CV) was considered as indicator of the estimates efficiency.

² The whole set of households included in a simple random sample of enumeration areas are surveyed thorough long form.

As expected, sampling errors for SRS sorted out to be uniformly lower than those obtained from the areal pattern (cluster effect). However the difference in efficiency between the two was less than 2 points of CV so making the ASD a useful alternative in any case. Different stratification schemes were tested for the final units (households and enumeration areas respectively) without any evidence of significant improvement of efficiency of either the estimates.

Regarding the sampling rates, their increase from the baseline of 10% determines a reduction of the expected CV of:

- 33-38% with a rate of 20%;
- 53-58% with a rate of 33%.

In other words, a sampling rate of 33% determines:

- CV of about 4% for frequency estimate of 1,000 units;
- CV of about 13% for frequency estimates of 100 units;
- CV of about 40% for frequency estimates of 10 units.

Table 3 reports some results on the average cell variability of tables estimated at LAU2 level for different topics, sampling fractions and municipal population sizes. Having fixed the cell absolute frequency threshold for which the estimates have a $CV \geq 12.5\%$ at a given sampling fraction, two indexes were considered:

- I1, representing the average number of cells of the table (computed for the municipalities falling in that class of population size) showing CV larger than 12.5%;
- I2 accounts for the cumulative percentage of character falling in cells considered by index I1.

As expected, sampling estimates at municipal level show lower variance for larger municipalities where the sample of households is greater. However, even for tables where many cells show a CV larger than 12.5% the whole character included by them remains quite small.

Taking into account the need of guarantee comparability with previous censuses until sub-municipal areas and considered the next census round as a bridge from traditional census to one based on a multiple time approach, the choice to maintain a sampling fraction of 33% seemed a fair trade-off between the need to limit response burden, decrease field enumerator work and answer to users expectations. Moreover, since the scarce accuracy of estimates evidenced by statistical analysis for municipalities under 20,000 inhabitants, the sampling approach was finally considered only for larger municipalities.

7. The census portal and the management system for field operations

Next census has been conceived as a set of activities highly connected each other and monitored by means of a 'census portal', supporting the various partakers during all the phases of their job.

The census portal foremost functions concerns the institutional communication among Istat and its partners, the dissemination of relevant documents and instructions useful for data collection, the online census forms, and all the functionalities needed so to implement the data collection field activities which goes under the name of management system for field operations (Sistema di Gestione della Rilevazione - SGR).

With the help of census portal many of the planned activities will be better assisted and monitored, namely:

- management of population registers and auxiliary sources;
- on demand print activity of personalized³ census forms;
- filling in and management of online census forms;
- management of handbooks and auxiliary survey forms;
- frequent asked questions and glossaries;
- dissemination and management of survey regulations;
- management system for field operations, including the "enumeration area control sheet"⁴;
- final comparison at individual level between census results and population registers;
- reporting of the balance sheet of the final comparison at municipal level.

8. Comparison between Census data and municipal population registers

The comparison of census results and administrative population registers consists in counting how many private and institutional households and people enumerated by census correspond to the ones included at reference date into the local register. Every difference found between the two sources have to be shared between Istat and the municipalities.

The 2011 census will benefits of administrative lists so to make as close as possible census counts and population registers. Together with the above

³ Census forms are univocally related to households included into municipal population register by the identification code of household

⁴ The sheet is a web tool, shared by Istat and each enumerator, recording information on households and address useful for real time control of the field operations.

mentioned LIFA roster, another tool, named LIAC (Lista Integrativa Ausiliaria Comunale), will be used in order to limit the enumerators field work while minimizing under-enumeration problems. LIAC preparation is in charge of each municipality, consisting in recording all the changes (births, deaths and change of residence, both inside and among municipalities) occurred into the population register during the period between the transmission of the of the LAC, 31st of December, 2010, and the census reference date, 9th of October 2011. Every municipality under 20,000 inhabitants will accomplish the task by recording each change in residence status of their citizens, whereas larger municipalities will send the whole LAC referred at 8th October 2011 through the STARLAC procedure, leaving to Istat the record linkage between the two versions of LAC, in order to include all the differences into the LIAC.

Contextually to the field work, the municipalities will start checking their population registers on the basis of enumeration results and following the regulation issued by Istat. Balance sheets reporting the results of comparison will be prepared by municipalities through SGR and immediately shared with Istat.

Two type of reports are requested, the former showing the following summary information:

- number of households enumerated by census and enlisted into the population register at census reference day;
- of which, household number with perfect concurrence on their components between the two sources;
- number of enumerated households not found in population registers (considered as register undercoverage);
- number of households included into the population register being untraceable at census (considered register overcoverage)
- number of not surveyed households due to refusal to answer;
- number of not surveyed households due to temporary absence.

A second report will provide similar information on individuals, distinguishing between residents in either private or institutional households, their gender and citizenship.

The same report will show the number of people enumerated in the same municipality at addresses different than those reported into the register, people who are enumerated by law because of their temporary absence and those resulting in duplications due to their multiple enumeration occurrence.

The balance sheets provided by each municipality will be validated by Istat in order to compute its legal population.

9. Final Remarks

Despite the innovation efforts made in order to balance census costs with its benefits, the next census round could not completely accomplish this result. Decennial Census indeed suffers from significant drawbacks in achieving its goals. As first, the availability of data every ten years looks very poor today because of the rapid changes affecting the population's structure, the configuration of territory and of the urban settlements. Moreover, dissemination timeliness of census results is hardly to achieve since the large-scale of field work and the huge amount of data to be collected and processed. The lack of timeliness is difficult to accept by users today, primarily by the local authorities and particularly in comparison with the costs of the census activities in terms of both financial and organizational resources. For these main reasons the need for a more timely and frequent census data presses censuses to change. Most of the innovations established for the 2011 Census round aim to a wider use of administrative data assisted by yearly sample surveys.. The use of LAC and LIFA registers, together with RNC and sampling, are only the foremost improvements going toward this goal. The next step is represented by a multiple time survey approach analogous to those already implemented in USA (American Community Survey) and France (Rolling Census). Planning and implementing such a new paradigm for Italian Census is the challenge for the next years.

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SUMMARY

Several innovations have planned for the next Census aiming to achieve some important goals: improvement of the consistency between demographic information coming from population registers and Census at municipal level; improvement of timeliness in order to comply with Eurostat data dissemination date (March, 31, 2014); reduce of response burden for both private and institutional households; the evolution from the traditional Census to one assisted by local population registers (LAC) updated to December, 31st of 2010; introduction sample strategy to carried out information from long and short form of questionnaire; producing sample estimates not only for Census purposes but also during inter-censual period.

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ON THE CONCEPTS OF BONFERRONI SEGREGATION INDEX AND CURVE

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1. Introduction

There seems to be a much greater literature dealing with the analysis of wage discrimination by gender than with that of occupational segregation, the latter referring to the fact that the distribution of female workers among the various occupations is quite different from that of male workers.

Occupational segregation measures that have appeared hitherto in the literature, such as the Duncans' dissimilarity index and the Gini index of occupational segregation, generally give the same importance to all occupations (for an exception, see, Deutsch and Silber, 2005). In this paper, following Bonferroni's (1930) work on the measurement of income inequality, we propose a segregation measure that takes into account the degree of feminization of each occupation. In other words the less feminized an occupation is, the greater the weight which will be given to this occupation. More precisely this weight will depend on the cumulative proportion of males in each occupation, the occupations being ranked in ascending order of feminization. This seems to be a useful property from a policy point of view since it allows focusing on those occupations where segregation is higher.

The paper is organized as follows. Section 2 reviews the traditional approaches to the measurement of occupational segregation. Section 3 introduces then two new indices of segregation, called the Bonferroni segregation indices, as well as a Bonferroni segregation curve. Section 4 checks the properties of these new indices while section 5 offers a short empirical illustration.

2. On the traditional measurement of occupational segregation by gender

The most popular index of occupational segregation by gender is certainly the Duncans' (1955) famous dissimilarity index which is usually expressed as:

$$I_D = \left(\frac{1}{2}\right) \sum_{i=1}^I \left| \left(\frac{M_i}{M}\right) - \left(\frac{F_i}{F}\right) \right| \quad (1)$$

where M_i and F_i represent respectively the number of male and female workers in occupation i , I is the total number of occupations, $M = \sum_{i=1}^I M_i$ and $F = \sum_{i=1}^I F_i$.

It can be shown (see, for example, Flückiger and Silber, 1999) that (1) may be also written as

$$I_D = \left(\frac{1}{2}\right) \sum_{i=1}^I \left(\frac{M_i}{M}\right) \left| \frac{\left(\frac{F_i}{M_i}\right) - \left(\frac{F}{M}\right)}{\frac{F}{M}} \right| \quad (2)$$

or as

$$I_D = \left(\frac{1}{2}\right) \sum_{i=1}^I \left(\frac{F_i}{F}\right) \left| \frac{\left(\frac{M_i}{F_i}\right) - \left(\frac{M}{F}\right)}{\frac{M}{F}} \right| \quad (3)$$

Expressions (2) and (3) show then clearly that the Duncan index is a weighted relative mean deviation around the mean.

Rather than using the Duncan index, some have proposed to apply the well-known Gini index (also called Gini concentration ratio) to the measurement of occupational segregation by gender. Silber (1989a) defined then this Gini index of occupational segregation as

$$I_G = \left(\frac{1}{2}\right) \sum_{i=1}^I \sum_{j=1}^I \left(\frac{M_i}{M}\right) \left(\frac{M_j}{M}\right) \left| \frac{\left(\frac{F_i}{M_i}\right) - \left(\frac{F_j}{M_j}\right)}{\frac{F}{M}} \right| \quad (4)$$

or as

$$I_G = \left(\frac{1}{2}\right) \sum_{i=1}^I \sum_{j=1}^I \left(\frac{F_i}{F}\right) \left(\frac{F_j}{F}\right) \left| \frac{\left(\frac{M_i}{F_i}\right) - \left(\frac{M_j}{F_j}\right)}{\frac{M}{F}} \right| \quad (5)$$

Expressions (4) and (5) are in fact quite similar to expressions (2) and (3) since the Duncans' (1955) index I_D in (2) (in (3)) compares the gender ratios $\left(\frac{F_i}{M_i}\right)$ (the gender ratios $\left(\frac{M_i}{F_i}\right)$) in the various occupations i with the overall gender ratio $\left(\frac{F}{M}\right)$ (the overall gender ratio $\left(\frac{M}{F}\right)$) in the whole labour force while the Gini index I_G is estimated by looking at all the binary comparisons between the gender ratios in the various occupations.

Silber (1989a) has also shown that (4) and (5) could be expressed as

$$I_G = \left[\left(\frac{M_1}{M} \right) \dots \left(\frac{M_i}{M} \right) \dots \left(\frac{M_I}{M} \right) \right]' G \left[\left(\frac{F_1}{F} \right) \dots \left(\frac{F_i}{F} \right) \dots \left(\frac{F_I}{F} \right) \right] \quad (6)$$

or as

$$I_G = \left[\left(\frac{F_1}{F} \right) \dots \left(\frac{F_i}{F} \right) \dots \left(\frac{F_I}{F} \right) \right]' G \left[\left(\frac{M_1}{M} \right) \dots \left(\frac{M_i}{M} \right) \dots \left(\frac{M_I}{M} \right) \right] \quad (7)$$

where in (6) $\left[\left(\frac{M_1}{M} \right) \dots \left(\frac{M_i}{M} \right) \dots \left(\frac{M_I}{M} \right) \right]'$ is a row vector of the I shares corresponding to the percentage of males working in the various occupations (where in (7) $\left[\left(\frac{F_1}{F} \right) \dots \left(\frac{F_i}{F} \right) \dots \left(\frac{F_I}{F} \right) \right]'$ is a row vector of the I shares corresponding to the percentage of females working in the various occupations). Similarly, in (6) $\left[\left(\frac{F_1}{F} \right) \dots \left(\frac{F_i}{F} \right) \dots \left(\frac{F_I}{F} \right) \right]$ is a column vector giving the percentage of females in the various occupations (in (7) $\left[\left(\frac{M_1}{M} \right) \dots \left(\frac{M_i}{M} \right) \dots \left(\frac{M_I}{M} \right) \right]$ is a column vector giving the percentage of males in the various occupations). The operator G in (6) and (7) is called the G -matrix (see, Silber, 1989b) and its typical element g_{ij} is equal to 0 if $i = j$, to -1 if $j > i$ and to $+1$ if $i > j$. Note also that in the elements of the vectors located on both sides of the G -matrix in (6) are ranked by decreasing values of the ratios $\left(\frac{F_i}{M_i} \right)$ (in (7) by increasing values of the ratios $\left(\frac{M_i}{F_i} \right)$).

Expressions (6) and (7) indicate therefore clearly that occupational segregation by gender is estimated by comparing a set of "prior shares" with a set of "posterior shares". In (6) the "prior shares" are $\left\{ \left(\frac{M_1}{M} \right) \dots \left(\frac{M_i}{M} \right) \dots \left(\frac{M_I}{M} \right) \right\}$ and the "posterior shares" are $\left\{ \left(\frac{F_1}{F} \right) \dots \left(\frac{F_i}{F} \right) \dots \left(\frac{F_I}{F} \right) \right\}$. In (7) on the contrary the "prior shares" are $\left\{ \left(\frac{F_1}{F} \right) \dots \left(\frac{F_i}{F} \right) \dots \left(\frac{F_I}{F} \right) \right\}$ while the "posterior shares" are $\left\{ \left(\frac{M_1}{M} \right) \dots \left(\frac{M_i}{M} \right) \dots \left(\frac{M_I}{M} \right) \right\}$.

Such an interpretation of the Gini-segregation index is in fact also at the basis of the so-called Segregation Curve (see, Duncan and Duncan, 1955). The Segregation Curve is an extension of the Lorenz Curve and is constructed as follows. Classify the occupations by increasing values of the ratios $\left(\frac{F_i}{M_i} \right)$. On the horizontal axis put then the cumulative values of the shares $\left(\frac{M_i}{M} \right)$ and on the vertical axis the cumulative values of the shares $\left(\frac{F_i}{F} \right)$ in the various occupations. The plot of these cumulative values on both axes will then give a curve that is called a Segregation Curve. Naturally one could also plot on the horizontal axis the cumulative values of the shares $\left(\frac{F_i}{F} \right)$ and on the vertical axis the cumulative values of the shares $\left(\frac{M_i}{M} \right)$ in the various occupations but then the occupations have to be classified by increasing ratios $\left(\frac{M_i}{F_i} \right)$. It should be clear that if the cumulative values on the horizontal axis

are always equal to the corresponding cumulative values on the vertical axis, there will be no segregation because it would imply that for each occupation the share of males in the total male labour force is equal to the share of females in the total female labour force. In such a case the segregation curve would become identical to the diagonal line joining the points (0,0) to the point (1,1). Clearly the further away the Segregation Curve is from this diagonal, the more segregation there is. This is why the area between a Segregation Curve and the diagonal has been proposed as a measure of segregation. It can, in fact, be proven (see, Flückiger and Silber, 1999) that the area lying between the segregation curve and the diagonal is equal to half the Gini index of segregation which was defined in (6) and (7). Therefore $I_G \in [0,1]$. It can also be shown (see, Flückiger and Silber, 1999) that the highest vertical distance between the diagonal and the Segregation Curve, is identical to the Duncan index which was defined in expressions (1) to (3).

In the following section we will show that in the same way as a link may be easily established between the Segregation Curve and the Duncan or Gini indices, it is possible to measure occupational segregation by gender by extending the use of the so-called Bonferroni index and Bonferroni curves.

3. On the definition of a Bonferroni index of occupational segregation by gender and of a Bonferroni segregation curve

The concepts of Bonferroni index and Bonferroni curve were originally introduced by Bonferroni (1930) to measure income inequality¹. Bonferroni (1930) defined as follows the Bonferroni curve. Assume n individuals whose shares in total income are given as $\{s_1, \dots, s_i, \dots, s_n\}$ with $s_1 \leq \dots \leq s_i \leq \dots \leq s_n$. On the horizontal axis plot, like for the Lorenz curve, the cumulative population shares $\left\{\left(\frac{1}{n}\right), \dots, \left(\frac{i}{n}\right), \dots, \left(\frac{n}{n}\right)\right\}$. On the vertical axis plot then not the cumulative income shares (as in the case of the Lorenz curve) but the ratios of the cumulative income shares over the cumulative population shares. In other words plot the following ratios:

$$\left\{\left(\frac{s_1}{(1/n)}\right), \dots, \left(\frac{s_1 + s_2 + \dots + s_i}{(i/n)}\right), \dots, \left(\frac{s_1 + \dots + s_i + \dots + s_n}{(n/n)}\right) = \frac{1}{1} = 1\right\} \quad (8)$$

¹ See also Tarsitano (1990), Chakravarty (2007) and Barcena-Martin and Imedio-Olmedo (2008) for more recent reviews of the Bonferroni index. For papers stressing more the statistical properties of the Bonferroni index, see, for example, Giorgi and Mondani (1994), Giorgi (1998), Giorgi and Crescenzi (2001) and Giorgi and Nadarajah (2010).

The Bonferroni index I_B is then defined as the area lying between the Bonferroni curve which has just been defined and the horizontal line at height 1 (see Figure 1).

The Bonferroni index I_B can therefore be expressed as

$$I_B = \left[(1/n) \left(1 - \left(\frac{s_1}{(1/n)} \right) \right) \right] + \dots + \left[(1/n) \left(1 - \left(\frac{s_1 + \dots + s_i}{(i/n)} \right) \right) \right] + \dots \\ + \left[(1/n) \left(1 - \left(\frac{s_1 + \dots + s_{n-1} + s_n}{(n/n)} \right) \right) \right] \quad (9)$$

Expression (9) shows clearly that the Bonferroni index is computed by comparing "a priori" cumulative population shares $\left(\frac{i}{n}\right)$ with "a posteriori" cumulative income shares $\left(\frac{s_1}{(1/n)}, \dots, \frac{s_1 + \dots + s_i}{(i/n)}, \dots, \frac{s_1 + \dots + s_{n-1} + s_n}{(n/n)}\right)$ for each i where $1 \leq i \leq n$.

Let us now go back to the issue of measuring occupational segregation by gender and assume, as was done in section 2, that, for example, the "a priori" shares are the proportions of male employed in the various occupations while the "a posteriori" shares are the proportions of female employed in the various occupations. The Bonferroni segregation curve will then be defined as follows. We would put on the horizontal axis the cumulative values of the proportions of the males working in the various occupations. On the vertical axis we would then plot the ratio of the cumulative values of the proportion of females working in the various occupations over the cumulative values of the proportion of males working in the various occupations. Note that on both axes the occupations would be ranked by increasing values of the gender ratios $\left(\frac{F_j}{M_j}\right)$.

Let us now define as p_i the cumulative value $\frac{\sum_{j=1}^i M_j}{M}$ of the proportion of males in the male labor force. It is easy to observe that the height $B(p_i)$ of the Bonferroni segregation curve, in the case of an egalitarian distribution (that is, when the gender ratios $\left(\frac{F_i}{M_i}\right)$ are identical in all occupations) will be 1, whatever the value of p_i . On the contrary when segregation is at its maximal value (that is, when in an occupation there are either only male or females workers, this being true whatever the occupation) the height $B(p_i)$ of the Bonferroni segregation curve will be equal to 0, as long as $p_i < 1$ and we also have $B(1) = 1$.

Naturally we could also plot the cumulative values of the proportions of the females working in the various occupations on the horizontal axis and on the vertical axis the ratio of the cumulative values of the proportion of males working

in the various occupations over the cumulative values of the proportion of females working in the various occupations. This time however we would classify the occupations by increasing values of the gender ratios $\left(\frac{M_j}{F_j}\right)$. This would lead us to another type of Bonferroni curve (male to female).

Using (9) we can then define a Bonferroni index of occupation segregation by gender as

$$B_s^1 = \left(\frac{M_1}{M}\right) \left[1 - \frac{\left(\frac{F_1}{F}\right)}{\left(\frac{M_1}{M}\right)}\right] + \dots + \left(\frac{M_i}{M}\right) \left[1 - \frac{\sum_{j=1}^i \left(\frac{F_j}{F}\right)}{\sum_{j=1}^i \left(\frac{M_j}{M}\right)}\right] + \dots + \left(\frac{M_I}{M}\right) \left[1 - \frac{\sum_{j=1}^I \left(\frac{F_j}{F}\right)}{\sum_{j=1}^I \left(\frac{M_j}{M}\right)}\right] \quad (10)$$

or as

$$B_s^2 = \left(\frac{F_1}{F}\right) \left[1 - \frac{\left(\frac{M_1}{M}\right)}{\left(\frac{F_1}{F}\right)}\right] + \dots + \left(\frac{F_i}{F}\right) \left[1 - \frac{\sum_{j=1}^i \left(\frac{M_j}{M}\right)}{\sum_{j=1}^i \left(\frac{F_j}{F}\right)}\right] + \dots + \left(\frac{F_I}{F}\right) \left[1 - \frac{\sum_{j=1}^I \left(\frac{M_j}{M}\right)}{\sum_{j=1}^I \left(\frac{F_j}{F}\right)}\right] \quad (11)$$

It is evident that $B_s^1 \in [0,1]$ and that $B_s^2 \in [0,1]$.

Expression (10) may also be written as

$$\begin{aligned} B_s^1 &= \sum_{i=1}^I \left(\frac{M_i}{M}\right) \left[1 - \frac{\sum_{j=1}^i \left(\frac{F_j}{F}\right)}{\sum_{j=1}^i \left(\frac{M_j}{M}\right)}\right] = \\ &= \left(\frac{1}{F/M}\right) \left[\frac{\sum_{i=1}^I \frac{M_i F_i \sum_{j=1}^i M_j}{M M_i M}}{\frac{\sum_{j=1}^I M_j}{M}} - \frac{\sum_{i=1}^I \frac{M_i \sum_{j=1}^i F_j}{M}}{\frac{\sum_{j=1}^I M_j}{M}} \right] \\ &= \frac{1}{F/M} \sum_{i=1}^I \sum_{j=1}^i \left(\frac{F_i - F_j}{M_i - M_j}\right) \frac{M_i M_j}{M M} = \\ &= \frac{1}{F/M} \sum_{i=1}^I \sum_{j=1}^i w_i \left(\frac{F_i}{M_i} - \frac{F_j}{M_j}\right) \frac{M_i M_j}{M M} \end{aligned} \quad (12)$$

It can be seen that expression (12) is somehow similar to that of the Gini index of segregation in equation (4) but in this case the binary comparisons between the

gender ratios in the various occupations are weighted by the inverse of the cumulative shares w_i of males in the first i less female dominated occupations, where $w_i = \frac{1}{\sum_{j=1}^i M_j}$.

Alternatively B_s^2 can be written as:

$$\begin{aligned}
 B_s^2 &= \frac{1}{M/F} \sum_{i=1}^I \sum_{j=1}^i \left(\frac{M_i - M_j}{\frac{\sum_{j=1}^i F_j}{F}} \right) \frac{F_i F_j}{F F} = \\
 &= \frac{1}{M/F} \sum_{i=1}^I \sum_{j=1}^i \gamma_i \left(\frac{M_i}{F_i} - \frac{M_j}{F_j} \right) \frac{F_i F_j}{F F} \tag{13}
 \end{aligned}$$

The weights γ_i in (13) are now equal to the inverse of the cumulated shares of females in the first i less male dominated occupations, that is, $\gamma_i = \frac{1}{\frac{\sum_{j=1}^i F_j}{F}}$. Clearly

the weights γ_i are different from the weights w_i and this is why there are two expressions for the Bonferroni index.

These weights w_i and γ_i are in fact quite an attractive feature of the Bonferroni index because they allow one not to impose the same importance to all the occupations, this importance being a function of the degree of feminization of the occupation².

Note that, using (13), the Bonferroni segregation indices can be also expressed as follows:

$$B_s^1 = \frac{1}{F/M} \sum_{i=1}^I \frac{M_i}{M} \frac{F_i}{M_i} \left(1 - \sum_{j=i}^I \left(\frac{\frac{M_j}{M}}{\frac{\sum_{k=1}^j M_k}{M}} \right) \right) \tag{14}$$

$$B_s^2 = \frac{1}{M/F} \sum_{i=1}^I \frac{F_i}{F} \frac{M_i}{F_i} \left(1 - \sum_{j=i}^I \left(\frac{\frac{F_j}{F}}{\frac{\sum_{k=1}^j F_k}{F}} \right) \right) \tag{15}$$

² Deutsch et al. (2005) examined also the case where the weight given to an occupation depends on the degree of its feminization, by introducing a generalization of the Gini segregation index.

4. The desirable properties of a segregation index

Desirable axioms for an index of occupational segregation have been proposed, for example, by James and Taeuber (1985), Siltanen et al. (1993), Kakwani (1994), Hutchens (1991, 2001) and Mora and Ruiz Castillo (2003).

Here is a list of some of the most common axioms that appeared in the literature.

Axiom 1: Size Invariance

Let f and m represent respectively the vectors $\left\{\left(\frac{F_1}{F}\right) \dots \left(\frac{F_i}{F}\right) \dots \left(\frac{F_l}{F}\right)\right\}$ and $\left\{\left(\frac{M_1}{M}\right) \dots \left(\frac{M_i}{M}\right) \dots \left(\frac{M_l}{M}\right)\right\}$ and let θ be a segregation index with $\theta = \theta(f, m, F, M)$.

Then if $F'_i = \lambda F_i$, $M'_i = \lambda M_i \forall i$, $F' = \lambda F$, $M' = \lambda M$ we will have $\theta' = \theta$. The Bonferroni index clearly obeys this axiom.

Axiom 2: Complete Integration

If $(F_i/F) = (M_i/M) \forall i$, then $\theta = 0$.

Looking at expressions (10), (11), (12) and (13) it is easy to conclude that in such a case the Bonferroni index will be equal to 0.

Axiom 3: Complete Segregation

$F_i > 0$ implies that $M_i = 0$ and $F_i > 0$ implies that $M_i = 0, \forall i$, and then $\theta = 1$.

In terms of the Bonferroni Segregation Curve it is easy to see that, since we classify the occupations by increasing gender ratios $\left(\frac{F_j}{M_j}\right)$, in the case of complete segregation we will first have the occupations which include only males but when we include all these occupations we will already reach the point (1, 0) on the horizontal axis. Then we will include the occupations which include only females and end up at the point (1, 1). The Bonferroni curve will hence be first the horizontal axis from point (0, 0) to point (1, 0) and then the vertical axis from point (1, 0) to point (1, 1). Since the Bonferroni Segregation index is equal to the area lying between the Bonferroni curve and the horizontal line at height 1, it is easy to observe that this area in the case examined is equal to 1 and hence the Bonferroni Segregation index in such a case reaches its maximal value.

This result can also be proven easily, using expression (12).

Axiom 4: Symmetry in Groups

Let f' and m' be two permutations of f and m respectively. Then $\theta(f, F, m, M) = \theta(f', F, m', M)$.

Since the occupations are in any case classified by increasing gender ratios $\left(\frac{F_i}{M_i}\right)$, such a permutation will clearly not affect the value of the Bonferroni Segregation index. This implies that the name of the occupations does not affect the value of the Bonferroni segregation index.

Axiom 5: Symmetry in Types

$$\theta(f, F, m, M) = \theta(m, M, f, F).$$

This axiom does not hold for the Bonferroni index of segregation since, as shown previously, the weight attached to each occupation depends on the type of comparison we are making. In expressions (12) and (13), $w_i \neq \gamma_i$.

Axiom 6: Principle of Transfers

If there is a small shift of the female (male) labour force from an occupation with a higher position in the ranking determined by the ratios $\left(\frac{F_i}{M_i}\right)$ (or determined by the ratios $\left(\frac{M_i}{F_i}\right)$) to an occupation with a lower position in the ranking determined by these ratios, while still preserving the ranking of the occupation, the Bonferroni segregation index must decrease.

The proof is simple. Define a vector f' as

$$f' = \left\{ \left(\frac{F_1}{F}\right), \dots, \left(\frac{F_i + d}{F}\right), \dots, \left(\frac{F_j - d}{F}\right), \dots, \left(\frac{F_I}{F}\right) \right\}$$

and call ΔB the difference $B_s(f, F, m, M) - B_s(f', F, m, M)$.

Using (14) we easily derive that

$$\begin{aligned} \Delta B_s &= \underbrace{\frac{1}{F} \frac{d}{M} \frac{M_i}{M} \sum_{k=j}^I \frac{\frac{M_k}{M}}{\sum_{h=1}^k \frac{M_h}{M}}}_A - \underbrace{\frac{1}{F} \frac{d}{M} \frac{M_j}{M} \sum_{k=1}^I \frac{\frac{M_k}{M}}{\sum_{h=1}^k \frac{M_h}{M}}}_B = \\ &= -\frac{1}{F} \frac{d}{M} \left(\sum_{k=i}^{j-1} \frac{M_k}{\sum_{h=1}^k M_h} \right) \end{aligned} \tag{16}$$

Clearly $A \leq B$ and $\Delta B_s \leq 0$ so that $B_s(f, F, m, M) \leq B_s(f', F, m, M)$.

Axiom 7: Increasing Returns to a Movement Between Groups

This notion is analogous to the property of decreasing returns of inequality in proximity in Kolm (1999), or the transfer sensitivity property in Shorrocks and Foster (1987) in the income inequality literature.

Therefore if there is a small shift of the female (male) labour force from a female- (male-) dominated occupation to a male- (female-) dominated occupation,

the segregation index must decrease more, the more male- (female-) dominated the “receiving” occupation is.

This property is easy to check on the basis of expression (12). As the weight of an occupation decreases with its degree of feminization, then the same difference $\left(\frac{M_i}{F_i} - \frac{M_j}{F_j}\right)$ in the gender ratio will receive a higher weight the less feminized the occupation is.

Axiom 8: Organizational Equivalence

This axiom was originally proposed by James and Taeuber (1985) and has been called "Insensitivity to Proportional Divisions" by Hutchens (2001). The idea here is that an index of occupational segregation should be unaffected by the division of an occupation into units with identical segregation patterns. Note that this axiom allows the comparison of economies with a different number of occupations by artificially equalizing those numbers with the help of a suitable division or combination of occupations. It appears that the Bonferroni index of segregation does not obey this axiom because the division of an occupation into units with identical segregation patterns will affect the weights in expression (12).

5. An empirical illustration

In this section we illustrate the relevance of the Bonferroni segregation index that was introduced in the previous sections.

Table 1 (part 1) – Data on the occupational structure by gender in Italy in 2008 (on the basis of the ISCO-88 classification).

Percentages in brackets. Data source: EU-SILC 2008.

Occupation	Males	Females	Total
1	209914.80 (1.51)	3559.41 (0.04)	213474.20 (0.93)
11	25606.19 (0.18)	7049.54 (0.08)	32655.73 (0.14)
12	304864.30 (2.19)	84935.10 (0.93)	389799.40 (1.69)
13	791755.10 (5.69)	452544.40 (4.97)	1244299.50 (5.41)
21	344389.80 (2.48)	103930.80 (1.14)	448320.60 (1.95)
22	287350.60 (2.07)	219645.20 (2.41)	506995.80 (2.20)
23	274409.80 (1.97)	475489.60 (5.22)	749899.40 (3.26)

Table 1 (part 2) – Data on the occupational structure by gender in Italy in 2008 (on the basis of the ISCO-88 classification).

Percentages in brackets. Data source: EU-SILC 2008.

Occupation	Males	Females	Total
24	426768.80 (3.07)	341864.10 (3.75)	768632.90 (3.34)
31	909637.30 (6.54)	128631.30 (1.41)	1038268.60 (4.51)
32	200035.90 (1.44)	477232.00 (5.24)	677267.90 (2.94)
33	92423.49 (0.66)	591938.10 (6.50)	684361.60 (2.97)
34	1181691.60 (8.50)	1183636.60 (12.99)	2365328.20 (10.28)
41	985406.50 (7.08)	1182772.70 (12.98)	2168179.20 (9.42)
42	216532.10 (1.56)	322916.35 (3.54)	539448.44 (2.34)
51	751596.80 (5.40)	924394.90 (10.15)	1675991.70 (7.28)
52	279699.60 (2.01)	548018.60 (6.02)	827718.20 (3.60)
61	400377.10 (2.88)	131926.60 (1.45)	532303.70 (2.31)
71	1522841.60 (10.95)	110236.30 (1.21)	1633077.90 (7.09)
72	1252116.80 (9.00)	83233.15 (0.91)	1335349.90 (5.80)
73	175268.00 (1.26)	87302.80 (0.96)	262570.80 (1.14)
74	500514.30 (3.60)	266127.80 (2.92)	766642.10 (3.33)
81	318247.19 (2.29)	36234.17 (0.40)	354481.40 (1.54)
82	524518.80 (3.77)	345454.90 (3.79)	869973.70 (3.78)
83	804148.04 (5.78)	25565.14 (0.28)	829713.20 (3.60)
91	581462.90 (4.18)	788375.50 (8.65)	1369838.40 (5.95)
92	226309.20 (1.63)	126781.70 (1.39)	353090.90 (1.53)
93	321412.00 (2.31)	60222.23 (0.66)	381634.20 (1.66)
Total	13909299.00 (100)	9110018.80 (100)	23019317.00 (100)

The empirical investigation is based on the European Union Statistics on Income and Living Conditions (EU-SILC) data set for the 2008 wave. We focus on occupational segregation by gender in Italy. We study occupational segregation on the basis of the ISCO-88 (COM) classification provided in Annex 1.

We start with a description of the occupational structure in Italy in 2008. Table 1 shows the share of males and females in the different occupations. We consider 27 occupational categories.

We observe that there are occupations that are strongly feminized, such as teaching associate professionals, life science and health associate professionals, and models, salespersons and demonstrators, while in occupations such as armed forces, drivers and mobile plant operators, or metal, machinery and related trades workers the opposite is true.

In what follows, we quantify the occupational segregation by gender in Italy. Figure 1 shows the Segregation curve corresponding to the ISCO-88 (COM) classification. Each point of the curve indicates the cumulative proportion of females in the total female labour force corresponding to each cumulative share of males in the total male labour force. Note that the occupations are ranked by increasing values of the gender ratio (females to males). This segregation curve describes hence the degree of inequality in the gender ratios between the various occupations³.

As mentioned in the previous section, the Gini index of occupational segregation measures twice the area between the segregation curve and the curve corresponding to the case of perfect equality of the gender ratios in all occupations⁴.

But, as mentioned previously, it is also possible to illustrate the extent of occupational segregation via the use of what we called the Bonferroni segregation curve (see Figure 2). In this case each point of the curve gives the ratio of the cumulative proportion of females in total female labour force over the cumulative proportion of males working in the various occupations corresponding to each cumulative share of the males in the total male labour force. As before, the occupations are ranked by increasing values of the gender ratio (females to males). As stressed before in this case the importance given for a specific occupation to the difference between the shares of females and males in the labour force depends on the degree of feminization of the occupation. The corresponding Bonferroni curve

³ One could have also inverted the labels of the axes and draw an alternative segregation curve which would however have given the same description of the degree of occupational segregation.

⁴ Note that if we had drawn the alternative segregation curve mentioned in footnote 2 we would have obtained the same value of the Gini segregation index.

shows that there exists occupational segregation, as the curve is here also distant from the perfect equality line which is the horizontal line at height 1.

Figure 1 – Segregation curve. Italy 2008. Data source: EU-SILC 2008.

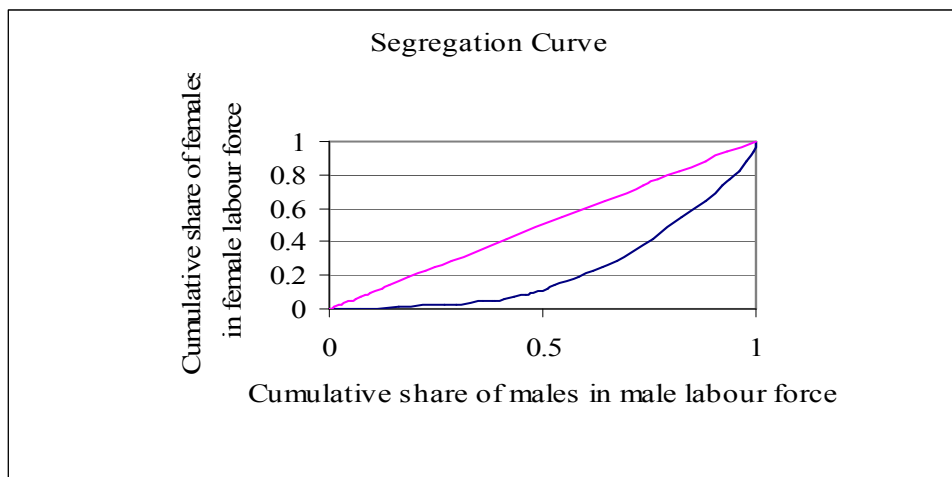
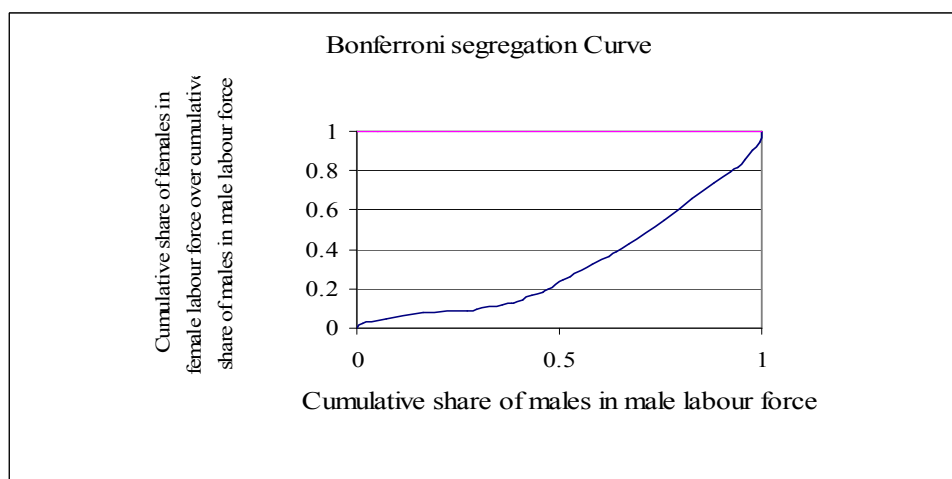
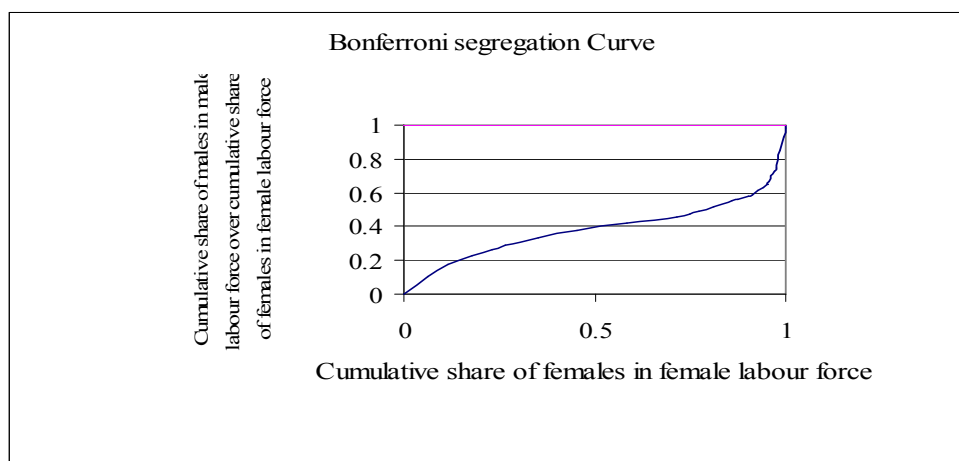


Figure 2 – Bonferroni segregation curve (female to male). Italy 2008. Data source: EU-SILC 2008.



As mentioned previously this curve may be also be plotted by inverting the labels of the axes (see Figure 3).

Figure 3 – Bonferroni segregation curve (male to female). Italy 2008. Data source: EU-SILC 2008.



Comparing Figure 1 with Figures 2 and 3 we may observe that, as expected, the (traditional) segregation curve is always non decreasing and convex. The Bonferroni segregation curve however, though not decreasing, has sections which may be convex and others that may be concave. As mentioned previously, the Bonferroni segregation index corresponds to the area lying between the Bonferroni curve and the curve corresponding to the case of perfect equality. But, unlike in the case of the Gini index, we get different values of the Bonferroni index of segregation, depending on the segregation curve used (Figure 2 versus Figure 3), because, as we saw, the weights given to the various occupations are not the same in both cases.

Table 2 below reports the value of various occupational segregation indices computed for different subgroups of the Italian labour force in 2008.

Four occupational segregation indices were computed: the Dissimilarity index, the Gini index of segregation, the Bonferroni index of segregation when the ranking of occupations is determined by the gender ratio of females to males, and the Bonferroni index of segregation when the ranking is determined by the gender ratio of males to females. For the population as a whole, the Gini index is smaller than any of the Bonferroni indices⁵. It also appears that the Bonferroni segregation index is greater when more weight is placed on less feminized occupations

⁵ This result was expected following the results of Imedio et al. (2009).

(Bonferroni (female/male)) than when more weight is placed on more feminized occupations (Bonferroni (male/female)).

Table 2 – Occupational segregation indices (Italy). Data source: EU-SILC 2008.

	Duncan index	Gini segregation index	Bonferroni (fem/male)	Bonferroni (male/fem)
Level of education				
Primary	0.438	0.559	0.679	0.605
Secondary	0.409	0.535	0.659	0.601
Post-secondary	0.414	0.533	0.652	0.591
Tertiary	0.299	0.422	0.524	0.506
Age				
15 to 24	0.511	0.638	0.738	0.694
25 to 39	0.431	0.541	0.668	0.608
40 to 49	0.404	0.533	0.664	0.606
50 to 60	0.362	0.503	0.635	0.587
60 or more	0.373	0.491	0.620	0.564
Employee status				
full time	0.392	0.526	0.657	0.603
part time	0.313	0.378	0.517	0.424
Citizenship				
local	0.385	0.514	0.645	0.589
non local	0.567	0.681	0.749	0.732
Total	0.354	0.460	0.598	0.529

When the population is broken down by different characteristics, the four indices lead to similar conclusions. Occupational segregation is lowest among individuals with a high level of education (International Standard Classification of Education 1997) and highest among those with only primary education. Segregation decreases with age, although it is not clear whether this is an age or a cohort effect. Segregation seems to be higher among those working full-time than among part-time employees. Finally, occupational segregation is higher for those individuals whose country of citizenship is different from the one in which they live.

Finally although the correlation coefficient between any pair of the four indices is always greater than 0.989 so that a priori it should not matter which segregation index one uses, the Bonferroni segregation index has the advantage of giving different weights to the various occupations, these weights depending on the degree of feminization. Such a property should thus make it quite attractive from a policy point of view.

Annex 1

List of occupations according to the ISCO-88 (COM) classification.

This variable refers to the main job (current main job for people at work or last main job for people who do not have a job). If multiple jobs are held or were held, the main job should be the one with the greatest number of hours usually worked.

The basis for the classification in the ISCO-88 scheme (International Standard Classification of Occupations, published by the International Labour Office (I.L.O., 1990) is the nature of the job itself and the level of skill required.

Armed forces

01 Armed forces

Legislators, senior officials and managers

11 Legislators, senior officials and managers

12 Corporate managers

13 Managers of small enterprises

Professionals

21 Physical, mathematical and engineering science professionals

22 Life science and health professionals

23 Teaching professionals

24 Other professionals

Technicians and associate professionals

31 Physical and engineering science associate professionals

32 Life science and health associate professionals

33 Teaching associate professionals

34 Other associate professionals

Clerks

41 Office clerks

42 Customer services clerks

Service workers and shop and market sales workers

51 Personal and protective services workers

52 Models, salespersons and demonstrators

Skilled agricultural and fishery workers

61 Skilled agricultural and fishery workers

Craft and related trades workers

71 Extraction and building trades workers

72 Metal, machinery and related trades workers

73 Precision, handicraft, craft printing and related trades workers

74 Other craft and related trades workers

Plant and machine operators and assemblers

81 Stationary-plant and related operators

- 82 Machine operators and assemblers
- 83 Drivers and mobile plant operators
- Elementary occupations
- 91 Sales and services elementary occupations
- 93 Laborers in mining, construction, manufacturing and transport

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SUMMARY

In this paper, following Bonferroni's (1930) work on the measurement of income inequality, we propose a segregation measure that takes into account the degree of feminization of each occupation. In other words the less feminized an occupation is, the greater the weight which will be given to this occupation. More precisely this weight will depend on the cumulative proportion of males in each occupation, the occupations being ranked in ascending order of feminization. This seems to be a useful property from a policy point of view since it allows focusing on those occupations where segregation is higher. The relevance of the Bonferroni segregation index that was introduced is illustrated in a short empirical investigation based on the European Union Statistics on Income and Living Conditions (EU-SILC) data set for the 2008 wave.

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ECONOMIC INSECURITY: SOME INDICES

Conchita D'Ambrosio

1. Introduction

Economic insecurity is a term very much used by all of us to describe specific situations of high economic uncertainty we find ourselves in. The perception that the level of economic insecurity has risen since the 1990s and especially since the 2007 global crisis is wide spread. Economic insecurity appears also to be a key concept for the measurement of well-being and social progress proposed by the Commission on the Measurement of Economic Performance and Social Progress; see Stiglitz, Sen and Fitoussi (2009, Henceforth Stiglitz Commission). "Insecurity is a source of fears and anxieties that negatively affects the quality of life of the people concerned. Insecurity also implies uncertainty about the future, which decreases [quality of life] for risk-averse individuals." (Stiglitz Commission, 2009, p.194). But what exactly is meant by economic insecurity? In 1998, Osberg wrote that the term 'economic insecurity' did not appear in dictionaries of economic jargon at the time (Osberg, 1998, p.22). Still, the New Palgrave Dictionary of Economics, the International Encyclopedia of Social and Behavioural Sciences and the Social Science Encyclopedia contain no entry on it. And there is more to this absence. To the best of my knowledge, there are very few papers in the social sciences literature that have dealt with defining and measuring it. This note is a survey of these contributions.

I will start with providing some of the definitions of economic insecurity available in the literature. I will then introduce the Osberg and Sharpe (2009) index and the Economic Security Index (2010). I will conclude with a description of my work on the topic with Bossert (2009).

The three indices are very different and focus on various aspects of the economy which could generate insecurity. Without going into specifics before any formal introduction of the indices some rough differences can be stated already. The Osberg and Sharpe measure is an index of insecurity at the society level; the Economic Security Index and Bossert and D'Ambrosio are indices that capture the phenomenon at the individual level. The first two are measures of objective risks

and losses; the third focuses on an individual's past and present with the aim of predicting the subjective assessment and anxiety about the future. Empirical applications are available for the first two; we were not able to find any good data for the implementation of the index proposed by Bossert and D'Ambrosio.

2. Definitions

“Economists have written a great deal about ‘risk’, but very little about ‘insecurity’,” according to Osberg (1998, p.22). He continues by saying that “[A] definition of ‘economic insecurity’ which reflects the common usage meaning of the term ‘insecure’ might be: “the anxiety produced by the lack of economic safety – i.e. by an inability to obtain protection against subjectively significant potential economic losses”. (Osberg, 1998, p.23). According to the United Nations Department of Economic and Social Affairs (2008, p.vi), “It is not easy to give a precise meaning to the term economic insecurity. Partly because it often draws on comparisons with past experiences and practices, which have a tendency to be viewed through rose-tinted lenses, and also because security has a large subjective or psychological component linked to feelings of anxiety and safety, which draw heavily on personal circumstances. Still in general terms economic insecurity arises from the exposure of individuals, communities and countries to adverse events, and from their inability to cope with and recover from the costly consequences of those events.” Jacobs (2007) suggests that “Economic insecurity is perhaps best understood as the intersection between “perceived” and “actual” downside risk”.

For the Stiglitz Commission (2009, p.198) “Economic insecurity may be defined as uncertainty about the material conditions that may prevail in the future. This insecurity may generate stress and anxiety in the people concerned, and make it harder for families to invest in education and housing”.

If I had to summarize in one sentence what I found based on common threads of the above quotations, I could say that *economic insecurity is the anxiety which arises from the anticipation of adverse events and from the fear of difficulties to recover from them.*

The prediction and measurement of anxiety is a new field for social scientists. In the next section I survey the indices proposed so far.

3. Indices

In Osberg and Sharpe (2009) economic security is one of the determinants, together with consumption flows, stocks of wealth and economic equality of the Index of Economic Well-being (IEWB). The Osberg and Sharpe proposal for measuring (in)security is based on the previous work of Osberg (1998) and follows the human rights approach. Specifically, the index is based on Article 25 of the United Nations' Universal Declaration of Human Rights which states

that: "Everyone has the right to a standard of living adequate for the health and well being of himself and of his family, including food, clothing, housing and medical care and necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control." Insecurity in Osberg and Sharpe is seen as the inability to obtain protection against significant potential economic losses. As such, an individual is insecure when he experiences lack of safety in case of unemployment, sickness, widowhood and old age. The protection against these four objective risks is estimated for different countries. Insecurity is then seen as a failure of the welfare state.

The risk of unemployment is included as its expected value of financial loss. This compound probability depends on the unemployment rate and the probability of receiving unemployment benefits if unemployed. The financial risk raised by illness is measured as the percentage of disposable household income spent by households on health care services that is not reimbursed by public or private health insurance. The risk of widowhood is interpreted as the risk of becoming poor because of a family breakup. This probability is measured as the product of the probability of divorce, the poverty rate among single female parent families and the average poverty gap ratio among single female parent families. Poverty is defined in relative terms as the proportion of households below one half median equivalent income. Insecurity as a consequence of old age is proxied by the poverty intensity experienced by households headed by a person 65 and over. Since good data are not available for measuring security in case of disability for many countries, Osberg and Sharpe decided to set its value to zero in the index they compute.

The second index of insecurity I am aware of is the Economic Security Index (ESI) sponsored by the Rockefeller Foundation and proposed by Hacker together with a team of experts. The Rockefeller Foundation has started in 2008 an initiative, the "Campaign for American Workers", with the objective to improve economic security among American workers and their families. Within this initiative the Economic Security Index was introduced in 2010 with the aim to improve knowledge and understanding of the dimensions of American economic

security. Economic Security Index is a measure specific to the USA society and is available since 1985. It captures three major risks to economic well-being that US citizens believe are difficult to anticipate and about which they express deep concern. These are: (1) major income loss, (2) large out-of-pocket medical spending, and (3) insufficiency of liquid financial wealth to deal with the first two risks. Specifically, the Economic Security Index is equal to the share of US citizens who experience at least a 25 percent decline in their inflation-adjusted available household income from one year to the next and who lack an adequate financial safety net to replace this lost income until it has returned to its original level. Available household income is income that is reduced by the amount of a household's out-of-pocket medical spending, as well as adjusted to reflect household size, household debt burdens, and, for older citizens, household retirement assets. An adequate financial safety net is defined as sufficient financial wealth to make up for an individual's reduced income for as long as it takes the typical person to recover from a loss of comparable magnitude. If an individual has an adequate financial safety net, he is not counted as insecure even if available household income declines by 25 percent or more.

The Osberg and Sharpe index and the Economic Security Index share many similarities. They are both measures of objective issues such as risks, the former, and losses, the latter. The losses considered by the Economic Security Index are often caused by the realization of the risks considered at the basis of Osberg and Sharpe. Specifically, the Economic Security Index looks at the actual income loss which includes medical spending not reimbursed by public or private health insurance. Among the major causes of income losses is becoming unemployed, disabled or facing a family breakup, which are the events considered in Osberg and Sharpe. As opposed to Osberg and Sharpe, the Economic Security Index includes the evaluation of the availability of an adequate financial safety net. The Economic Security Index is closer to capture anxiety since it focuses on losses and not on given levels of a variable. The complete consideration of losses and gains is at the basis of the Bossert and D'Ambrosio's (2009) index of insecurity which I describe next.

Bossert and D'Ambrosio (2009) assume that economic insecurity is the anxiety produced by the exposure to adverse events and the difficulty to recover from them. Past, present and future are all involved. An individual is insecure about the future, since the future is all that matters for generating anxiety. The resources of today are important: the wealthier an individual is, the bigger the buffer stock he can rely on in case of an adverse future event. Past experiences play a role in shaping an individual's self-confidence on how well he can do in case of an adverse event. We remember gains and losses in our resources over time. Of course, the more recent these variations are, the more vivid our memories. Evidence from psychology and

economics support this view. It has been shown that very often people decide from experience as opposed to deciding from description, that is, people's choices are based on previous personal experience and not on the description of all possible outcomes and their probabilities. Bossert and D'Ambrosio assume that an individual's sentiment of insecurity today depends on the current wealth level and variations in wealth experienced in the past. Bossert and D'Ambrosio think of wealth as a comprehensive variable that encompasses everything that may help an individual in coping with adverse occurrences. It includes claims on government, family, friends that Sen (1976) has called 'entitlements,' that is, "the set of alternative commodity bundles that a person can command in a society using the totality of rights and opportunities that he or she faces" (Sen, 1984, p. 497). The current wealth level could also be interpreted as the present value of all expected changes in future wealth. This value will take into account the individual's evaluation of future prospects. According to the measures BD characterize, insecurity is given by the current wealth level multiplied by minus one plus weighted sums of the wealth gains (losses) experienced in the past. Two sequences of coefficients are employed—one applied to gains, one applied to losses. The coefficients are such that recent experiences are given higher weight than experiences that have occurred in the more distant past. A subclass of these measures is obtained by giving higher weights to the absolute values of past losses than to those of past gains, reflecting an attitude analogous to risk aversion in models of individual decision making under uncertainty.

More formally, for any $T \in \mathbb{N}_0$, let $\mathbb{R}^{(T)}$ be the $(T + 1)$ -dimensional Euclidean space with components labeled $(-T, \dots, 0)$. Zero is interpreted as the current period and T is the number of past periods taken into consideration. A measure of individual insecurity is a sequence of functions $V = \langle V^T \rangle_{T \in \mathbb{N}_0}$ where, for each $T \in \mathbb{N}_0$, $V^T: \mathbb{R}^{(T)} \rightarrow \mathbb{R}$. This index assigns a degree of insecurity to each individual (net) wealth stream $w = (w_{-T}, \dots, w_0) \in \bigcup_{T \in \mathbb{N}_0} \mathbb{R}^{(T)}$. The class of BD indices involves two sequences of parameters—one the members of which are applied to past losses in wealth, one that is used for those period pairs in which there are gains. The sequences need not be the same but, within each sequence, some natural restrictions apply. Let $\alpha = \langle \alpha_{-t} \rangle_{t \in \mathbb{N}}$ and $\beta = \langle \beta_{-t} \rangle_{t \in \mathbb{N}}$ be two sequences of parameters such that

$$[\alpha_{-t} > \alpha_{-(t+1)} > 0 \text{ and } \beta_{-t} > \beta_{-(t+1)} > 0] \text{ for all } t \in \mathbb{N} \quad (1)$$

The set of all sequences α such that $\alpha_{-t} > \alpha_{-(t+1)} > 0$ for all $t \in \mathbb{N}$ is denoted by \mathcal{C} . \mathcal{C}^2 is the Cartesian product of \mathcal{C} with itself, that is, \mathcal{C}^2 is the set of all pairs of sequences satisfying (1). The BD measure of insecurity corresponding to a pair of

sequences $(a, \beta) \in \mathcal{C}^2$, $V_{(a, \beta)} = \langle V_{(a, \beta)}^T \rangle_{T \in \mathbb{N}_0}$, is defined by letting, for all $w = (w_{-T}, \dots, w_0) \in \mathbb{R}^{(T)}$,

$$\begin{aligned}
 V_{(a, \beta)}^T = & \sum_{\substack{t \in \{1, \dots, T\} \\ w_{-t} > w_{-(t-1)}}} a_{-t} (w_{-t} - w_{-(t-1)}) + \\
 & + \sum_{\substack{t \in \{1, \dots, T\} \\ w_{-t} < w_{-(t-1)}}} \beta_{-t} (w_{-t} - w_{-(t-1)}) - w_0
 \end{aligned} \tag{2}$$

4. Conclusion

Since its presentation to the public in September 2009, the Stiglitz Report has had a major influence in the political debate. Its recommendations on how to find a more comprehensive approach toward gauging a country's success beyond Gross Domestic Product has been followed by many countries including Australia, France, Germany, Ireland, Italy, Mexico, the Netherlands, Switzerland and the USA. Recommendation 2 states that "Quality of life also depends on people's objective conditions and opportunities. Steps should be taken to improve measures of people's health, education, personal activities, political voice, social connections, environmental conditions and insecurity." (p.58). In this paper I have surveyed the measures of economic insecurity so far proposed in the literature. I expect many more to appear in the near future. I hope that better longitudinal data will be available to measure this complex phenomenon for many countries.

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SUMMARY

Economic insecurity is a term very much used by all of us to describe specific situations of high economic uncertainty we find ourselves in. Surprisingly, economic insecurity is a phenomenon that has not yet been analyzed from a thorough theoretical perspective. To the best of my knowledge, there are only a few contributions in the social sciences literature that are devoted to defining and measuring it. This note is a survey of these contributions. I will start with providing some of the definitions of economic insecurity available in the literature. I will then introduce the Osberg and Sharpe (2009) index, the Economic Security Index (2010) and conclude with a description of my work on the topic with Bossert (2009).

NEW POVERTY MEASURES TO MEET LOCAL POLICY NEEDS: THE CUMULATION APPROACH

Achille Lemmi, Gianni Betti, Giulio Tarditi, Vijay Verma

1. Introduction

The computation of poverty and social exclusion indicators is an essential monitoring tool. Indicators are most useful when they are comparable across time and space, as this allows determining trends and making meaningful comparisons between different situations. Policy research and applications require disaggregated statistics to increasingly lower levels and smaller subpopulations in order to take informed decisions, as national statistics are insufficiently precise.

The method discussed here addresses the problem improving the sampling precision of such indicators for subnational regions, through the cumulation of data in a rotational panel design (Verma *et al.*, 2010b). The reference is EU-SILC data, as it is to date the major source of comparative data on poverty in Europe. This dataset involves a rotational panel, which replaces a quarter of the sample each year, hence allowing a unit to be monitored for up to of four years. Cross-section and longitudinal databases of various durations are derived.

Measures can be calculated by aggregating information on individual elementary units into average measures – such as means, rates and proportions – or into distributional measures – such as variation or dispersion measures. It is interesting to note that a set of average measures at regional level can serve as a dispersion measure and can be a valid tool to identify geographical disparities.

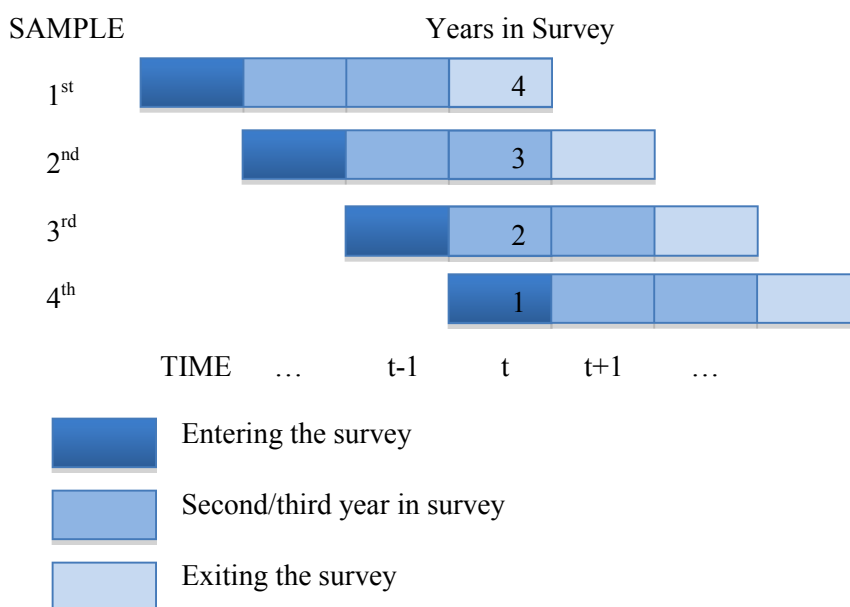
When using survey data, one can adopt different approaches to construct regional indicators:

- a) Direct estimation – as done at national level;
- b) Alternative indicators – with indicators that use data more intensively;
- c) Cumulation of data over time – by changing the temporal reference period;
- d) Synergy with other sources – adopting small area estimation techniques.

2. Cumulation in rotational panel design

The EU-SILC survey has been developed in each country on a common blueprint in order to adapt to the various country needs. Most countries use the standard rotational panel design, in which each cross section at time t has units that have been in the survey from one to four years. The diagram shows how the first (earliest introduced) sample has been in the study for four years, and is present in the cross-section data at time t . Similarly for the 2nd, 3rd and 4th samples active in the survey at time t .

Figure 1 – Rotational panel diagram: four subsamples and four (yearly) time periods.



Direct estimation would identify an estimator at time t by calculating it with respect to the cross section dataset, independent of values in adjacent timeframes. The cumulation method on the contrary relies on the integration of information in multiple timeframes. The sample overlap must be taken into account, and assumptions need to be made to guarantee a correct estimation of the indicator that will refer to an intermediate time frame.

3. Pooling data versus pooling estimates

To pool data between two or more data sources the analysis must be conducted on the same type of units, such as households or individuals, and the variables must be measured in a comparable way. The pooling of information can be done by:

1. Combining source estimates
2. Pooling data at the micro level

Technical details and relative efficiencies of the procedures depend on the situation characteristics. The two approaches may give numerically equivalent results, or one may provide more accurate estimates than the other, or only one may be appropriate/feasible.

Linear statistics such as totals pooling country estimates $\{\varphi_i\}$ with some appropriate weights $\{\omega_i\}$ give the same result as pooling data at the micro level with weights $\{w_{ij}\}$ rescaled as $w'_{ij} = w_{ij}(\omega_i/\sum w_{ij})$.

For ratios of the form $\varphi_i = \sum w_{ij} v_{ij} / \sum w_{ij} u_{ij}$, the two approaches give very similar results, however not identical, corresponding respectively to the “separate” and “combined” ratio estimates.

Cumulation is concerned with an equally common issue, in which the pooling of different sources is computed on the same population. In the case of a rotational panel design we have the pooling of different sources describing similar and largely overlapping populations. In a national survey this allows to pool over survey waves, which allows increasing the precision due to the additional information. This is of critical importance in regional estimates where available information is scarce.

Estimates from samples of the same population are most efficiently pooled with weights in proportion to their variances. This implies that they are efficiently pooled when the population has been sampled with similar sampling designs and in direct proportion to their sample size.

Alternatively the samples may be pooled at the micro level, with unit weights inversely proportional to the probability of being selected in any single sample. This latter procedure can be more efficient (O’Muircheartaigh and Pedlow, 2002), but may be not feasible as it requires the unit probability of selection into each of the samples, irrespective of whether the unit appears in the particular sample (Wells, 1998). An additional difficulty must be accounted for when dealing with complex sampling designs, as the structure of the resulting pooled sample can become too complex for variance estimation.

Different waves of a rotational panel survey increase the difficulty, due to the fact that the waves do not correspond to exactly the same population. This is analogous to combining samples from multiple frames for which it has been noted

that micro level pooling is generally not the most efficient method (Lohr and Rao, 2000).

For the above reasons, pooling of wave-specific estimates rather than of micro data sets is generally the appropriate approach to aggregation over time from surveys such as EU-SILC.

4. Variance estimation of cumulated measures

Standard poverty analysis determines the statistical unit's poverty status (poor or not-poor) based on the income distribution for each wave separately. As a benchmark indicator we will take the Head Count Ratio (HCR) indicator, which identifies the proportion of poor within the sample. These proportions are then averaged over a number of consecutive waves. The objective is to quantify the gain in sampling precision from such pooling given that data from different waves of a rotational panel are highly correlated. In other words, suppose a person's poverty status is determined from his income within the income distribution separately for each year, and once the poverty measure has been computed for each wave in the dataset, it is averaged over the number of consecutive waves. The cumulation method measures how much gain in sampling precision derives from this pooling, given that consecutive years generally present highly correlated data.

For estimating variances of cumulated measures properly taking into account the complexity, we can use for example the Jack-knife Repeated Replications (JRR) variance estimation methodology. Originally introduced as a technique of bias reduction, the JRR method has by now been widely tested and used for variance estimation of complex statistics, such as cumulative and longitudinal measures (Durbin, 1959). Efron and Stein (1981) and Efron (1982) provide a discussion of the Jackknife methodology.

JRR relies on replications generated through repeated re-sampling of the parent sample, and the following algorithm applies to a statistics Q of any complexity:

$$var(Q) = \sum_k \left[(1 - f_k) \frac{a_k - 1}{a_k} \sum_j (Q_{kj} - Q_k)^2 \right] \quad (1)$$

where k refers to stratum and j to individual Primary Sampling Unit (PSU); a_k is the number of PSUs in the stratum, and $(1 - f_k)$ is the finite population correction. Q_{kj} is the estimate based on the whole sample but excluding the particular PSU(k,j). Q_k is the average of Q_{kj} values for units in the stratum k .

In the application of JRR, a replication is formed by:

1. Eliminating one Primary Selection Unit (PSU) from the parent sample;

2. Compensating the weight given to the remaining units in stratum;

This generates a number of replications equal to the number of PSUs in the sample. We have applied this method for estimating variances in the EU-SILC rotational panel design for:

1. Sub-populations (including geographical domains);
2. Longitudinal measures such as persistent poverty rates;
3. Measures of net change and averages over cross-sections.

The union of all cross-sectional samples being compared or aggregated forms the parent sample. Using the common basis as structure of this total sample, a set of JRR replications is defined. Each replication is formed such that the replication identifying unit is excluded in its construction, hence being excluded in every wave where the unit appears. For each replication, the required measure is constructed for each of the cross sectional samples involved, and these are used to obtain the required averaged measure for the replication, according to JRR standard procedure (Betti *et al.*, 2007).

5. Illustrating the effect of correlation

In place of the full JRR application, it is more illuminating to provide here the following simplified procedure for quantifying the gain in precision from averaging over waves of the rotational panel. We also limit the analysis to the combination of two waves¹.

We will refer to the statistical unit's poverty status in terms of dichotomous indicator $[0,1]$ in the two adjacent years as $\{p_j\}$ and $\{p'_j\}$, with respective expected value $\{p\}$ and $\{p'\}$. The population variance can be calculated as:

$$\text{var}(p_j) = \sum(p_j - p)^2 = p(1 - p) = v \quad (2)$$

$$\text{var}(p'_j) = \sum(p'_j - p')^2 = p'(1 - p') = v' \quad (3)$$

$$\text{cov}(p_j, p'_j) = \sum(p_j - p)(p'_j - p') = a - pp' = c_1 \quad (4)$$

In the above notation $\{a\}$ is the persistent poverty rate over the two years. If the two waves completely overlap, in which case $p = p'$, the variance of the average

¹ The formula for pooling across a generic k number of years is discussed in Verma *et al.* (2010b).

measure $\{v_A\}$ can be calculated as follows by knowing the correlation $\{b\}$ and the variance $\{v\}$:

$$v_A = \frac{v}{2}(1 + b) \quad (5)$$

$$b = \frac{c_1}{v} = \frac{a-p^2}{p-p^2} \quad (6)$$

For applications to pairs of waves in EU-SILC it is necessary to allow for variations in cross-sectional sample sizes and partial overlaps as follows:

$$v_A = \frac{(v_1+v_2)}{4}(1 + b(n/n_h)) \quad (7)$$

Where $\{v_1\}$ and $\{v_2\}$ are the sampling variances, $\{b\}$ is the correlation coefficient over the two cross sections, $\{n\}$ is the overlap between the cross section samples, and $\{n_h\}$ is the harmonic mean of the sample size $\{n_1\}$ and $\{n_2\}$.

To calculate the precision gain due to cumulation some other formulas will be useful. The standard error of average poverty rate (Head Count Ratio, HCR)² assuming independent samples:

$$se_{ind} = \sqrt{\frac{(v_1+v_2)}{4}} \quad (8)$$

The standard error increasing factor due to positive correlation between waves:

$$F = \sqrt{(1 + b(n/n_h))} \quad (9)$$

The standard error of average HCR given correlated samples:

$$se_{cor} = \sqrt{v_A} = se_{ind}F \quad (10)$$

Arithmetic mean of the standard errors in the two different years:

$$se_{arit} = \sqrt{v_{arit}} = \frac{(\sqrt{v_1} + \sqrt{v_2})}{2} \quad (11)$$

² In the Eurostat terminology, here we refer to at-the-risk-of-poverty rate defined as the percentage of individuals with a disposable equivalent income below the 60% of the median.

Average gain in precision i.e. increase in effective sample size:

$$G = 1 - \left(\frac{se_{corr}}{se_{arit}} \right)^2 = \frac{v_{arit} - v_A}{v_{arit}} \quad (12)$$

The above described methodology has been applied to the cross-sectional and longitudinal EU-SILC data for Italy (2007-2008), Poland (2005-2006) and Czech Republic (2005-2006)³. Averaging the HCR over two waves leads to a variance of this averaged estimator that is approximately 30% less than the variance of the HCR estimated from just a single wave.

Table 1 – Gains from the cumulation over two waves: results for Italy, Poland and Czech Republic.

	Italy EU-SILC 2007-2008	Poland EU-SILC 2005-2006	Czech Republic EU-SILC 2005-2006
se_{ind}	0.36	0.34	0.43
se_{corr}	0.43	0.40	0.51
se_{arit}	0.50	0.48	0.61
F	1.20	1.18	1.18
G	26%	30%	30%

However, the EU-SILC cross-sectional datasets available to academic research have some major limitations, well described in Verma *et al.* (2010a)⁴. In this case one must add some further assumptions:

³ This small subset of countries was selected on the basis of the following considerations: a) The country contained several NUTS1 or NUTS2 regions. b) These regions were identified in the micro data set distributed by Eurostat. c) Information on sample structure was available in the data set, not only for the whole country, but also at the regional level.

⁴ The main limitation including the following. a) The sample structure information provided can be linked to only the longitudinal microdata in UDB (through common household identifiers, DB030), but not to the cross-sectional data set because of randomisation of the identifiers. b) Furthermore, the datasets involved are not truly longitudinal in terms of individuals present continuously in the panel, but are merely the part of the cross-sectional sample comprised of households belonging to rotation groups which have been present in the survey for one or more preceding waves. c) The information on sample structure, including the specially provided supplementary information, is generally coded only for the newly introduced panels each year, not for the entire data set. Feeding forward this information for panels introduced earlier is not straightforward because of changes in household identifiers, for instance due to household splits. Links have to be established at the personal level, going through personal register (P-file, variable HX030). d) For some countries, the information on effective stratification is incomplete where implicit stratification resulting from the systematic

1. $\{a\}$ is the persistent poverty rate of the balanced panel
2. $\{p\}$ is computed as the arithmetic mean poverty rate of longitudinal datasets
3. $\{n\}$ is computed by the following formula, where $\{m, m_1, m_2\}$ are respectively the panel and the two longitudinal sample sizes:

$$n = 0.75 \cdot \min(n_1, n_2) \frac{m}{\min(m_1, m_2)} \quad (13)$$

6. Variance and design effects

A useful concept when analysing and interpreting sampling errors is given by the so called “design effect” (Kish, 1995). The design effect is the ratio of the variance under the actual sample design, to the variance under a simple random sample of the same size. This can be expressed as follows:

$$d^2 = v/v_0 = (se/se_0)^2 \quad (14)$$

Passing from sampling errors estimates to design effects can clarify patterns of variation and determinants of magnitude of the error, particularly useful when smoothing and extrapolating the results. The design effect can be decomposed by identifying multiplicative sub-components, which can give indications to the most likely source of sampling inefficiency. Once the patterns of variation have been identified the results may be extended to other statistics, designs and situations in general. A crucial aspect of the JRR and other replication methods is that they can approximate the total design effect by estimating separately some of its components (Verma and Betti, 2010, 2011).

EU-SILC provides a further reason for decomposing the total design effect. Direct and complete computation cannot be done in many cases due to the limited information of the sample structure included in the micro data available to

sampling used. Variable defining the order of selection (DB070) is not coded or not coded in a standard way in some countries. e) The problem is compounded in some cases because of inconsistencies in the coding of the variable identifying ‘sample rotation groups’ (DB075). f) The same may be mentioned in cases where some of the PSUs may be ‘self-representing’, thereby forming effective strata rather than PSUs as coded.

researchers. By identifying sub-components one can identify components that may be more easily imputed. This means that from a situation where they can be computed, because the information is available, they can be carried over as simplifying assumptions if the situation is similar and the information is not available or the computation is not possible.

Starting from Verma *et al.* (2010a) we can algebraically decompose total variance into components or factors:

$$v = v_0 d^2 = v_0 (d_W d_H d_D d_X)^2 \quad (15)$$

In this case the design effect has been decomposed into four factors $\{d_W, d_H, d_D, d_X\}$, respectively the effect of sample weights, clustering of persons into households, clustering of households into dwellings, and other residual effects mainly due to clustering and stratification. All factors other than $\{d_X\}$, do not involve clusters or strata, but depend only on individual elements (households, persons etc.) and the sample weight associated with each such element in the sample. By contrast $\{d_X\}$ represents the sampling error of the various complexities of the design such as multiple stages and stratification. This implies that unlike other components it requires information on the sampling structure linking elementary units to higher stage units and strata. Given this information, it can be estimated using JRR.

We can compute the variance under two distinct assumptions about the structure design. First the variance under the actual design $\{v\}$ and second the variance computed by assuming the design to be a weighted simple random sample of the ultimate units $\{v_R\}$. This second variance can be estimated from a “randomised sample” in which the real sample uses only the individual weights and completely disregards the sample structure. By construction $v_R = v_0 (d_W d_H d_D)^2$ hence we can estimate $\{d_X\}$ as follows⁵:

$$d_X = \sqrt{v/v_R} \quad (16)$$

Table 2 distinguishes the HCR indicator with respect to two different poverty lines: national and regional. The poverty line defines the level to which the income distribution is pooled. In this case the at-risk-of-poverty definition is used. A national poverty line treats individuals equally across regional placement, by referring to the national income distribution. Vice-versa regional poverty lines take

⁵ In table 2 $\{d_D\}$ is unitary because in Poland the units of selection are households and not dwellings.

into account where individuals live, by using the corresponding regional income distribution to define the threshold.

Table 2 – *Estimation of variance and design effects at national level. Cross-sectional sample. Poland EU-SILC 2006.*

Estimate	d_x	d_w	d_H	d	%se ⁶ actual	%se SRS
Mean equivalised disposable income	0.94	1.22	1.74	1.99	0.57	0.29
Head count ratio using national poverty line	1.02	1.09	1.74	1.94	0.51	0.26
Head count ratio using regional poverty line	1.05	1.09	1.74	1.99	0.61	0.30

Both methods have advantages. Using regional poverty levels is considered a more purely relative measuring rule; however it is seldom used in official statistics, possibly to avoid confusion. One can argue that if European countries use national poverty lines then the principle should apply also to smaller geographic areas; however a nation generally has a homogeneity in language, life-styles, policies and other aspects that may be less evident in regions. Both measures are informative and are worth monitoring.

7. Illustrative applications of cumulation at the regional level

In table 3 we can read the estimates of variance and design effect for the cross-sectional 2005 and 2006 datasets in Poland, and compare the national estimates previously presented in table 2. All values except $\{d_{X(R)}\}$ and $\{d_x\}$ are computed at regional level analogously to the computation at national level. All factors other than $\{d_x\}$ do not involve clusters or strata, but essentially depend on individual elements and the associated sample weights, hence are usually well estimated even for quite small regions. The factor $\{d_{X(R)}\}$ for a region (R) may be estimated by three different approaches.

The first approach is to calculate $\{\%se\ SRS\}$ directly at regional level, as was done at national level. This requires large regions, each with a large enough number of PSUs (over 25-30) to estimate the variance.

⁶ The notation $\{\%se\}$ refers to the percentage of the mean value when dealing with mean statistics (eg. equivalised disposable income). For proportions and rates (eg. poverty rates) it is given as absolute percentage points. The terms $\{\%se\ actual\}$ and $\{\%se\ SRS\}$ relate respectively to the variances $\{v\}$ and $\{v_0\}$ in the text.

The second approach makes an assumption on the relationship between $\{d_{X(R)}\}$ and the national (N) counterpart $\{d_{X(N)}\}$.

The most common assumptions are one of the following:

1. The region involves a SRS of elements⁷, then $\Rightarrow d_{X(R)} = 1$;
2. The region design is very similar to the national design $\Rightarrow d_{X(R)} = d_{X(N)}$;
3. The main difference is accounted for by the average cluster size⁸ $\{C\}$

$$\Rightarrow d_{X(R)} = 1 + (d_{X(N)}^2 - 1) \frac{C_R}{C_N} \quad (17)$$

Finally the third approach⁹ gives a very good approximation and is very simple, as it does not involve the JRR computation of variance. For means indicators, such as the median equivalised income, one can reasonably assume a constant coefficient of variation. In SRS the region-to-country ratio of relative standard errors (expressed as percentage of the mean value as in table 3) is inversely proportional to the square-root of their respective sample sizes:

$$(\%se * SRS)_{(R)}^2 = (\%se * SRS)_{(N)}^2 (n_{(N)}/n_{(R)}) \quad (18)$$

For proportions¹⁰ $\{p, q = 1 - p\}$ with standard error expressed in absolute percent points as in table 3, the following can be applied:

$$(\%se * SRS)_{(R)}^2 = (\%se * SRS)_{(N)}^2 (n_{(N)}/n_{(R)}) \frac{p_{(R)}q_{(R)}}{p_{(N)}q_{(N)}} \quad (19)$$

One can notice that in table 3 $\{\%se \text{ actual}\}$ at regional level is approximately 200-300% the national level, for all of the three measures discussed. Regional HCR estimates based on the national poverty line are quite different from those based on the regional ones. While individual regional estimates of HCR using the regional

⁷ This is true regardless of sampling design in other regions.

⁸ This is meaningful only if $d_{X(N)} \geq 1$ which is common but not always true. Values smaller than one may arise when stratification is stronger than clustering, when units within clusters are negatively correlated (rare) or simply as a result of random variability. In these cases method 2 should be adopted.

⁹ This is the method used in table 3.

¹⁰ Here poverty rates are treated as ordinary proportions.

poverty line are quite close to the national estimate (19.0 for 2006), the ones using the national poverty line are more variable (from 14.7 to 25.2 for 2006).

Table 3 – Estimation of variance and design effects at the regional (NUTS1) level. Full cross-sectional sample¹¹. Poland EU-SILC 2006.

	2005						2006		
	Est.	No. people	%se* SRS	d_x^*	d	%se actual	Est.	No. people	%se actual
Mean equivalised disposable income									
Poland	3,704	45,122	0.29	0.94	1.99	0.57	3,040	49,044	0.62
PL1	4,236	8,728	0.65	0.94	2.06	1.34	3,455	9,871	1.32
PL2	3,889	9,273	0.63	0.94	1.78	1.13	3,143	10,181	1.22
PL3	3,162	9,079	0.64	0.94	2.00	1.28	2,618	9,674	1.32
PL4	3,530	6,912	0.73	0.94	1.90	1.39	2,977	7,195	1.84
PL5	3,906	4,538	0.90	0.94	1.96	1.77	3,164	5,066	1.85
PL6	3,419	6,592	0.75	0.94	1.90	1.43	2,816	7,057	1.58
At-risk-of-poverty rate, national poverty line									
Poland	19.1	45,122	0.26	1.02	1.94	0.51	20.5	49,044	0.51
PL1	17.1	8,728	0.57	1.02	1.85	1.06	20.9	9,871	1.07
PL2	14.7	9,273	0.52	1.02	1.86	0.97	19.0	10,181	1.05
PL3	25.2	9,079	0.64	1.02	2.09	1.34	20.8	9,674	1.21
PL4	18.7	6,912	0.66	1.02	1.98	1.32	20.1	7,195	1.35
PL5	18.6	4,538	0.82	1.02	1.91	1.56	22.2	5,066	1.68
PL6	21.4	6,592	0.71	1.02	1.95	1.40	21.3	7,057	1.37
At-risk-of-poverty rate, regional poverty lines									
Poland	19.0	45,122	0.30	1.05	1.99	0.61	20.5	49,044	0.51
PL1	19.8	8,728	0.70	1.04	1.90	1.34	20.9	9,871	1.07
PL2	18.5	9,273	0.67	1.04	1.91	1.27	19.0	10,181	1.05
PL3	18.6	9,079	0.68	1.06	2.14	1.45	20.8	9,674	1.21
PL4	17.5	6,912	0.76	1.05	2.04	1.54	20.1	7,195	1.35
PL5	20.9	4,538	1.00	1.04	1.97	1.96	22.2	5,066	1.68
PL6	19.1	6,592	0.80	1.05	2.00	1.60	21.3	7,057	1.37

For country and NUTS1 level poverty lines, cumulating the estimates over two waves leads to a reduction of 30% in variance compared to a single wave. This reduction of the variance is smaller for mean equivalised income due to a higher correlation (exceeding 0.70) between incomes for the two years.

¹¹ The quantities with an asterisk are directly computed only at the country level, for individual regions these values have been estimated from the country level values on the basis of simple models as explained in the text.

Table 4 – Gain in precision from averaging over correlated samples. Poland NUTS1.

	se_{ind}	se_{corr}	se_{arit}	F	G
Mean equivalised disposable income					
Poland	0.42	0.55	0.60	1.31	14%
PL1	0.94	1.26	1.33	1.33	11%
PL2	0.83	1.08	1.17	1.30	15%
PL3	0.92	1.20	1.30	1.31	14%
PL4	1.15	1.47	1.62	1.27	18%
PL5	1.28	1.70	1.81	1.32	12%
PL6	1.07	1.41	1.51	1.32	12%
At-risk-of-poverty rate, national poverty lines					
Poland	0.34	0.40	0.48	1.18	30%
PL1	0.70	0.83	0.99	1.18	29%
PL2	0.65	0.76	0.92	1.17	31%
PL3	0.88	1.03	1.24	1.18	30%
PL4	0.89	1.05	1.26	1.18	30%
PL5	1.06	1.23	1.50	1.17	32%
PL6	0.94	1.12	1.33	1.19	29%
At-risk-of-poverty rate, regional poverty lines					
Poland	0.40	0.47	0.56	1.18	30%
PL1	0.86	1.02	1.21	1.18	29%
PL2	0.83	0.98	1.16	1.18	29%
PL3	0.94	1.10	1.33	1.17	31%
PL4	1.03	1.21	1.45	1.18	30%
PL5	1.29	1.51	1.82	1.17	31%
PL6	1.05	1.24	1.49	1.18	31%

8. Presenting the relationships between income and HCRs

Three indicator estimates across two years and seven areas are reported in table 3. These are the regional equivalent (NUTS1) of the results presented in table 2. In figure 2 the estimates have been centred¹² (zero mean) to eliminate the average country variation over the two years. For this reason the intercept's p-value has not been reported.

The rate calculated on the national poverty line (HCR_n) is a more absolute measure of poverty, as all individuals are confronted with the same threshold. The graph on the left shows a clear negative linear relationship between the HCR_n and

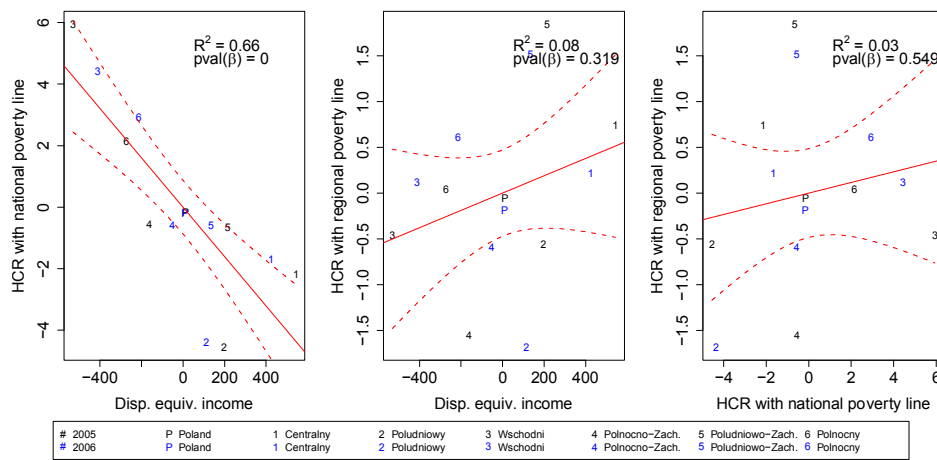
¹² It may be noted that - under the considered time frame - the data show an 18% difference in median income, and respectively an increase in the HCR of 7.8% (national poverty line) and 8.5% (regional poverty line).

the disposable equivalent income. This is intuitive, as richer regions are likely to have a lower proportion of their income distribution below a given national threshold, with respect to poorer regions.

The rate calculated on the regional poverty line (HCR_r) is instead a more relative measure of poverty, as individuals are confronted with a threshold based on their regional income distribution. In the centre graph one can notice a weak positive relationship, which implies that richer regions have higher HCR_r. This evidence suggests that richer regions have a more unequal income distribution.

The two poverty measures are connected. HCR_n integrates the national income distribution below the national poverty line. It reflects the overall effect of “within” and “between” regions income disparity. Conversely the HCR_r integrates the regional income distribution below the regional poverty line. This does not take into account the differences between the various regional poverty lines, hence it can be considered a purely “between” poverty measure.

Figure 2 – Scatterplot between the zero centred median disposable equivalent income, the Head Count Ratio calculated on the national poverty line and the Head Count Ratio calculated on the regional poverty line.



9. Conclusion

The poverty measures estimates calculated through the proposed cumulation method are able to incorporate information from multiple time frames. This additional information can increase the sampling precision by a substantial amount - depending on the overlap between different waves - hence the method is successful in its principal objective. National and regional poverty lines have been investigated as both specifications contribute to a deeper understanding of the underlying deprivation structure. In both cases the cumulation method shows similar effectiveness. The design effect has been calculated and it decomposed into factors that identify separate sampling properties, by comparing the actual sampling design with the simple random sample benchmark.

There are however some limitations to the numerical illustrations which can be provided. Firstly, the correlation between different waves in the cross-section data has been imputed from the longitudinal dataset, as the link between statistical units was not available in the fuller cross-sectional data sets. Secondly, the fact that only a few countries have released the information regarding the sampling structure did not allow a full EU27 comparison.

In conclusion, further information disclosure from statistical agencies is necessary to make full use of this method. This is especially important in a diverse EU27, where the monitoring of poverty is a crucial tool to guarantee that the benefits and costs of free trade are more equally shared.

Acknowledgements

This paper has been partly funded by the Italian PRIN research project n. 2007HEWTBE-003, and partially funded by the European Commission 7th Framework Project FP7-SSH-2007-1 n. 217565 - SAMPLE. The Authors are grateful to Dr. Francesca Gagliardi and Dr. Caterina Ferretti for their support and helpful comments.

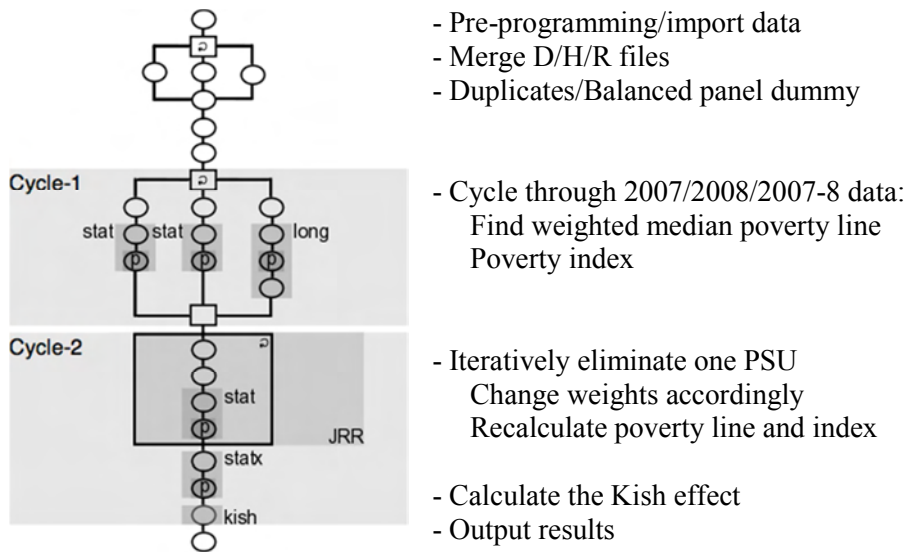
Annex 1

Both SAS and R code have been implemented for the estimation procedure. Due to the previously discussed limitations in the data availability to academic research, different quantities need to be calculated from the longitudinal and cross-sectional datasets:

1. $(a), (p_1), (p_2), (m), (m_1), (m_2)$ from the longitudinal dataset
2. $(est_1), (est_2), (se_1), (se_2), (n_1), (n_2)$ from the cross-sectional datasets¹³

The code control flow diagram is fairly simple. The most time intensive step is the calculation of the poverty line as it is repeated many times in the JRR and needs to take into account the cross-sectional weights which vary from one replication to another.

Figure 3 – R meta-code control flow diagram: square nodes identify control structures and round nodes identify functions or blocks of functions.



¹³ The appropriate structure of STRATA and PSUs must be defined.

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SUMMARY

Poverty and social exclusion indicators are an essential monitoring tool, most useful when comparable across countries. Implementing informed policies often requires statistics disaggregated to lower levels than those meeting national needs. National estimates are particularly insufficient for monitoring poverty and social exclusion, as these fields require complex statistics that take into account the distribution. The correct statistics are necessarily based on intensive and relatively small-scale surveys of households and individuals. This paper addresses how to improve the sampling precision for EU regions through the cumulation of data over rounds of regularly repeated national surveys. The reference data for this paper are the EU Statistics on Income and Living Conditions, which provides a standard integrated design adopted by nearly all EU countries. It involves a rotational panel, where a new sample of households and individuals replace each year 25% of the existing sample, and are followed for four years, offering each year a cross-sectional sample and longitudinal samples of various duration. As the cross sectional datasets available to academic research are not provided with the inter-temporal statistical unit link, correlation between two waves cannot be computed directly, but must be inferred through the longitudinal dataset. In order to compute sampling errors, it is essential to take into account the sample design by appropriately coding the sample structure. In survey data, lack of information on the sample structure is a long-standing and persistent problem, and it represents a major problem in the EU-SILC micro-data available to researchers. In many cases the limited information prevents direct and complete computation of variances. We have developed approximate procedures in order to reduce these limitations, and have presented useful estimates of sampling errors. Decomposition of variances and design effects identify more “portable” components, which can be carried over from external situations, allowing variance estimates for a wider range of statistics, thus partially overcoming the lack of information on sample structure.

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A SENSITIVITY ANALYSIS ON GENDER GAPS IN THE ITALIAN LABOR MARKET¹

Maria Grazia Pittau, Shlomo Yitzhaki, Roberto Zelli

1. Introduction

The aim of this paper is to validate an old/new methodology which uses concentration curves within the Gini regression framework, to detect whether the relationship between two variables is monotonic, that is if the local slope does not change along the range of the explanatory variable.

Our starting point is based on Yitzhaki (1996) which interprets the OLS and Gini regression coefficients as weighted averages of slopes defined between adjacent observations of the explanatory variable. The method used, whether OLS or Gini regression, determines the weighting scheme. This distinction enables one to differentiate between the contribution of the basic data, i.e., the slopes that are used by both methods, and the contribution of the method used, which determines the weighting scheme. Both weighting schemes are based on the variability of the explanatory variable. The difference is in the way variability is defined. The OLS weighting scheme is based on the variance of the explanatory variable while in Gini regression it is based on the Gini's Mean Difference (GMD) of the same variable. This leads to the Lorenz curve which describes the way the GMD is composed of. Yitzhaki and Schechtman (2004) presented the weighting scheme of the Gini regression coefficient as derived from the Concentration Curve of the dependent variable with respect to the explanatory variable.

In this paper, we use variations of the Lorenz curve and the Concentration Curve in order to decompose the regression coefficient into the contribution of each segment of the explanatory variable to the regression coefficient. In particular, we are interested in finding out the contributions of positive and negative segments of the regression coefficient so that one can see how the regression coefficient is composed of.

1 This paper represents a shorter and slightly modified version of the paper entitled "The make up of a regression coefficient: An application to gender" authored by Pittau, Yitzhaki and Zelli (2011).

The methodology is also applicable to the OLS, but some of the properties that can be revealed by using the GMD are lost when using the OLS. Therefore, we concentrate on Gini regression and we will point out the properties that are relevant to the OLS too. This means that the appropriate interpretation of the linear regression model is actually as a linear approximation to an unknown regression curve (Schechtman, Yitzhaki, and Artzev, 2008).

While most of the research in this area is theoretical, we provide the validity of this methodology in examining gender differences in the effect of age on labor market participation in Italy.

The structure of the paper is the following: Section 2 presents a brief review of the theory used in the paper. Readers who are interested only in the practical application can read only section 2.3, the practitioner's guide. Section 3 describes the data and the labor market variables we used in the analysis. Section 4 reports the main empirical results on gender differences in the Italian labor market in terms of labor participation, hours of work and earnings. Section 5 concludes and gives suggestions for further research.

2. A brief review of the theory

2.1. The LMA and NLMA curves.

The LMA (Line of independence Minus the Absolute concentration curve) is based on an extension of the Lorenz curve. The Absolute Lorenz Curve (ALC), which is the Lorenz curve multiplied by the expected value of the variable defines the GMD or simply Gini, which is similar to the variance. The GMD can be extended to define the equivalents of the Pearson correlation coefficient and the Ordinary Least Squares regression coefficient. The Gini has decomposition properties that nest the decomposition of the variance as a special case.

The NLMA curve is a Normalized LMA curve intended to relate the curve to a different parameter such as a regression coefficient or correlation. The use of curves to describe variability and correlation enables a better understanding of the contribution of different sections to the overall parameter. Hence, in what follows we will be skipping from curves to parameters and vice versa.

Let us start with the definition of LOI:

$$\text{LOI}(F_X^*) = \mu_Y F_X^* \quad (1)$$

The LOI, which is an abbreviation for Line Of Independence (represented by OCB in the Figure 1), presents the cumulative value of the smallest values of the

explanatory variable, would the dependent and the explanatory variables be statistically independent.

The second curve is

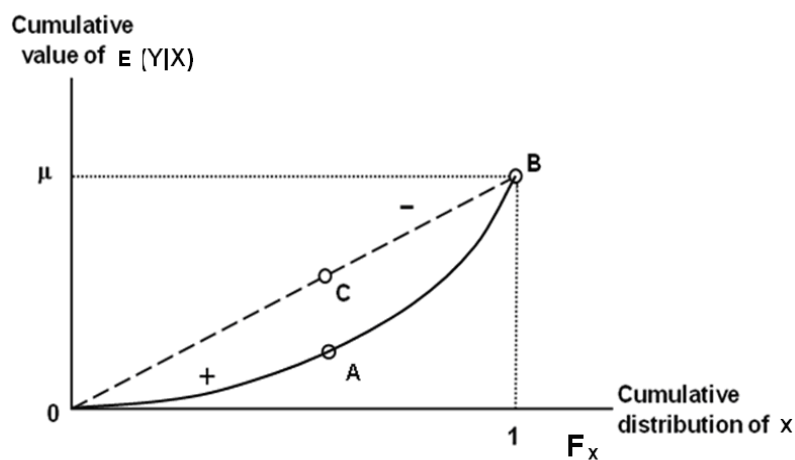
$$ACC(F_x^*) = \int_0^{F_x^*} E(Y | F_x) dF_x \tag{2}$$

as the Absolute Concentration Curve (ACC) of the dependent variable with respect to the explanatory variable. The ACC (represented by OAB on the Figure 1) describes the expected cumulative value of the observations of the explanatory variable. Note, that the LOI is actually the ACC of Y with respect to X, provided that X and Y are statistically independent.

The LMA curve is defined as the vertical difference between the curves:

$$LMA(F_x^*) = LOI(F_x^*) - ACC(F_x^*) \tag{3}$$

Figure 1 – Variables and descriptive statistics: demographics.



The properties of the LMA curve that are used in this paper are the following:

- (a) The curve starts at (0,0) and ends up at (1,0). It can take any shape depending on properties of $E(Y|X=x)$.
- (b) The derivative (slope) of the curve is equal to $\mu_Y - E(Y|X=x_F)$, where x_F is the value of X at F_x^* . That is the curve has a positive slope if the

conditional expected value of the dependent variable is smaller than its expected value, it is horizontal if the conditional expected value of the dependent variable is equal to the expected success, and it declines if $E(Y|X=x_F) > \mu_Y$.

- (c) The curve is concave (convex) if $E(Y|X=x_F)$ is monotonically increasing (decreasing) with X .

The properties listed above enable one to follow the monotonicity of the regression curve from the LMA curve. In the next section we will “translate” properties of the LMA curve into the properties of the regression curve.

The LMA curve has several additional properties that enable us to connect it to the familiar concepts of regression coefficients and correlations.

2.2. The Ordinary Least Squares and Gini regression coefficients

The OLS regression coefficient does not need an introduction. However, the LMA curve is directly related to a different concept of a regression coefficient – the Gini regression coefficient (Olkin and Yitzhaki, 1992). The properties listed below hold only with respect to the Gini regression coefficient while others hold for both regression coefficients.

The simple OLS regression coefficient is defined as

$$\beta^{\text{OLS}} = \frac{\text{cov}(Y, X)}{\text{cov}(X, X)} \quad (4)$$

The Gini simple regression coefficient is defined as (Olkin and Yitzhaki, 1992):

$$\beta^{\text{G}} = \frac{\text{cov}(Y, F(X))}{\text{cov}(X, F(X))} \quad (5)$$

where $F(X)$ is the cumulative distribution of X .

The next set of properties enables connecting the LMA curve to regression methodology.

- (d) The area enclosed between the LMA curve and the horizontal axis is equal to $\text{cov}(Y, F(X))$, which is the numerator in both the Gini regression coefficient and the Gini correlation (Yitzhaki, 2003).
- (e) If we redraw the LMA curve with X instead of plotted on the horizontal axis, then the area enclosed between the curve and the horizontal axis is

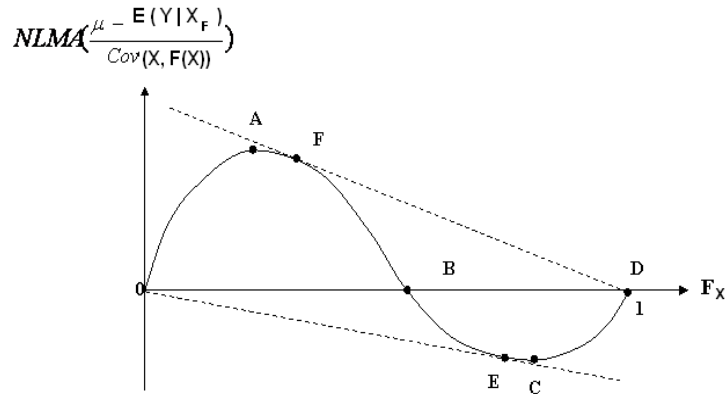
- equal to $\text{cov}(Y, X)$, that is the numerator of the OLS and Pearson coefficients. (Yitzhaki, 1998).
- (f) If the curve is always above (below) the horizontal axis, then the sign of Gini and Ordinary Least Squares (OLS) regression coefficients of Y on X will be positive (negative) for all monotonic non-decreasing transformations of Y or X.
 - (g) If the curve intersects the horizontal axis then there exists a monotonic non-decreasing transformation of Y that can change the sign of the Gini and the OLS regression coefficients.
 - (h) If in a given section the curve is convex (concave) then the sign of Gini regression coefficient in that section is negative (positive).

Property (d) enables us to draw two additional curves that will improve the content of the curve. By dividing the vertical axis by $\text{cov}(X, F(X))$ the area enclosed between the curve and the horizontal axis becomes equal to the Gini regression coefficient. This curve is referred to as the Normalized LMA (NLMA) curve.

Property (e) is listed in order to relate the curve to the OLS regression coefficient. However, the use of X instead of F(X) makes the LOI (equation 1) non-linear so that all the properties that are based on the convexity/concavity of the LMA curve are lost. What remains are the properties that are based on intersection of curve with the horizontal axis.

Figure 2 presents an a-typical curve intended to demonstrate the properties of the NLMA curve. From O to A and from C to D the curve is increasing which means that values of Y are lower than the average value of Y. From A to C the curve declines which means that the values of Y are greater than the average. Between O to B the curve is concave which means that the regression curve increases with X. The curve reaches a peak at A so that it reaches a turning point at this point, and it has a trough at C which means that it has a "negative" turn, from above average to below average.

The area enclosed between the curve and the horizontal axis is positive so that the Gini regression coefficient is positive. However, the curve intersects the horizontal axis which means that by applying a monotonic transformation to Y one can change the sign of Gini or OLS regression coefficients. For example, Shrinking Y at the range BD and increasing the value of Y in the range OB will increase the range with positive contribution to the regression coefficient, making the coefficient more positive than the one we have.

Figure 2 – An example of NLMA curve.

Property (d) of the LMA states that the area enclosed between the LMA curve and the horizontal axis is equal to $\text{cov}(Y, F(X))$. From (5) we can see that by normalizing (i.e., dividing) the vertical axis of the LMA figure by $\text{cov}(X, F(X))$ we get a graphical representation of the Gini regression coefficient. We refer to the Normalized curve as the NLMA curve.

Having described graphically the Gini regression coefficient, we can follow Yitzhaki and Schechtman (2010) in order to see the contribution of different sections of X to the regression coefficient on Y .

Assume that the observations are partitioned into M disjoint groups, according to different levels of ability, denoted by $m=1, \dots, M$ and let $p_m = n_m/n$ be the relative size of group m .

Then, the Gini and OLS regression coefficients can be decomposed as follows:

$$\beta^i = \sum_{m=1}^M w_m^i \beta_m^i + w_B^i \beta_B^i \quad (6)$$

where $i = \{\text{OLS}, \text{Gini}\}$. For $i = \text{OLS}$ we have:

$$w_m = p_m \frac{\text{cov}_m(X, X)}{\text{cov}(X, X)} \quad \beta_m = \frac{\text{cov}_m(Y, X)}{\text{cov}_m(X, X)}, \quad w_B = \frac{\text{cov}_B(\bar{Y}_m, \bar{X}_m)}{\text{cov}(X, X)}$$

$$\beta_B = \frac{\text{cov}(\bar{Y}_m, \bar{X}_m)}{\text{cov}(\bar{X}_m, \bar{X}_m)},$$

where \bar{Y}_m and \bar{X}_m denote the vectors of group means.

The structure of the decomposition for i -Gini is identical to the one presented in (6) except that the terms are the equivalent terms of the Gini regression coefficients while the weights are the shares of each section of X in the overall Gini of X . Equation (6) allows us to investigate the contribution of each section of X to the regression coefficient, with one major difference. For the Gini we can present the contribution in an easy to follow an LMA curve. The decomposition (6) is based on four types of components: the group's weight (w_m), the group's regression coefficient (β_m), the between-group weight (w_b) and the between-group regression coefficient (β_b). We will use this decomposition in the application section.

To see the connection to OLS regression it is worth to point out that a variation of the LMA (and NLMA) curves can be used to describe the contribution of each section to the Ordinary Least Squares coefficient. Would we change the horizontal axis to be X instead of F_X then the area enclosed between the new LMA curve and the horizontal axis will be equal to the numerator of OLS regression coefficient. By dividing the new curve by $\text{cov}(X, X)$, i.e., the variance of X , then the area enclosed between the new curve and the horizontal axis will be equal to the OLS regression coefficient. However, the equivalent of the LOI ceases to be linear and the convexity/concavity properties of the curve may change. Therefore, to get as much as we can from the curve, it is worth to use the Gini regression rather than the OLS.

2.3. A practitioner's guide

In this section we present the relationship between some theoretical patterns of the slope of the regression curve, i.e., $\partial E\{Y | X = x\} / \partial x$, and the representations of those patterns in LMA.

There are several properties of the LMA curve that are needed for the analysis:

1. If the LMA curve increases (decreases, horizontal) then $E(Y|X)$ is below (above, equal) the average of Y .
2. If the LMA curve is concave (linear, convex) then the slope of the regression curve is positive (flat, negative) locally.
3. If the LMA curve is always above (below) the horizontal axis then the sign of the regression coefficient is positive (negative) for all possible monotonic non-decreasing transformations of Y , i.e., for all possible assumptions on the distribution of X .
4. If the LMA curve intersects the horizontal axis then there are sections of X with negative and positive correlation with Y . This implies that one can

find monotonic non-decreasing transformation that can change the sign of the regression coefficient.

Following are some examples for the relationship between the regression curve and LMA curve.

Figure 3 – *A discrete regression curve.*

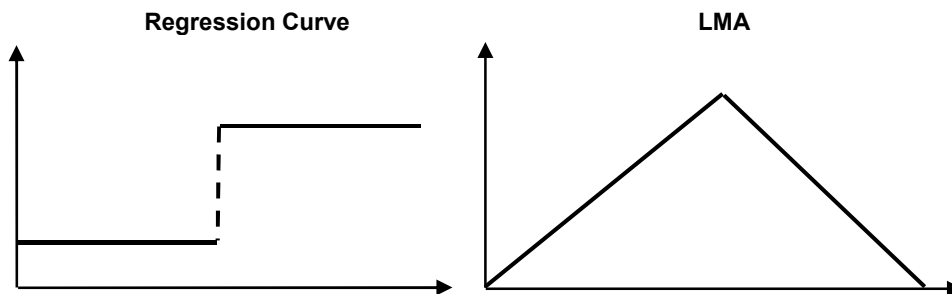


Figure 3 presents the curvature of a regression curve that is discontinuous and "jumps" from zero to one about the median of X . Then the LMA curve would create a symmetric triangle with a slope of 0.5 at the left-hand side of the peak and then the curve symmetrically declines at the second half. Changing the values of Y to another constant changes the slope of the LMA curve, but the shape will remain the same.

Figure 4 – *A Linear Regression Curve.*

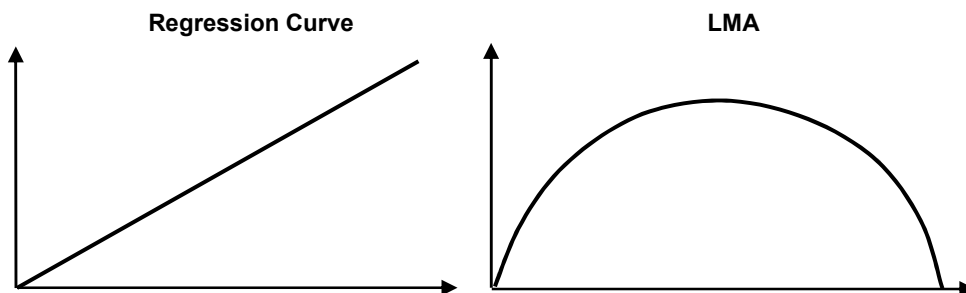


Figure 4 presents a linear regression curve. That is Y is a linear function of X . In this case the LMA curve looks like a bell curve with the peak being at the median. At the left-hand side of the figure the curve is increasing, an indication that the depending variable is below the average, while at the right hand side of the figure the curve is declining which indicates that Y is above its average.

Finally the curious reader may ask why we propose the use of the LMA curve over alternative presentation of the regression like a scatter diagram or a diagram with X on the horizontal axis and $E\{Y|X\}$ on the vertical axis, when actually they rely on the same data and carry the same information. The answer to this question is based on two properties of the LMA curve: the first is that the LMA curve is a cumulative curve and as such it tends to reduce the effect of random perturbations and the second is that the LMA curve is informative about the overall regression coefficient. It is the only curve that can tell whether a monotonic transformation of the variable can change the sign of the regression coefficient.

2.4. Estimation and testing

Estimation of the parameters involved that are related to the Gini methodology (Gini regression and Gini correlation coefficients) were developed in Schechtman and Yitzhaki (1987), Schechtman, Yitzhaki and Artzev (2008), and Schechtman, Yitzhaki and Pudalov (2011). The estimators are the sample's representation of the population parameters with the empirical cumulative distribution substituting for the cumulative distribution. It is shown in the above mentioned papers that the estimators are composed of functions of U-statistics, so that for large samples the distributions of the estimators converge to the normal.

The estimation of the LMA curve is also based on the sample's version of the population curve. However, we do not have yet tests that can be used for testing concavity or convexity of the curve, but we can use the Gini parameters that are based on truncated segments of the curve to test for concavity/convexity. Therefore, our recommendation at this stage is to rely on large samples and pay attention only to large sections in order to be sure that the findings are significant.

3. The data

The analysis on the gender gap in the labor market is based on data drawn from the European Union Survey on Income and Living Conditions (EU-SILC). Soon after its launch, EU-SILC became the principal source for comparative statistics on labor market conditions, income and related phenomena in the member states of the European Union. In this paper we focus on Italy, but similar analyses can be carried out also for other European countries.

A comprehensive age profile of economic variables is currently possible only using cross-sectional data. Adoption of a cohort analysis would have required a much larger number of waves than those currently available. Therefore, our

analysis focuses on the latest wave released for the year 2008, which collects information on household activities related to the year 2007.²

For each respondent we have selected age, personal cross-sectional sampling weight, activity status, average weekly hours of work in main and secondary activities, employee income and self-employed income. Note that we are able to identify the age in terms of years and quarters.

Table 1 – *Population aged 18--65 years by activity status and gender (percentage values). Italy 2007.*

	Men	Women	Total
Population	49.9	50.1	100.0
Employed	71.9	46.8	58.3
Unemployed	6.2	7.1	6.7
Retired	9.0	6.6	7.8
In other activities	12.3	38.8	25.6
Undefined	0.6	0.7	0.7
Total	100.0	100.0	100.0
Participation rate	78.1	53.9	65.9

Source: authors' calculation on weighted data from EU-SILC 2008. Cross-sectional weights.

Note: Activity status defined according to the PX050 derived variable. Participation rate defined as the percentage of employed and unemployed over the total population aged 18-65.

We selected individuals aged between 18 and 65 years old, that corresponds to the end of the high school and the most frequent year of retirement in Italy, respectively. In the following we give a description of the variables (see for more details the reference manual: Eurostat, 2009). Each household respondent (of any age) is labelled by her activity status (PX050), which is a derived variable of the survey. The activity status is calculated on the basis of questions concerning the number of months spent at full-time work, at part-time work, in unemployment, in retirement, studying, and in inactivity. The respondent is identified as employed (full-time and part-time), unemployed, retired, or in other inactivities if the respondent has spent more than six months in that status³.

Table 1 reports the structure of the population aged between 18 and 65 by activity status and gender.

² Cross-sectional UDB SILC 2008 Rev.2, October 2010.

³ If the respondent has not spent at least six months in none of those status, the variable is coded as missing/undefined.

The hours of work corresponds to the number of hours the respondent normally works in a week in his/her job. This covers all hours including extra hours, either paid or unpaid, which the person normally works, but excludes the travel time to work as well as the main meal breaks. If multiple jobs are held, it is asked to indicate the number of working hours in the the main job and in the subsidiary jobs. The main job is the one with the greatest number of hours usually worked. Some respondents, particularly the own-employed and family workers, may not have usual hours, in the sense that their hours vary considerably from week to week or month to month. When the respondent is unable to provide a figure for usual hours for this reason, the average of the hours actually worked per week over the past four weeks is used as a measure of usual hours (Eurostat, 2009).

Employee income is defined as the total annual remuneration, in cash or in kind, payable by an employer to an employee for work done by the latter during the income reference period. Employee income is composed by gross employee cash or near cash income, gross non-cash employee income, and employer's social insurance contribution. Self-employment income includes gross cash benefits or losses from self-employment including royalties, and value of goods produced for own consumption. An individual can earn his/her labor income from multiple activities. Therefore an individual can obtain her/his earnings from wage sand self-employment income simultaneously. In Italy this phenomenon is particularly prominent. Based on EU-SILC data, the estimated percentage of employees who only work exclusively for a public or private employer represent 58.3% of the total population in work, 19.2% is the percentage of self-employed persons who exclusively work in their own business, whereas people who receive simultaneously employee and self-employment income represent 22.5% of total employment.

Table 2 reports average weekly hours of work and annual earnings by gender in Italy in 2007. On average, women tend to work less than men by around 17%, corresponding to less than seven hours a week, and earn annually about 25% less, corresponding to about 9,200 euros. Note, however, that gender differences in participation rate are much larger than gender differences in hours worked by participants.

Table 2 – *Weekly hours of work and annual earnings by gender. Italy 2007.*

	Men	Women	Total
Weekly hours of work	42h 52'	35h 31'	39h 54'
Annual earnings (euro)	37,708	28,520	34,107

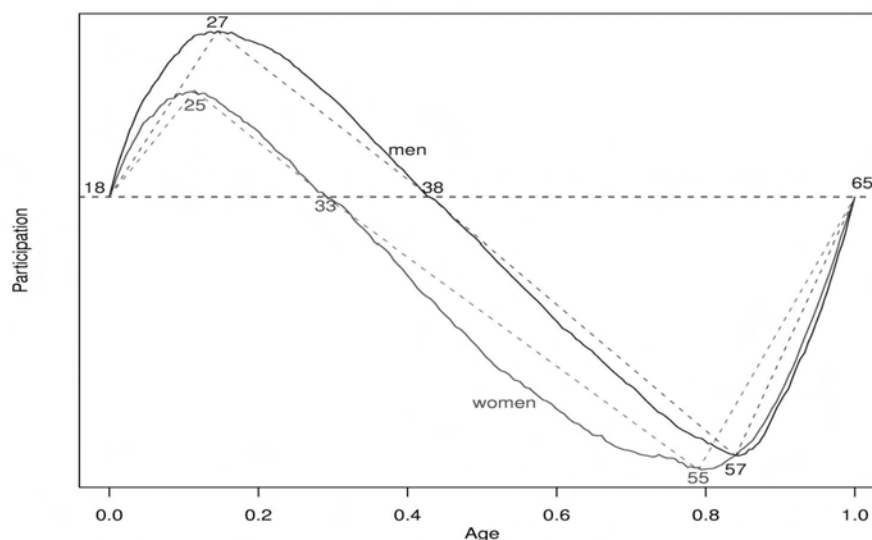
Source: authors' calculation on weighted data from EU-SILC 2008. Cross-sectional weights.

4. Analysis of age profiles

Our empirical strategy is to find whether there is a gender difference in the age profiles of key variables in the labor market, under the plausible assumption that the working age population is between 18 and 65 years old. We have selected the regression with the age as the explanatory variable because it is well documented that in many areas age does not create monotonic relationship with other variables (Deshpande and Suresh, 1990). The first variable is participation. Next we take working hours per week. Finally we take total earnings. For each variable, we look at the NLMA curve of men and women to decompose the overall regression coefficient into the contributions of each section of X (age groups). The uncertainty of the estimated regression coefficients is assessed by a Jackknife resampling methods, a procedure that recalculates the coefficients dropping one observation at a time and adjusting the weights accordingly (Yitzhaki, 1991).

4.1. Participation

Individual participation is a binary variable, assuming the value of one if the respondent's activity status is employed or unemployed and zero otherwise, according to the activity status defined above. The participation rate (at each age) is defined as the percentage of employed and unemployed relative to the corresponding total population. Figure 5 reports the NLMA curve for participation and age by gender. The overall Gini regression coefficient of participation on age is negative. This can be seen from the figure because the area below the horizontal axis is greater than the area above it. Also can be seen from the figure that the Gini regression coefficient for women is more negative than the regression coefficient for men because the area above the axis for women is smaller than that for men and the area below the horizontal axis is greater for man than for women. This can be verified from Table 3.

Figure 5 – NLMA curve for participation and age by gender in Italy, 2007.

Both NLMA curves intersect the horizontal axis. This means that the Gini covariance (the numerator of the Gini regression coefficient) is partly positive (for low age section) and partly negative (for high age section). A monotonic non-decreasing transformation applied to X expands (shrinks) the regions with a derivative greater (smaller) than one. But since the numerator of the Gini regression coefficient uses only the cumulative distribution of X , its magnitude will not be affected. However, the denominator is affected. But since the denominator is always positive, a monotonic transformation of X can change the magnitude of the

Gini regression coefficient but it cannot change its sign. On the other hand, the OLS regression coefficient relies on the same NLMA curve with one difference: instead of having F_X on the horizontal axis we have X . Clearly, if there is intersection with the horizontal axis for NLMA for Gini there is also one for OLS. Applying a transformation on X that shrinks the section we do not like and increases the section we favor can change the sign of the OLS regression coefficient. For example, if we sufficiently expand the variable age for young ages and shrink it for high ages we will be able to change the sign of the OLS regression coefficient from negative to positive. For example, the log transformation applied to the age variable may be able to change the sign of the OLS regression coefficient. If it is not sufficient to do the job, we may try the double log. This is another advantage of the Gini regression coefficient over the OLS, the greater robustness with respect to transformations of variables.

From the slope of the NLMA curve we can identify ranges with above and below the average participation rate. If the curve increases (decreases) then the participation rate is below (above) the average. As expected, participation rate of men and women is below the (corresponding) averages at the extremes of the range, that is under 27 (corresponding to the 14th percentile) and above 57 years (corresponding to the 84th percentile) for men, and under 25 (corresponding to the 12th percentile) and above 55 years (corresponding to the 80th percentile) for women. Until the age of 27 for men and 25 for women the participation rate is rapidly increasing, while past the age of 57 for men and 55 for women it rapidly decreases. In the middle, the participation rate is quite stable and above average; the NLMA curve is almost linear for men and slightly convex for women, indicating that the changes in the local coefficients are close to zero for men and slightly negative for women. Table 3 presents the contributions of different sections of the variable age to the Gini and OLS regression coefficients, according to this age grouping. In conclusion, although average participation rates are different, it seems that the pattern of the regression coefficients for women and men over the life time are similar with the changes in women behavior preceding, in terms of age, the changes in men.

Table 3 – *Gini and OLS regression coefficients of participation on age by gender. Italy 2007.*

Section	MEN				WOMEN			
	Gini		OLS		Gini		OLS	
	weight	β	weight	β	weight	β	weight	β
I	0.012	6.52 (0.43)	0.007	6.51 (0.43)	0.006	6.32 (0.75)	0.002	6.34 (0.74)
II	0.175	-0.09 (0.04)	0.307	-0.10 (0.05)	0.184	-0.31 (0.07)	0.316	-0.29 (0.07)
III	0.009	-5.82 (0.53)	0.004	-5.87 (0.52)	0.015	-5.01 (0.34)	0.008	-5.05 (0.33)
Between	0.803	0.30 (0.00)	0.682	0.31 (0.00)	0.795	0.69 (0.05)	0.670	0.69 (0.05)
Overall	1.000	-0.23 (0.00)	1.000	-0.24 (0.00)	1.000	-0.59 (0.00)	1.000	-0.58 (0.03)

Men. Section I: under 27. Section II: between 27 and 57. Section III: above 57.

Women. Section I: under 25. Section II: between 25 and 55. Section III: above 55.

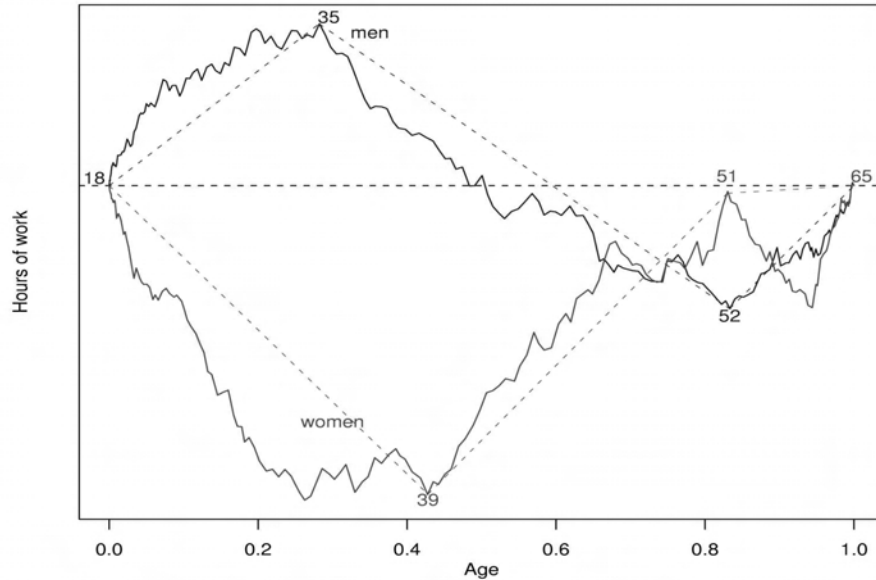
In parentheses Jackknife standard errors of the regression coefficients.

4.2. Hours of work

In Italy the behavior of men and women in terms of working hours is very different. Table 4 reports the estimates of the OLS and Gini coefficients and their corresponding decompositions according to the age sections identified by the NLMA curve.

The NLMA curve for men is increasing and concave until the 26th percentile, corresponding to 35 years old, indicating that the weekly hours of work are below the average for men and increasing: the β coefficient is positive (β OLS =0.113 and β Gini=0.098). Since age is measured in quarters, this roughly means that men increase their weekly effort at work by less than half an hour, each year, until the age of 35. When they are passed 35 years, they stabilize their effort above the men average. The NLMA curve is declining and slightly convex until the age of 52, and the β coefficients are negative and close to zero. Having past the age of 52, the NLMA curve is increasing and convex, indicating that working hours are below average (for men) and declining. The β coefficient is negative (β OLS =-0.083 and β Gini=-0.063), indicating that the time weekly spent for work fade at a pace of around 20 minutes each year older.

The women age profile of working hours is almost specular to men. From the NLMA curve we can identify three age groups: up to 39 years old; between 39 and 51; and over 51. In the first section the NLMA curve declines and it is slightly convex. This means that working hours are above average (for women) and declining. The estimated negative coefficient (β OLS =-0.132 and β Gini=-0.130) implies that adding one year in age corresponds to an expected weekly reduction of more than half an hour at work until the age of 39. Between 39 and 51 years old the effort oscillates around the average and then slightly increase. Past 51 years, women drastically reduce their weekly effort at work at an expected annual rate of 1 hour and 40 minutes.

Figure 6 – NLMA curve for weekly hours of work and age by gender in Italy.**Table 4** – Gini and OLS regression coefficients of weekly hours of work on age by gender, Italy 2007.

Section	MEN				WOMEN			
	Gini		OLS		Gini		OLS	
	weight	β	weight	β	weight	β	weight	β
I	0.050	0.098 (0.048)	0.045	0.113 (0.047)	0.118	-0.130 (0.044)	0.119	-0.132 (0.042)
II	0.130	-0.038 (0.022)	0.130	-0.037 (0.023)	0.066	0.059 (0.067)	0.045	0.057 (0.067)
III	0.022	-0.063 (0.084)	0.015	-0.083 (0.084)	0.026	-0.444 (0.112)	0.016	-0.405 (0.106)
Between	0.807	0.010 (0.00)	0.810	0.008 (0.001)	0.790	-0.053 (0.016)	0.820	-0.050 (0.016)
Overall	1.000	0.005 (0.010)	1.000	0.005 (0.008)	1.000	-0.062 (0.011)	1.000	-0.062 (0.014)

Men. Section I: under 35. Section II: between 35 and 52. Section III: above 52.

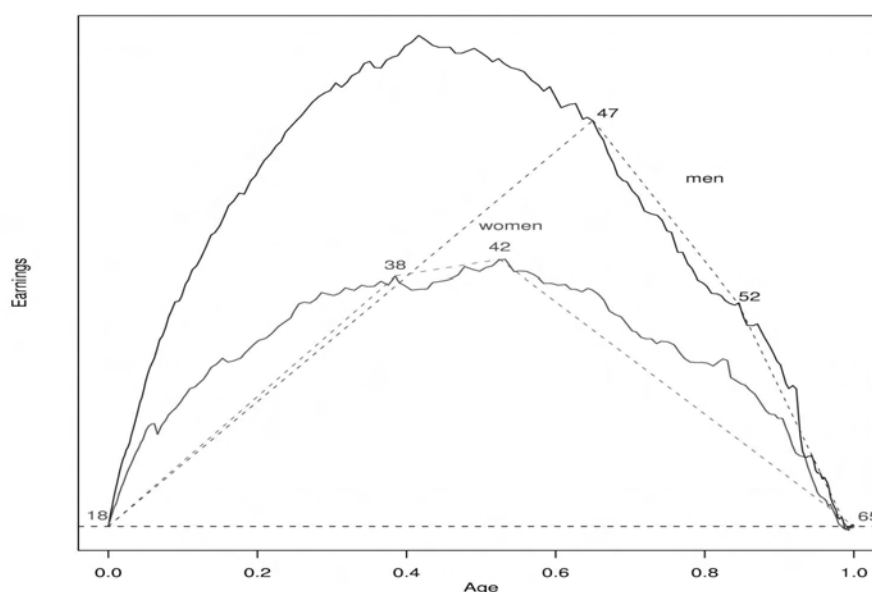
Women. Section I: under 39. Section II: between 39 and 51. Section III: above 51.

In parentheses Jackknife standard errors of the regression coefficients.

4.3. Earnings

Here we analyse the relationship between age and earnings of total employment. The overall estimated Gini regression coefficient is 586.3 for men and 345.4 for women (similar values for the OLS estimates, see Table 5). From Figure 7 we can see that both the NLMA curves do not cross the horizontal axis and therefore no monotonic transformation can change the sign of the overall coefficients. The men's curve is positive and concave until the age of 47 and becomes convex between the range of 47-52, indicating that the covariance is positive for men aged less than 47 and therefore the sign of the local regression coefficients are also positive. For men between 47 and 52, instead, the covariance is negative. As shown in Table 5, in that range earnings are expected to decline at a rate of approximately 2,500 euros per year. After that age they increase.

Figure 7 – NLMA curve for earnings and age by gender in Italy.



The NLMA shape for women changes from a concave to a convex curve in the range of 39 percentile and 56 percentile of the cumulative distribution of age, that corresponds to a range of about five years, between 38 and 42. In this range, that accounts 12% of the women employed, the covariance between income and age is negative and therefore the sign of the regression coefficient is negative. Table 5 shows the contribution of each age group to the overall regression coefficient. Until

the age of 38, annual income is expected to have an increase of about 2,200 euros per year. Then for women between 38 and 42 income is expected to decline by a rate of about 800 euros per year. Having passed the age of 42, earnings start increasing again.

Table 5 – Gini and OLS regression coefficients of earnings on age, by gender. Italy 2007.

Section	MEN				WOMEN			
	Gini		OLS		Gini		OLS	
	weight	β	weight	β	weight	β	weight	β
I	0.263	765.4 (78.1)	0.292	780.8 (72.0)	0.103	556.3 (71.6)	0.094	581.3 (66.1)
II	0.014	-685.2 (128.4)	0.003	-690.6 (124.9)	0.006	-200.4 (66.3)	0.001	-227.1 (66.1)
II	0.034	399.7 (78.1)	0.019	171.6 (79.4)	0.132	228.2 (84.7)	0.137	209.2 (82.3)
Between	0.689	520.1 (30.5)	0.686	515.7 (30.5)	0.759	342.3 (27.6)	0.768	342.6 (27.6)
Overall	1.000	586.3 (29.3)	1.000	582.6 (22.5)	1.000	345.4 (24.8)	1.000	346.2 (19.8)

Men. Section I: under 47. Section II: between 47 and 52. Section III: above 52.

Women. Section I: under 38. Section II: between 38 and 42. Section III: above 42.

In parentheses Jackknife standard errors of the regression coefficients.

5. Conclusion and suggestions for further research

In this paper we illustrated the potentiality of using concentration curves within the Gini regression framework in depicting gender differences in the age profiles in the labor market in Italy. Building up the Line of independence Minus the Absolute concentration curve (NLMA) for each key variable in the labor market, we detected sections in the curve that are convex and sections that are concave. The Gini regression enabled to quantify the contribution of each section to the overall regression coefficient. This connection between the Gini regression coefficients and the concentration curves allowed us to verify monotonicity of regression curves between age and each variable. The search for a monotonic relationship is important because conclusions that are based on non-monotonic regression curve may be sensitive to the selection of the range of the variables in the model and to monotonic transformation of the variables so that two researchers, using the same

data can reach contradicting conclusions concerning the effect of one variable on the other.

Based on the EU-SILC, we analyzed the Italian labor market focusing on participation, hours of work and earnings for the total population employed. Although Italian women participation rate is markedly lower than men, their age profiles are quite similar. The behavior of men and women in terms of hours of work is, instead, almost specular. The estimated effect of age on hours of work is positive for men aged less than 35 years, whereas is negative for women until the age of 39. Past those ages, the work effort is slightly decreasing for men and increasing for women until the early 50s. Over 50, the reduction of working hours is much more pronounced for women than men. The covariance of earnings with age is always positive, for men and women, indicating a positive overall relationship between earnings and age. However, for women, it was possible to identify a range between 38 and 42 years, so that the sign of the covariance becomes negative.

Further theoretical research is needed in order to move from simple Gini regression to multiple Gini regression. It can be shown that the regression coefficients in a multiple regression framework are actually composed of a (complicated) function of the simple regression coefficients of all the variables that are participating in the multiple regression. Hence, it seems that analyzing the sensitivity of regression coefficients in a multiple framework is actually based on the properties of the simple regression coefficients.

Acknowledgements

The authors would like to thank Yolanda Golan for helpful comments.

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SUMMARY

In this paper we illustrate the potential use of an old/new methodology which combines the use of concentration curves in order to investigate the components that make up a regression coefficient. The illustration is based on examining gender differences in the effect of age on labor market participation in Italy. Women participation rate is substantially lower than men, but their age profile is similar. The most striking difference is in terms of hours of work: while Italian men increase their work effort until the age of 35, Italian women reduce it until the age of 39. Earnings increase with age for both men and women, however the local regression coefficient is negative for Italian women in the age of 38-42.

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FAMILIES ALL'ITALIANA: 150 YEARS OF HISTORY

Alessandra De Rose, Daniele Vignoli

Preface

With this paper we intend to contribute to the discussion about the specificity of the family model *all'italiana*, through an historical perspective. After a fresh look at data and documents that describe the evolution of family structures and behaviours from 1861 onwards, we consider trends in family patterns at beginning of the new Millennium, and compare the Italian case with other European countries. To substantiate our reflection, we also look at the evolution over time of definitions and conceptual frameworks, data sources, strategies of analysis and empirical results.

1. What families? How to detect them?

The concept of “family” had been refined over time, resulting in definitions and survey methods the more and more responding to changes in social institutions. Referring to Corsini (1978) for an extensive review, we retrace them in broad terms, as they are of critical importance both to illustrate the difficulty of reconstructing comparable time series and to understand the origin of certain choices made by the Italian official statistical system.

The first two Population Censuses (1861 and 1871) of the Kingdom were based on the idea of a family closely linked to that of “hearth”, gathering the “domestic partnerships, usual or precarious, of all those people who eat together and warm themselves around the same “fire”, including the “servants”, “guests” or the “boarders”, and even the soldiers living in barracks, prisoners in penitentiaries, and other voluntary or forced cohabitations. Only with the Census of 1881 it had been introduced the distinction between the household itself, that is, the “domestic hearth” based on kinship ties and conjugal links, and other forms of collective cohabitation.

Since then, the two fundamental criterions used at Census to identify an household were that of “living under the same roof” and that of “economic unit”,

but it was only thanks to a fundamental study of Livi (1915) that the distinction between *household* – as group of people living together for a common task - and *family* – as kinship relations network – became the more and more clear.

“In everyday language we hear about a family with very different meanings; that word indicates the descent along the masculine side in its continuity through time, or one talks of family referring to the single group of parents and children, living together or not the formers with the latter¹” (Livi, 1915, p.4). This modern view of what is meant by the term *family*, which highlights on the one hand the kinship relationships and, on the other, the idea of nucleus formed by parents and children, began to prevail in data collection only some decades after the Unification of Italy. Following suggestions by Livi and other scholars, for the 1921 Census and the 1931 Census it was adopted a strict definition of *natural household*, aimed to identify, among the total households, those based only on relations of kinship and affinity. In the subsequent surveys this distinction was abandoned, however, and the term “*famiglia*” has been used with the standard meaning of *household*, matching that of *Ménage* of French Censuses or that of *Househaltung* used in the German ones (ISTAT, 1937).

Since the 1936 Census, ISTAT decided to no longer refer to the *present household*, that included only the members present at the time of the Census, but, "given the particular circumstances in which the Census was played, for the absence of the habitual residence of a high number of family heads, it was considered appropriate gathering data on the *resident household*, that is whose head of household has a usual residence in the town at Census" (ISTAT, cit.). This choice created a cut of point with the previous surveys.

A crucial example of irresolution related to what kind of information on family are necessary to be collected (that even today continues to be debated) is that of “irregular” unions. Until 1929, date of the Concordat between the State and the Church (*Patti Lateranensi*), not only the unmarried couples, which were relatively few, but also the marriages celebrated only with the religious rite were considered illegal. The Family Code "Pisanelli" of 1865 had, in fact, established that only weddings celebrated in a civil ceremony might have legal value. Corrado Gini, on the basis of the evidence stemming from the 1901 Census, noted the large amount of couples who, while declaring at the census as married, were in fact married only religiously or even simply living together. He therefore argued that “the Census

¹ In Italian: *Nel linguaggio comune si sente parlare di famiglia con significato diversissimo; così si indica con tale parola la discendenza dal lato mascolino nella sua continuità attraverso il tempo, o si parla di famiglia come dell'insieme dei genitori e dei figli, convivano o no questi ultimi con i primi*

can no more avoid to point out a fact that acquired much of social importance² (Gini, reported in Corsini 1978). Afterwards, the debate on whether to include a specific question about the “irregular” marital relationship was fierce in preparation of the next Censuses. At the meeting of the Superior Council of Statistics (*Consiglio Superiore di Statistica*) of November 21, 1920, during the examination of the contents of the family questionnaire, Beneduce highlights "the need to detect free cohabiting unions. These are now a very common path, which is also implicitly recognized by the new legislation, for example as regards the granting of war pensions. Even the social legislation relating to insurance established that people simply living together can enjoy the benefits"³ (Ministero per l'Economia Nazionale 1925, p. 37). The consideration of “irregular” unions became mandatory for the Census of 1931, two years after the Concordat between Church and State. On that occasion, they were counted more than 200,000 non legally married unions, 2.4% of all households (ISTAT, 1935). Questions on “irregular” families, have been shelved again in subsequent editions of Population Census, but the theme of non-marital unions continued to be present in the social and political debate.

The first Population Census after the II World War, that of 1951, has been of crucial importance to understand changes occurred in family life after the conflict. In fact, ISTAT proposed for the first time a very detailed typology of households, according to the kind of relationship between the head of the family and the other cohabiting members. This classification has been utilized in the following three Population Censuses of 1961, 1971 and 1981.

Significant improvements in ways of collecting data on household and family occurred with 1991 Census and, with only minor differences, with that of 2001. Beside a new definition of household, based on the new law approved in 1989 regulating the functioning of the Population Registers (*Anagrafe*), a more detailed classification of family structures have been applied, and, unlike previous Censuses, the informal unions are now explicitly recognized and separately counted.

The mentioned the Population Registers were established in any Italian Municipalities in 1864 and often reformed with subsequent legislative actions until

² In Italian: *il censimento non possa ormai prescindere dal rilevare un fatto che ha assunto tanta importanza sociale.*

³ In Italian: *la necessità di rilevare le libere convivenze. Sono queste ora una forma molto diffusa, che trova anche un riconoscimento implicito nella nuova legislazione, ad esempio per quel che riguarda la concessione delle pensioni di guerra. Così pure nella legislazione sociale relativa alle assicurazioni è stabilito che potranno usufruire dei benefici anche le persone semplicemente conviventi.*

the 1228 Act of 1954. They were destined to receive any piece of information from all the family units residing on the town's territory, having to ensure the continuous updating of population according to civil status events – births, deaths and marriages - and mobility within the national borders or with abroad. Moreover, a reciprocal adjustment between Census and Population Register is made at any Census round, although "it is even today impossible an exact correspondence between the two sources"⁴ (Corsini, cit.). In 1989, as said, a new Population Register Regulation passed by law, and this deeply influenced definition and data collecting rules. First, the criterion of "income pooling" used to identify the registered household was abolished, while the other two, namely cohabitation and kinship, affinity, adoption, or emotional bonds, remained in force. Secondly, the figure of the "family-holder" was suppressed and the new regulation assigns to each member of the family the responsibility about personal data declaration.

The new regulation aimed to adapt the legislation to a more and more dynamic picture of the Italian society culminated in marked far-reaching changes, both in institutional context and in demographic phenomena. Examples of this state of affair are the reform of family law in 1975 and the changes in household models and family behaviors, which were observed in Italy, although with some delay compared to the rest of Western Europe (see Section 3).

Indeed, neither the Census nor the Population Registry, even in their subsequent refinements and improvements, could fully met the growing scientific curiosity of those who wanted to open new perspectives in the study of social phenomena through family-related behaviours (Corsini, cit.), which appeared as a complex phenomenon of multidisciplinary interest. These considerations stirred up a growing interest in surveys on families; they were preceded by those on marriage and fertility held already on the occasion of 1931 Census round, and again in 1961 and 1971. In parallel, it is not worth to remember the initiatives stemming from the Academia, such as the Survey on Women, Fertility and Work promoted in 1974 by Nora Federici at the Institute of Demography of Rome University "La Sapienza". It was followed by the First National Fertility Survey in 1979, financed as part of the international program of the World Fertility Surveys, with the aim to offer to demographers and family sociologists new data able to describe in greater detail the new trends in family life as well as social norms, cultural background, and values. The 1983 ISTAT Survey on Households Structures and Behaviors (*Indagine sulle strutture e i comportamenti familiari*), and the subsequent Multi-Purpose Household Surveys system (*Indagini multiscope sulle famiglie*) represent an incredible improvement in the quality and the quantity of collected information.

⁴ In Italian: *è ancor'oggi inattuabile una esatta corrispondenza fra le due fonti.*

They allowed to broaden the focus on the family considering also intimate relationships, informal networks of support, and so on. The unit of analysis changed and integrated each other: “de facto” households, the basic family units or *nuclei*, and individual that are seen as the main social actors of their own life (ISTAT, 2010a).

The recent history tells of a growing harmonization in the definitions and data sources, which allow sophisticated comparative analyses at the international level both in time and space. Some issues related to data collection still remain problematic, however, namely those ruled by administrative purposes, such as the Population Register. Even today, for example, the quality of data resulting by vital statistics is strongly dependent on the correct application of rules for keeping and updating the registers themselves. At the end of the previous Millennium, the rules became even more hard after the introduction of more restrictive legislation on *privacy* and the simplification of administrative procedure. For example, a new law (127/97), containing “urgent measures for administrative simplification”, introduced substantial changes in vital events registration. Furthermore, that law forbids the Population Registers’ Official to know the information contained in the birth certificate – mainly because of *privacy* reasons – impeding the collection of important data. As a consequence, in 1998, the birth registration was interrupted, causing a loss of many information such as the characteristics of the delivery, of the newborn child and the parents, their geographical distribution and the mothers’ previous reproductive history. In order to fill the consequent lack of information, ISTAT reacted by adopting new strategies. Namely, an integrated system of surveys has been created, that let not only to gather the lost data, but also to considerably widen the relevant information related to births and the corresponding households.

Finally, in spite of the major steps made forward by ISTAT for the recognition of *de facto* families, an important issue is still unsolved. The debate between the cognitive needs of social observers and the political and/or moral opportunities to concede equal rights to citizenships belonging to different family situations is still far from any conclusion. This is the case, for example, of same-sex unions, or simple informal conjugal-type unions, that are not listed as such in standard Population Registers, if not in a few number of Municipalities and in separated lists (De Rose and Marquette, 2011).

2. Long-term changes in the European family

2.1 Some preconceptions to dispel

The historical and demographic studies of the 1970s have developed a typology of family structures (Laslett, 1977), which includes basically four categories of cohabitation, in turn divided into subtypes: (a) domestic groups "without structure", i.e., where the components are not clearly linked by ties of kinship or relationships or sex. These include the coexistence of both sisters and brothers, that between blood relatives, and those who live alone; (b) "simple" domestic groups, composed of parents with children, couples without children, children with one parent: it represents the basic family unit; (c) "extended" domestic groups, consisting of a simple group in addition to the direct ascending line (a grandfather or grandmother) or descendants (grandchildren) or collaterals (brothers, uncles); (d) "multiple" domestic groups, in which there are multiple nuclei (simple families) interrelated by descent (strain families, such as patriarchal or traditional) or by ties of blood relationship (living together as married brothers with their families).

The application of these typologies to the rich historiographical material in Western countries, particularly European ones, together with the refinement of sociological studies that have contextualized the analysis of the family in economic, institutional, and demographic respects, helped to dispel many common preconceptions about the family of the past and, in turn, allows to interpret the recent changes with greater clarity.

First of all, it was denied the view that, in the past, families were mostly composed by multiple structures, which prevailed everywhere as patriarchal system. It was also denied the fact that young couples establishing separate homes after weddings – *residenza neocale* – began to spread only with the advent of industrialization. The research based on well documented and relatively comparable historical sources, such as the parish registers – *Stati delle anime* – local censuses, etc. has shown, rather, that already in the XV Century in many European countries nuclear-marital household was the prevailing family structure. Thus, well before the accomplishment of the industrial revolution.

For many pre-industrial centuries the family has played a key role in the productive structure, embedding the character of a real business: particularly in rural industries and handicraft the family acted as a production unit. Moreover, families in the middle class and aristocracy were based on real contracts that regulated the use and the distribution of resources.

The family size was small because of a relatively low fertility, due to the high age at marriage of spouses, and because of the very high level of child mortality (at least until mid-nineteenth century). Yet, extended families and multiple families

coexisted with the basic family units, especially in rural areas. In particular, single family units were not prevalent in peasant societies and often associated with adverse social conditions. On the other side, patriarchal families were more common in the bourgeois and the aristocratic social classes because they were seen as a room for the transmission of wealth and the preservation of power.

What prevailed, then, was a wide diversity of family structures, even more articulated than in the present: differences among States, among cities and countryside, among social classes, and among forms of access to property, inheritance and among "trades and crafts" make it very difficult to say what we mean by the *traditional family* of the past.

Apart from a marked variety of shapes and structures, pre-industrial family was also characterized by considerable instability. Contrary to what one might think, in fact, relations and family ties were much less durable and binding than they are in the modern family. The high mortality rate, also supported by a not ignorable geographical mobility and the lack of rapid and efficient means of communication, put at risk the strength of family ties. The infant mortality could deprive a mother up to 50% of her children; the high risk of maternal death due to pregnancy and childbirth, made it possible for a man to fall in widowhood with orphan children, that justified the frequent second marriages. The low male life expectancy, the wars and migration away separated husbands from wives and fathers from children for a long time if not forever. In short, even without divorce or separation, the family of the past was no less subject to disintegration and instability than it is today.

Certainly, the process of industrialization and urbanization has led to the definitive spread of a family founded on nuclear marriage, that becomes more cohesive internally also thank to the great progress in survival chances of its components. During the XIX Century, a stable model of family founded on marriage, co-residence between spouses, and a prolonged permanence of children in the family, dominated everywhere in Europe: a model that became popular among all social strata and geographical areas.

On the threshold of the XX Century, the Western family system thus provides to be more simplified in structure and more binding in reciprocal behaviours: marriage establishes the union of the couple, the neo-locality characterizes the housing choice, the strong parent-child relationship becomes the essence of the parental bond. The new family model is now founded on highly individualistic and private values: the understanding sexual love between spouses, who choose each other not on the base of economic interests or a contract between families of origin, but on the strength of their feelings; the indissolubility of marriage; and the respect and care for children, which play a central role in parental affections and in the allocation of resources (Saraceno, 1996).

This model of family, with its system of norms and values, is so deeply rooted in Western culture, so that it become the benchmark scenario while speaking about "traditional family". Indeed, compared to this model – and not to a generic family of the past – the cultural, social and demographic changes occurred in the twentieth century, and particularly after the end of the II World War, marked a revolution, namely in the ways of the constitution and organization of the family (see Section 4).

Overall, what is different in the “contemporary” family system compared to the "traditional" one are not the romantic and individualistic goals underlying family formation. The love between partners remains at the base of a couple, but marriage (especially those celebrated with religious ceremony) is not anymore the only possibility to start living together; in turn, the beginning of the cohabitation can be postponed. The link between partners is no longer unbreakable if love and sexual harmony fade away; parenthood remains of unquestioned personal value, but the number of children can be tightly contracted and births may be spaced and planned.

2.2 *The case of Italy*

The rich historical excursus carried out by Barbagli about changes in ways of living "under one roof"⁵, highlights the complexity of family patterns characterising the Italian population right after the Unification as well as its marked geographical differences. Everywhere the nuclear family prevailed, but, in agreement with rules of residence after the wedding, rather dissimilar, in the Northern regions multiple families were much more prevalent than in the South (Barbagli, 1984). Incidentally, the patriarchal multiple household model, so beloved by the popular imagination of the Italian society was much less common than it was believed until recently.

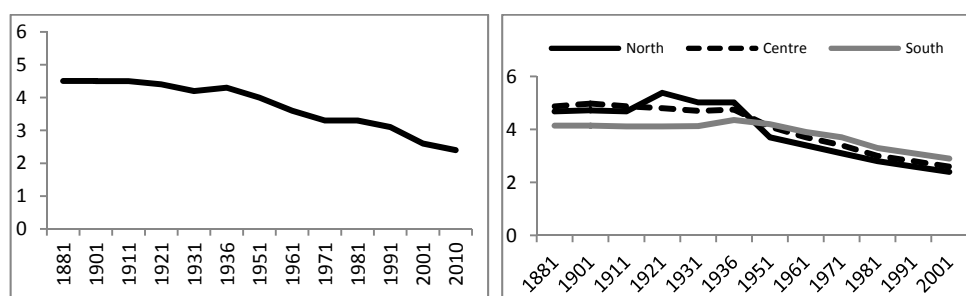
The Italian 1881 Census round (the first two, do not provide separate data between households and cohabitations, see Section 2) displays, on average, 4.5 members per household; and higher values in the Northern regions (Figure 1). Livio Livi, observing for the first time these data, explained the larger dimension of Northern regions households and thus the higher “family cohesion” just on the base of the different “economic effect” (Livi, cit.).

The most significant changes in the composition of households are observed from the mid-XX Century. The average household size decreased rapidly: from 4.0 in 1951 to 3.3 in 1971, to 2.6 in 2001, and to 2.4 in 2010, compared to an increase

⁵ In Italian: *sotto lo stesso tetto*.

in the number of households, almost doubled in 50 years, from 11.814 thousands in 1951 to 21.800 in 2001. At the same time, the North-to-South gradient reversed, with the family size shrinking faster in the Northern than in the Southern ones (Figure 1).

Figure 1 – Trend in family size and territorial differences. Italy, 1881-2001.



Source: ISTAT, Population Census, 1881-2001

As in other Western European countries, the reduction of the average family size is not meant to be a simplification of the types of relationships and living together: indeed, the changes of this very synthetic indicator conceal a profound transformation in the mechanisms leading to union formation, reproductive patterns, social and legal norms regulating the dissolution of marriages, and the formation of new families.

Cultural evolution and changes in customs, as well as institutional changes and economic and technological progress that Western societies have faced in recent decades, accompanied and supported the new patterns of family behavior. In Italy, this path is intertwined with the specific economic and social history of the country. The changes in family structures and behaviours are certainly explained by the above mentioned processes, albeit in a very complex and territorial-specific mechanisms. The peculiar Italian facets of industrialization and urbanization processes also help to explain why the Italian family appeared "late" in comparison to other European countries: the delay in the diffusion of new family pattern appeared in parallel with a delayed process of modernization of the country (Barbagli, cit.).

However, the extensive studies conducted using data from sample surveys on household and individuals since the year 1980 (see Section 2) from a life-course and a comparative perspective offer a more articulated picture of the ways of "doing family" in Italy and suggest the importance to frame the changes also looking at other country's peculiarities (Zanatta, 2003). In the following sections we focus on the most recent history of Italian family in comparison to the rest of

Europe and illustrate the main explanatory factors, also on the basis of results from empirical research on unions formation and dissolution.

3. Changes in the society and in the family: The Italian tale since 1970s

3.1 Italy, and Italy in Europe

After the mid XX Century, modernization, industrialization, and urbanization spread at different paces throughout Europe (Frejka, 2008). This led to the expansion of the service sector and created a renewed social stratification. Almost in parallel, since the beginning of 1960s, Europe has been experiencing a rapid transformation in the patterns of union formation and dissolution. In line with the Second Demographic Transition conceptual framework (Lesthaeghe, 1992; Sobotka, 2008), the main features of this process have been everywhere the same: cohabitation has increased outdistancing direct marriage and the number of unhappy marriages ending in divorce has risen. However, there has been a lot of cross-country variations in the intensity and the pace of the change. This process is most advanced in Nordic European countries where cohabitation is viewed as an accepted alternative to marriage and where more than half of marriages end in divorce, followed by Western, and Central and Eastern countries (e.g. Liefbroer and Dourleijn, 2006). The laggard cluster is Southern Europe, where we observe a delayed diffusion of new family behaviours (Hantrais, 2005).

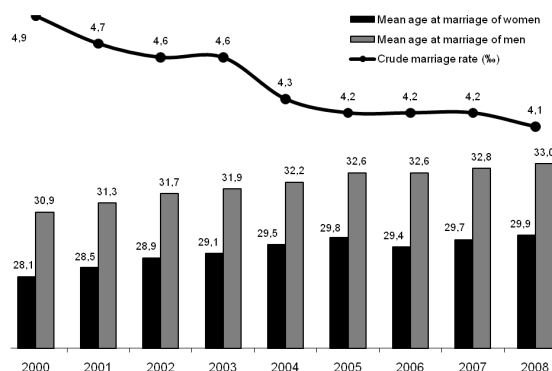
Indeed, in the Mediterranean Europe things began to change after 1970s. Italy is a clear example of this state of affair because the country experienced a series of important changes, in society in general and in legislation in particular, in a very limited time-span, mainly due to the political awakening of the young in the late 1960s and the strength of the feminist movement in the 1970s (Livi Bacci, 2001). For instance, advertising contraceptives was legally permitted in 1969, divorce was introduced in 1970, the new law regulating family ties was approved in 1975, and abortion was legalized in 1978. All these societal transformations took place under the relatively preoccupied eyes of the Vatican and under governments of Catholic inspiration (De Rose *et al.*, 2008). Women's employment also increased rapidly compared to that of other European countries, although in Italy it is still low by European standards and Lisbon's EU targets. The change in women's societal role is especially illustrated by developments in their educational attainment. Today more women than men in the age group 25–44 have a university degree. Between the academic years 1970-71 and 2005-06 the percentage of women obtaining a vocational or senior secondary school qualification – the Italian diploma – tripled, and today about 80% of 19-year-old women hold a diploma (ISTAT, 2008).

Accordingly, Italy was characterized by a very rigid union dynamic pattern until mid-1970s. From mid-1970s the rate of Italian marriages started a period of progressive decline, however. In the same period, a postponement in the age at marriage occurred as well. Then, during the 1980s we can observe the first traces of change, although the country preserved some peculiarities such as a low diffusion of marital disruptions and a slow pace of spread of cohabitation. During 1990s and especially since 2000 things have changed illustrating a much more complex family formation pattern, an increase of separations and divorces (Vignoli and Ferro, 2009), and a not-negligible diffusion of cohabitations (Gabrielli and Hoem, 2010). In short, already from these premises the link between changes in the Italian society and changes in the family seem to be intertwined. We substantiate this argument in the following, through proper figures.

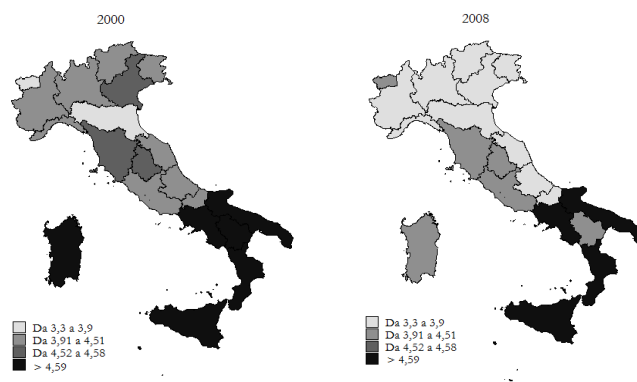
We confine our illustrations mainly to the period 2000-2008 because it is the one that highlights the most evident and unexpected signs of change. The *macro* data used stems from ISTAT's current surveys. Marriage, legal separations, and divorce are formally registered at any time by law. Other episodes of union formation, such as consensual unions, are not collected in official registers as well and, thus, can be studied through sample surveys only. The *micro* data were retrieved from the Italian variant of the Gender and Generations Survey (namely, the Italian Household Multipurpose Survey "Family and Social Subjects") conducted in November 2003. It represents the most representative and detailed survey in Italy up to date. Such data contains retrospective partnership histories.

3.2 Trends in marriages

In 2008 have been celebrated around 250 thousands of marriages, thus four every 1 thousands of inhabitants (Figure 2). In the same year, the mean age at marriage has been risen at 30 years for women and 33 years for men. Marriage is not only changing quantitatively but also qualitatively: between 2000 and 2008 first weddings were falling (from 90% to 86%); second and subsequent weddings were increasing (from about 10% to about 14%); and marriages in which at least one of the two spouses do not have Italian citizenship were growing (from 7% to 10%) (see Vignoli *et al.* 2011). In particular, one of the strongest signals of the ongoing Italian "family revolution" is represented by the exceptional increase in marriages celebrated with not-religious ceremony. If in the early 1960s the marriages celebrated with not-religious ritual were less than 2.0%, in 2010 they are about 37.0% (namely, a marriage over three). This increase, although partly due to the growth of second and higher-order marriages and marriages with at least a foreign spouse, increasingly affects first unions. In 2008, 1/4 of first marriages was celebrated with not-religious ceremony (ISTAT, 2010b).

Figure 2 – Trend in marital union and mean age at marriage by gender. Italy, 2000-2008.

Source: www.demo.istat.it

Figure 3 – Period total divorce rate by Italian regions, 2000 and 2008.

Source: Vignoli et al. 2011.

Despite the general downward trend of marriages is widespread across Italy, territorial differentials are persisting. Generally speaking they suggest a clear North-South gradient. Up to now, people get married more in the South (4,9‰ inhabitants in 2008) than in the North (3,6‰ inhabitants) and in the Center (4,0‰ inhabitants). Territorial differentials amplified comparing regions (Figure 3). In 2008 total marital rate ranges between the minimum of Friuli-Venezia Giulia (3,3 marriages per 1,000 inhabitants) to the maximum of Campania (5,5 marriages per 1,000 inhabitants).

3.3 Trends in marital dissolution

In Italy, it is not easy to obtain a divorce, which has been legally permissible since 1970 (Law n. 898) but only after a long period of physical and legal separation between the spouses (five years, initially; three years since 1987).

Looking at absolute numbers of divorces, it is not worth to separate the diffusion of Italian marital instability into five phases. The first phase is the one of the introduction of divorce law; it lasts between 1971 and 1974 registering about 20,000 divorces per year. Not many, considering that in the early 1970s many partners legally separated by at least 5 years that were waiting to dissolve their marriage by Law. Not many, also considering that up to the nationwide Italian referendum on the right to divorce held on the 12 May 1974, the survival of the divorce law was uncertain. The second phase runs from 1975 and 1980 and records about 12,000 divorces by year: it mainly concerns new cases of divorce. The third phase (1981-1986) appears characterized by an increase in the trend, with more than 15,000 divorces per year. Even if not strong, the increase is crucial because it happens in anticipation of the Law of 1987 that reduced the mandatory years of legal separation from five to three. In the fourth phase, from 1987, the increase in the absolute number of divorces started to be particularly relevant, reaching about 27,000 events in 1994. The rising breaking-down of Italian marriage illustrates its maximum intensity in the fifth phase, that began in mid-1990s and, especially, through the first decade of the XXI century. Between 1995 and 2008, in fact, the absolute number of divorces increased by more than 100%.

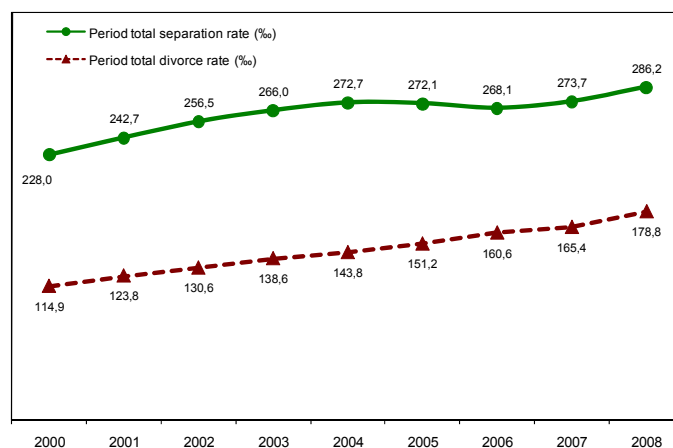
Turning from absolute to relative numbers, the Period Total Divorce Rate (sum of age-specific divorce rates), with respect to a hypothetical (synthetic) cohort of 1000 marriages, highlights the rise in Italian marital dissolution since the beginning of the 1990s (Vignoli *et al.* cit.). From 2000 to 2008, it increases from around 115 (divorces every 1,000 marriages) to 180 (Figure 4). However, only the 40% of legal separations fall in divorce. In 2008, the legal separations concern 300% of marital union (Figure 4).

But how much and how this increase in separations and divorces rather affects the duration of marriages? To properly assess this issue is necessary to move the perspective of the analysis from the year marking the breaking of the marital union to the one marking its beginning (Figure 5).

We look at marriages surviving at different durations and compare them among marriage cohorts. After eight years from the celebration (i.e. after having overcome the famous "crisis of the seventh year") for the 1972 cohort 972 unions were surviving among the initial 1000, while for the 1990 and 2000 cohorts this figure is reduced to 935 and 902, respectively. Note that such number of surviving

marriages (902) is reached by the 2000 marriage cohort after eight years, by the 1990 marriage cohort 1990 after 15, and by the 1972 marriage cohort after 32.

Figure 4 – Trends in divorce and (legal) separation in Italy, 2000-2008.



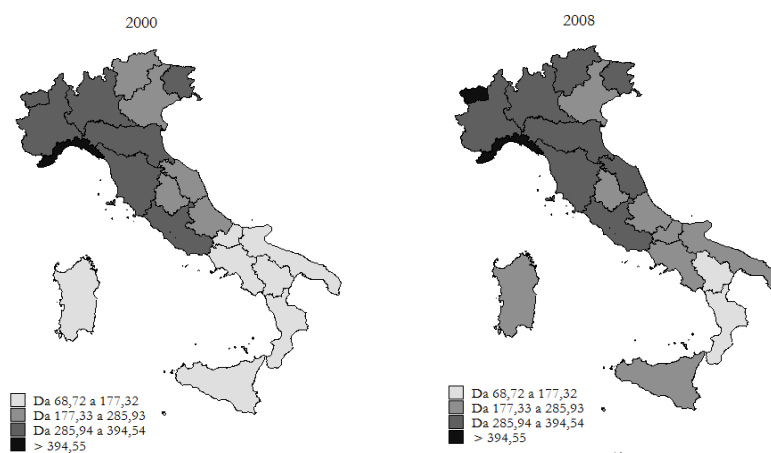
Source: www.demo.istat.it.

Figure 5 – Proportion of surviving marriages by marriage cohorts.



Source: Vignoli et al. 2011.

Differentials between the North and the South of the country persist in union dissolution as well (Figure 6). Legal separations are generally more frequent in the North and in specific Central regions (such as Lazio and Tuscany) than in the South. In the North we observe as the same level of marital dissolution as in the North-Center European countries (30-40 separations every 100 marriages).

Figure 6 – Period total (legal) separation rate by Italian regions, 2000 and 2008.

Source: Vignoli et al. 2011.

3.4 Trends in consensual unions

According to sample surveys on family and households, also the consensual unions are increasing in Italy. Overall the universe of cohabiting people is very heterogeneous, a sort of “archipelagos” (Rosina, 2007): some people perceive cohabitation as a specific step in their life-course prior to marriage, either to evaluate if the relationship is well-functioning or to wait a more stable (housing and economic) situation; some cohabit by choice and remains un-married for the rest of their lives; other cohabit because it is not possible to legally formalize their union, as not yet legally divorced or in the case of same-sex couples. In Table 1, the trend of first union by type and calendar period shows the prevalence of direct marriages (close to $\frac{3}{4}$ in the last observed period). However, the growing presence of pre-marital and consensual unions is clear: the former increases from 6.5% to 11.0% and the latter from 2.3% to 15.4% respectively from 1980-85 to 1995-2003.

Also in the case of pre-marital consensual unions and cohabitations the North-South gradient is evident (Table 1). The increased incidence of cohabitation happened in parallel to an anticipation of their cadence (Vignoli *et al.*, cit.). The percentage distribution of first consensual unions for women in the period 1980-90 shows a pick at the age 25-30 yrs old. In the subsequent calendar periods, the pick seems to be anticipated at the previous age class 20-25 yrs old.

Table 1 – *Type of first union by calendar period and macro-area in Italy, 1980-2003.*

	Marital union	Pre-marital cohabitation	Consensual union
Period			
1980-1984	91.2	6.5	2.3
1985-1898	88.1	8.4	3.5
1990-1994	83.4	10.8	5.8
1995-2003	73.7	11	15.4
Total	82.9	9.4	7.7
Area of residence			
North	88.4	6.5	5.1
Center	92.0	4.0	4.0
South	94.6	3.8	1.6
Total	82.9	9.4	7.7

Source: Gabrielli and Vignoli 2010

4. Explaining behaviours

4.1 *The shift in research from macro to micro*

We now move the focus of our discourse from the description of the trends in new family behaviours to the search of their determinants. In the second half of the XX Century, in fact, the scientific study of population changed its paradigm from the macro to the micro so that attention became focused mainly on individuals as the agents of demographic action. This ‘shift from studies on structures to studies on processes’ (e.g. Willekens, 1991; 1999), might be attributed to the increasing interest of demographers in research of individual behaviour on the one hand, and the progress in both data collection and analytical methods on the other hand. The former is a natural consequence of changes in family-related behaviour which progressed rapidly since the 1960s, whereas the latter might be linked to developments in survey-based social research, and progress in computational techniques and quantitative methods. Among them, development of the methods for longitudinal data collection and analysis, and in particular event-history analysis, constitute a path-breaking step in the studies on human behaviours. This new approach led to a set of research on individual behaviours much wider than is afforded by classical macro-demographic analysis, and enabled a move from the mere description of phenomena to their interpretation (Courgeau and Lelièvre, 1997; Salvini and Santini, 1999).

Life-course theory and event-history techniques, which aim to explore people’s life choices, have become standard practice in contemporary family and fertility

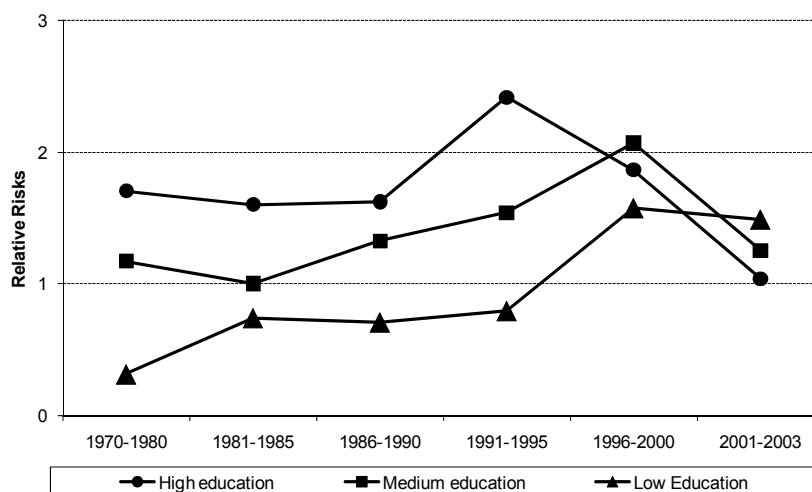
research. They also faced methodological advancements in at least two directions. First, in terms of *multilevel modelling* that allow the analyst to detect the effect of the context on individual behaviour as well as to identify the macro-characteristics which are mainly responsible for the contextual effect (Borra and Racioppi, 1995; Voss, 2007). Second, in terms of *multiprocess modelling* that allow to simultaneously consider parallel careers (such as fertility, partnership, employment, and so on) acknowledging the possible presence of non-random factors that can affect at the same time the different careers.

Only the shift in the research paradigm from macro to micro and the consequent methodological developments allow the study of the determinants of the new family changes. Overall, demographers and sociologists agree that the underlying determinants of the new behaviours are primarily the accentuation of individual autonomy, the increasing importance given to personal development, especially in the professional field, the changing role of women in society and the family. Deciding to postpone marriage, to cohabit, to dissolve an unhappy union, all become life-course strategies, embedded in biographies less and less standard. In the next section we provide a micro-illustration regarding the role played by women's education on marriage disruption risks. It provides evidence that also the links between the new behaviours and their determinants are changing.

4.2 An example: educational gradient and the diffusion of marital disruption in Italy

The analysis of Italian marital break ups started to be considered "statistically" interesting about a decade after the application of the law on divorce, approved in 1970. Past trends suggest a link between rising marital disruption and the increased level of education of Italian women. De Sandre (1980) was the first to show the increase in marital instability among women of high socio-economic status in the first half of the 1970s, a finding later confirmed by Corsini and Ventisette (1988), still on aggregate data, and by De Rose (1992) on micro data. Incidentally, De Rose concluded that the modest diffusion of family dissolution in Italy was to be ascribed, at least in part, to the relative backward situation of Italian women, who, with low levels of education and scarce and lower-qualified occupational activities, were basically confined to the roles of wives and mothers. After this first pioneering study the analysis of individual pathways leading to divorce, as a step in a woman's life-course, did not develop much. A recent study by Vignoli and Ferro (2009), corroborate the view that in Italy women's degree of economic independence, of which higher education represents a valid marker, is still one factor which plays a pivotal role in the effective possibilities to handle a separation.

Figure 7 – Trends in separation intensities in Italy by women's educational level, 1970–2003. Relative risks, by interaction between calendar period and women's educational level.



Source: Salvini and Vignoli 2011.

Note: The interaction is controlled for birth cohort, area of residence, parental divorce, number and age of youngest child, and employment status.

But, beside this incontrovertible positive gradient between women's education and marital dissolution, have this association always being the same over the last decades? William J. Goode (1962) argued that, at least initially, only the most "modern" couples would have the cultural and economic means to afford a divorce. As the social acceptability of divorce increases, the relationship between social status and divorce tends to become less significant and may even reverse its sign, so that, at the end of the process, marriage dissolution could be even more common at the bottom of the social hierarchy. This line of reasoning were further corroborated by the empirical analysis of Blossfeld *et al.* (1995) and Harkonen and Dronkers (2006).

Consistently with Goode's hypothesis empirical studies found a positive educational gradient in Italy, as already said. Recently, however, the period total divorce rate has increased dramatically (see Section 4.3). In this particular period of a rapid spread of separations Salvini and Vignoli (2011), by means of an event-history analysis based on the 2003 FSS (Family and Social Subjects survey) data, found some traces of a reversal in the educational gradient as the rate of separation was increasing more abruptly among the low educated while it levelled-off among

the high educated (Figure 7). The strong increase in marriage disruption observed in Italy in the last period appears thus mainly due to the fact that even the less educated women – who are still the most numerous group – are now facing a marked increase in separation risk. Their decision to opt for a separation is facilitated because the traditional and cultural setting has already been violated by their better educated counterparts.

5. The future of Italian families between wishes and constraints

So far we have shown that during the last decades, especially since mid-1970s, marriage has lost much of its centrality in Italy. However, the general incidence of consensual unions and marital disruption is still low compared to European standards.

Researchers offer two main interpretations of this state of affair. The first hypothesis can be called “Specificity” and claims that the adoption of cohabitation and marital dissolution among Italians will remain at lower levels than the rest of Europe (e.g., Reher, 1998). In line with this assumption, the differences among social groups persist over time, because the diffusion process by social strata is stagnant (e.g., Nazio and Blossfeld, 2003). The second hypothesis can be called “Delay”. According to this second theory Italy is a late-comer in the “new” family patterns together with other Southern European Countries (e.g., Barbagli *et al.*, 2003; Lesthaeghe and Willems, 1999). Thus, the diffusion process of consensual unions and marital disruptions within these countries occurred as well as the others and it is just temporally lagged.

Our paper, keeping in mind the last 150 years of history of Italian families, contributes to this general discussion. The examples we have illustrated confirm of a rising breaking-down of Italian marriages towards a growing flexibility of unions (see Section 3). They also illustrate a “democratization” of the new process of marital disruption in Italian society among various social groups (see Section 4.2). In a similar vein, other analyses conducted at the micro level suggest that such pattern of democratisation is not only in play among social group, but also between women and men (Salvini and Vignoli, 2011) as well as among geographical areas (Gabrielli and Vignoli, 2010). With only minor differences the same trend and trendsetters can be found also as regards the diffusion of consensual unions (Gabrielli and Vignoli, *cit.*).

What will the future be of the Italian families? The question is definitely ambitious, but our study provides at least some hints in this respect. Our results clearly show the great amount of qualitative changes that the Italian society is going to experience and a very dynamic picture of the Italian context with respect

to the diffusion of “new” family patterns. And they also pose a challenge to the fact that Italy will not reach the levels displayed by the rest of Europe in terms of incidence of cohabitation and marriage disruption. As already observed (De Rose *et al.*, 2008), spreading of new behaviours in Italy is curbed by the lack of a favourable social context. For example, a number of features are responsible for the scarce diffusion of non-marital cohabitation: strong ties between parents and children, a welfare state that provides very limited direct help to youth (Rosina and Fraboni, 2004; Di Giulio and Rosina, 2007), and an unfriendly legislation towards not married couples (De Rose and Marquette, 2011).

Overall, Italy is a contradictory society, and to be ready to support the inevitable changes in family way of living – clearly visible in the living arrangements of the younger generation – it will be necessary to remove some of the typical constraints *all’italiana*, as deeply illustrated in a recent report on Italian population (Salvini and De Rose, 2011). High number of children wanted, but few helps to family with children. High acceptance of non-marital unions, but no rights recognition. Claim for independence from young people, but problems in the labour market and housing systems. Women more and more educated and working, but still in a unequal gender system. Importance to intergenerational links, but few state support to family with elderly or disabled. Warming hospitality and open heart toward the stranger, but lack of both organization and of accepted rules for social inclusion.

In the end, we wish to finish as we started: with some observations on data collection system. The growing complexity of life-courses in contemporary Italy is difficult to be explained, or at least understood, due to lack of appropriate data. Future research should therefore be conducted using richer datasets that provide longitudinal (demographic, social, attitudinal, and economic) information for each member of the family, and the household itself. In other words, a panel survey dedicated to families, already asked by the scientific community (Pinnelli *et al.*, 2003; Corsini *et al.*, 2008), is no more deferrable.

Acknowledgments

We warmly thank Carlo A. Corsini from the University of Firenze for his precious hints, for the wealth of documents and literature he kindly made available to us, and for reading a preliminary version of this paper.

This paper received support from the grant of the national research project “*Dinamiche dei corsi di vita tra contesto e legami forti* [Life Course Dynamics between context and strong ties]”, PRIN-MIUR 2007.

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SUMMARY

In this paper we trace in broad terms the evolution over time of definitions, data sources, conceptual frameworks and strategies of analysis that document changes in family structures and behaviours from 1861 onwards. Then we come back to trends in family patterns at beginning of the new Millennium with a wealth of interpretive tools enhanced by the historiographical sensitivity, and compare the Italian case with the other European countries.

We focus on recent data on unions formation and dissolution and show many figures which suggest a growing flexibility of unions and a rising breaking-down of the Italian marriage. We thus contribute to the discussion about the delay vs. specificity of the “new” family models in Italy providing a dynamic picture in a context of institutional constraints and lack of welfare aids.

Finally, we point out the critical issues in management of the different sources of data on population and family events and on the need of new appropriate data to describe and explain the growing complexity of life-courses which characterizes the contemporary Italian society.

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DYNAMICS AND HETEROGENEITY IN ITALIAN HOUSEHOLDS THROUGH EXPENDITURE BEHAVIORS

Carlo Filippucci, Mario Mazzocchi, Alessandro Viviani

1. Introduction and objectives

Changes in consumption patterns are a major source of information on the economic dynamics of a country, on its internal disparities, and on emerging social and lifestyle trends. Despite this, very few studies have looked into the dynamics of Italy's private consumption over relatively long time periods (exceptions are Cuffaro, Cusimano and Vassallo, 2003 and Paiella, 1997). The analysis of consumption data can be approached through several alternative disciplines and strategies as witnessed by the vast international literature (see e.g. Miller, 1995). Perspectives vary depending on the analytical methods (quantitative versus qualitative), the leading discipline (statistics, economics, sociology, marketing, psychology), the level of analysis (micro vs. macro) and the main focus (wealth distribution and dynamics, lifestyle changes, market segmentation, etc.). Most studies on developed economies agree on a few well-known and consolidate views recognizing that we live in a 'consumption society' where consumption has showed a strong, constant and generalized growth, and aggregate consumption over time has reflected the key demographic dynamics. But while consumption has gained importance the main categories used for many years to describe and understand its dynamics have lost efficacy. Consumption appears to be led by autonomous (perhaps irrational) individual decisions driven by the social and cultural symbolic meaning it has assumed (Baudrillard, 1970; Fabris, 2003). However, since for many years developed countries have shown an impressive and continuous growth and improvement of life conditions and in particular of aggregate consumption, the interest in studying and modeling consumption patterns has shifted from the aggregate point of view to a microeconomic perspective¹. Yet, economic growth of western countries has recently broken, unemployment has

¹ Researchers have especially focused on the role of socio-demographic factors in explaining heterogeneity in household demand, see for example Blundell, Pashardes and Weber (1993).

increased, and poverty has become a new crucial issue, in this scenario consumption analysis could be again very useful for designing economic and social politics. Thus two general questions are to be explored: is it still useful to look into consumption data? Is there something new in consumption data we can learn in order to deal with the difficulties western economies and Italy in particular are meeting? The answers could be positive, especially if we redirect our objective towards the detection of social groups and major criticalities, and their evolution over time. For this purpose, we adopt a simple exploratory strategy, based on the large amount of household expenditure data available from the Italian Household Consumption Survey. These are micro-data available in electronic form for the years from 1985 to 2009.

The main object of this paper is to give a contribution to overcome the lack of studies on consumption structure dynamics analyzing changes in consumption behavior, composition and lifestyles of Italian households, by looking at their expenditure levels and budget allocations over time.

The article is structured as follows. Section 2 provides some further details on the data-set, including a comparison with aggregate expenditure data from National Accounts. Although the focus of this study is on the last 25 years, a snapshot of the key historical trends from 1861 to date are provided in Section 3. Section 4 provides some methodological details on the chosen classification and a first overview of the data-set. The dynamics over the last 25 years are explored in Sections 5 and 6, by looking at the data in two directions. Section 5 looks at the evolution of the 7 expenditure classes over time, by considering their demographic composition. Section 6 brings the perspective to the allocation of household expenditure into the various consumption categories and their aggregations. These analyses are limited to a selection of years because changes in consumption patterns have arisen slowly and can be appreciated looking at some point in time. Our focus is on the overall trends and main issues arising. The full data-set is used for the estimation of a set of Engel curves in Section 7, enabling a closer analysis of the time patterns using all available years. Finally, Section 8 draws some conclusions. The tables on which the analysis was based are available on-line².

² www2.stat.unibo.it/filippucci/consumi_dati/appendix.doc

2. Data and caveat

The data source for our analysis was the Household Consumption Survey (HCS) run yearly by the Italian National Institute of Statistics (Istat). This is the only source allowing to connect micro-data on consumption with demographic and social household characteristics³. The retained variables were: (a) household composition; (b) age of household head; (c) geographical location; (d) total (and equalized for a household of two adults) expenditure; (e) expenditure (shares) for each of 12 aggregate purchase categories. In the paper all monetary values were converted at 2009 price levels.

Table 1 – Variables and descriptive statistics: demographics.

Variable	Year		
	1985	2000	2009
Household number (population)	18,786,954	21,967,027	24,609,431
Sample size	32,704	23,728	23,005
Household composition			
Single <35 years old	2.2%	2.3%	3.0%
Single 35-64 y.o.	6.5%	8.6%	12.2%
Single >64 y.o.	9.2%	13.6%	14.9%
Couple, no children, household head <35 y.o.	2.6%	2.7%	1.6%
Couple, no children, h.h. 35-64 y.o.	7.5%	7.0%	7.7%
Couple, no children, h.h. >64 y.o.	7.7%	10.0%	10.7%
Couple, one child	18.9%	18.9%	16.8%
Couple, two children	19.1%	18.7%	16.2%
Couple, three or more children	12.2%	5.2%	3.7%
Single with children	6.5%	8.0%	7.6%
Other households	7.5%	5.0%	5.6%
Age of household head			
Less than 18 years old	.1%	.4%	.0%
18-34 y.o.	15.2%	10.7%	8.4%
35-64 y.o.	61.8%	57.2%	57.9%
65 y.o. and older	22.9%	31.8%	33.7%
Household location			
North-West	29.1%	29.3%	28.5%
North-East	18.6%	19.0%	19.8%
Centre	19.2%	19.2%	19.7%
South and Islands	33.0%	32.5%	31.9%

³ We accessed micro-data of surveys from 1985 to 2009, and the full data-set consists of 702,916 observations. Data were processed to ensure consistency when definitions or codes changed.

The list of variables – including the 12 aggregate purchase categories – is shown in tables 1 and 2. For the purposes of the descriptive part of our analysis, three points in time were selected, the first year available in electronic format (1985), the intermediate year (2000) and the last available year (2009). A further analysis considering all 25 years in the sample was based on Engel curve estimation, as discussed in section 7. While the HCS doesn't allow to go further back in time to gain an historical perspectives, it has a clear advantage compared to aggregate consumption data from National Accounts. The availability of individual data to capture heterogeneity across households, a key requirement for the objectives of this paper. Some historical trends from National Accounts are reported in Section 3.

Table 2 – *Variables and descriptive statistics: expenditure data.*

Variable	Year		
	1985	2000	2009
Total household expenditure			
Average household expenditure (€ 2009)	2,030.95	2,522.13	2,441.77
Equivalised expenditure (two adults, € 2009)	1,615.07	2,261.40	2,341.41
Budget allocation			
Food and drinks	33.0%	22.6%	21.6%
Tobacco	1.7%	1.0%	0.9%
Clothing and shoes	7.3%	6.1%	5.2%
Housing	15.5%	25.8%	31.0%
Furniture	5.6%	5.7%	4.4%
Fuel, energy	6.3%	5.7%	6.5%
Health	1.5%	4.1%	3.4%
Transportation	9.8%	11.5%	11.4%
Communications	1.0%	2.6%	2.3%
Education	0.3%	1.0%	0.6%
Leisure	4.5%	4.9%	3.6%
Other goods and services	13.5%	8.9%	9.1%

The HCS survey has also known limitations. The survey underwent major restructuring in 1997, which mainly implied a higher disaggregation for recorded purchases, and consequently a lower underreporting biases. This structural break in the survey affects comparison of expenditure data over time, especially for some categories like education or health, which were also affected by an extension of the

number of goods and services they include (e.g. the inclusion of school transport or spectacles)⁴.

In table 3 aggregated expenditure shares computed from the HCS and National Accounts are compared. Percentages above 100 indicate that the HCS estimates of expenditure shares are higher than those of National Accounts and vice versa. The last two rows show the difference in averages prior and after the 1997 restructuring. It is well known that differences in consumption data stemming from household surveys and National Accounts exist because different definitions and measurement criteria are used.

Table 3 – Expenditure shares from the Household Consumption Survey as a percentage of expenditure shares from National Accounts.

Year	Expenditure shares												
	FD	CL	HO	EN	HE	TR	TO	CO	FU	ED	LE	OT	TOT
1985	110.5	80.0	79.0	106.1	74.1	103.7	83.3	69.0	74.2	42.8	78.2	97.4	80.4
1995	114.8	68.7	101.5	86.7	79.4	108.8	72.0	99.7	64.3	51.8	76.9	88.8	75.7
1996	113.2	67.8	104.5	87.9	79.5	112.2	72.7	98.1	60.0	58.5	72.9	89.1	75.1
1997	116.9	75.0	121.0	89.0	123.4	89.7	59.6	95.4	83.8	153.1	72.4	59.2	83.3
1998	118.4	73.9	121.8	91.3	126.5	88.3	57.9	92.8	81.7	138.1	72.9	61.5	81.3
2000	119.0	76.1	122.8	90.7	119.7	92.1	53.3	87.9	91.0	142.1	73.4	55.8	77.7
2009	120.5	75.6	124.7	95.8	110.6	104.1	42.4	78.4	75.8	99.1	60.3	56.1	79.6
1985-96	110.9	77.1	92.4	88.4	87.1	112.7	75.4	84.8	73.1	46.2	76.6	93.3	81.1
1997-09	120.0	77.1	124.4	90.6	118.7	99.9	49.1	80.2	80.3	124.1	67.3	56.4	79.2

Notes: Food and Drinks (FD), Clothing (CL), Housing (HO), Fuel and Energy (EN), Health (HE), Transport (TR), Tobacco (TO), Communications (CO), Furniture (FU), Education (ED), Leisure (LE), Other (OT), Total expenditure (TOT).

Two pieces of information arise from the differences we stressed: the direction of discrepancies for each expenditure category between the two sources; the jump in averages before and after 1997 that summarises the effect of the 1997 restructuring and comparability of HCS data. Comparability issues emerge for health, education, housing, tobacco and other goods and services. Comparison across household classes within the same year and comparisons across years after 1997 are unaffected, while caution is needed when comparing data prior and following the 1997 restructuring.

⁴ The discrepancies between these two sources were investigated in Mantegazza and Tassinari (1992) by looking at the estimates of aggregate category expenditures. About the survey methodology implemented over the years see: *Istat, I consumi delle famiglie, (various years)* and Filippucci, Marliani (1992). About the current methodology see Istat (2011, pp. 43-60). See also Bardazzi (2000, p. 118-119) about the comparisons with National Accounts and the effects of the 1997 restructuring.

The relatively high discrepancies for some categories are mainly due to differences in definitions between the two sources, and the known inconsistencies due to measurement from the expenditure side and national accounting estimates from macro aggregates.

Finally, it is worth noting that the estimation procedure over the 25 years has changed so that significance of estimates in the different population sub-groups changes as well. In the paper we assume the same reliability for all estimates.

3. Household consumption: historical dynamics

Before analyzing consumption dynamics and under the perspective of the conference's objectives, some historical trends from national accounts are pointed out. Aggregate consumption per capita across one hundred years 1861-1961 (Figure 1) captures the main structural breaks and changes which have characterized the history of the Italian economy, in particular the systematic growth after the second world war. Some more relevant aspects concerning changes in household needs and preferences stem from the observation of the dynamics of the relative weight of food expenditure on the total expenditure. This variable shows more properly a significant evolution of consumption structure, as the share of food expenditure from 1951 decreases systematically as it is also shown by the HCS after its implementation, as shown in Table 4.

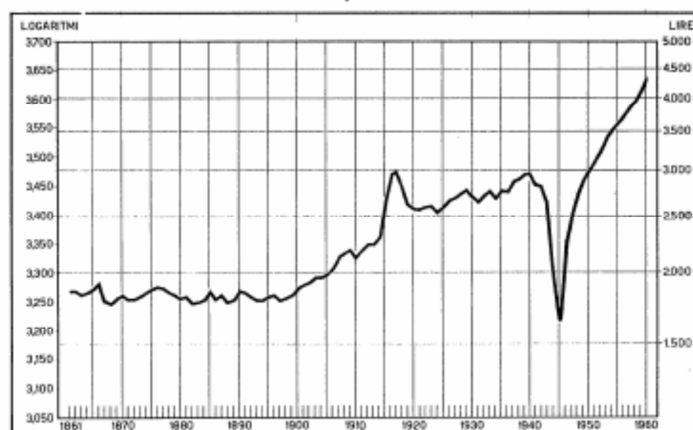
In synthesis, food expenditure could be considered a crucial variable to capture the dynamic of countries wealth according to the life-cycle model which seems to be the main reference frame to analyse consumption behaviour up to now.

Table 4 – *Food expenditure share (selected years, 1861-2009).*

Year	Food expenditure share (%)
1861	52.0%
1901	50.0%
1951	48.0%
1961	37.0%
1971	36.0%
1981	31.0%
1985	24.0%
2000	16.2%
2009	15.7%

Source: our processing on National Accounts data from Istat historical time series archive (seriestoriche.istat.it)

Figure 1 – *Per capita consumption expenditure at constant prices in Italy (1861-1961, Italian lire).*



Source: Istat (1961)

4. Social categories, poverty and consumption

The analysis of the huge amount of data produced by HCS asks for some strategic choice aimed at classifying households. Many approaches have been used to this purpose but in this paper a statistical explorative approach has been chosen. Our first approach was based on a cluster analysis but in spite of many different applications of such technique a satisfying and consistent classification was not found. As a consequence the classification we have chosen is based on expenditure classes. Given the interest on social disparities and their dynamic, we classified households according to seven expenditure ranges, which evolved over time depending on the time-varying relative poverty line. The classification of households was based on an equalized expenditure level for two adults household, and all monetary values were converted to 2009 price levels.

In this approach no theories of social organization are requested and households are grouped only according to their expenditure. The households characteristics in those classes and their changes across the three selected years have been analyzed.

It is evident that to this purpose it is necessary to adopt a criteria to define the limits of each class and a reference line for expenditure which ensures some consistency across years. This is not a straightforward task, as setting the reference line determines what portion of structural change is ascribed to economic growth

and cycles and what is left over as the target of our analysis, which is the detection of social changes through the information contained in consumption data.

4.1.1 *Absolute vs. relative poverty line*

In our approach it seems quite obvious to adopt the poverty line as the reference level for classifying households into expenditure classes, where the first class includes households below the *poverty line*, and the remaining classes are delimited by multiples of the poverty line, but the choice of the poverty line is not straightforward. There are two possible options: a *relative* poverty line (RPL) or an *absolute* poverty line (APL). Following ISTAT definition, households are below the RPL when their equivalized expenditure (for households of two adults) is below the average per capita expenditure, i.e. their equivalized expenditure is less than half the average equivalized expenditure. Instead, the APL depends on the definition of a basket of goods that are considered essential for ensuring an acceptable standard of living in Italy. The APL level is given by the minimum expenditure required to purchase such basket of goods, and it varies by household size, age composition, geographical location and town size.

Both choices have pros and cons. The RPL is relative to the average economic conditions of the population, hence it rises as the economy grows and vice versa. This has the advantage of ‘purging out’ the overall economic growth, so that households below the poverty line might get better off over time if they also benefit from economic growth. Under this choice, it must be emphasized that comparisons over time refer to the distribution of household expenditures rather than their absolute level. A generalized rise in expenditures (incomes) does not reduce the portion of population under the poverty line. Under the alternative choice (APL), the reference line responds to changes in prices for the necessary goods and is sensitive to economic growth and cycles. A recession or a price increase would increase the proportion of people under the poverty line.

We adopted the RPL approach, as this classification enables us to capture those consumption trends which are independent from economic growth and cycles. Hence, consistency of the household classification across years is ensured by attaching the reference level to the average level of per-capita expenditure. This does not mean that growth trends and cycles are ignored, as they can be recovered by looking at the dynamic of expenditure levels within each class, after applying the appropriate deflation methods.

The resulting classification of the household into classes and the lower and upper extremes for those classes are summarized in Table 5.

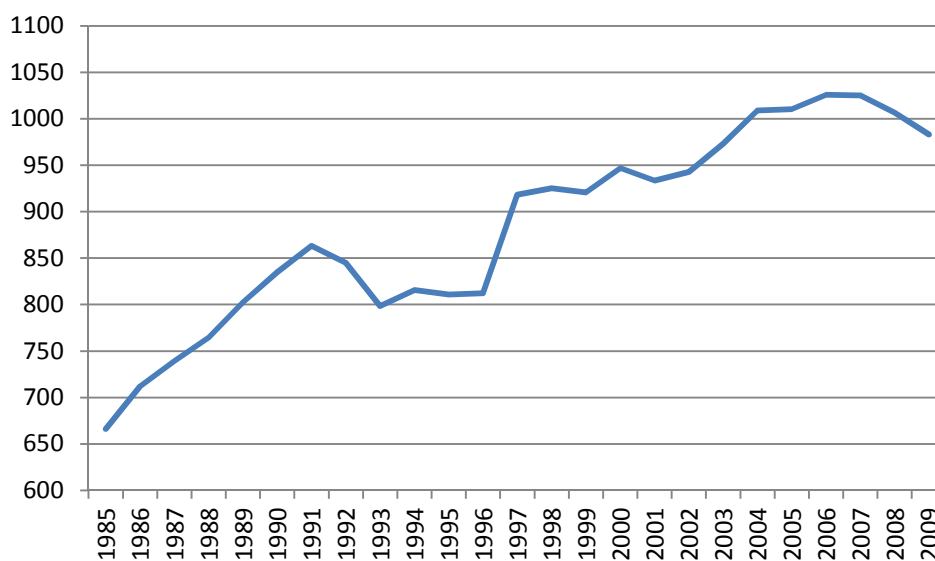
Figure 2 shows the evolution of the poverty line over the period 1985-2009. The line clearly shows how the reference line follows the economic trend and cycle,

with an overall growth over the whole sample and two evident recession cycles between 1992 and 1995 and after 2008.

Table 5 – Definition of expenditure classes (using current relative poverty lines, RPL and 2009 prices).

Expenditure class	Definition	1985	2000	2009
1	Below the RPL	Less than € 666	Less than € 947	Less than <€ 983
2	RPL to 1.5 RPL	€ 666 to € 999	€ 947 to € 1420	€ 983 to € 1475
3	1.5 RPL to 2 RPL	€ 999 to € 1333	€ 1420 to € 1893	€ 1475 to € 1966
4	2 RPL to 2.5 RPL	€ 1333 to 1666	€ 1893 to € 2367	€ 1966 to € 2458
5	2.5 RPL to 3 RPL	€ 1666 to € 1999	€ 2367 to € 2840	€ 2458 to € 2949
6	3 RPL to 3.5 RPL	€ 1999 to € 2332	€ 2840 to € 3314	€ 2949 to € 3441
7	Above 3.5 RPL	Above € 2332	Above € 3314	Above € 3441

Figure 2 – Poverty line and the economic cycle.



Source: Household Budget Surveys, various years (our processing)

5. Main features of households according to their expenditure level: a first snapshot.

The classification based on the RPL threshold is really useful to introduce the main features of Italian households across time.

It is hard to deny the impact of this picture, the surprise and the concern that it arouses. If we look at the average expenditure for the considered classes we can see that the distance between the disadvantaged and those with a higher spending power has changed very little over 25 years. In 1985 the average expenditure (at constant prices, € 2009) for the two extreme classes were respectively € 508 and € 3700, so the purchase power of the "richest" families was 7.3 times higher than that of the poorest ones; in 2000 the average expenditure rose to € 738 and € 5024, equal to a 6.8 a gap; ten years later, in 2009 the expenditure was respectively € 768 and € 5167, leaving the gap virtually unchanged at 6.7⁵.

One could argue that these data are not very informative if we do not know the exact weight of each class, and this is true; however, looking at the distribution of families in the different classes, not many reasons emerge to mitigate the concern. In fact, as it can be seen in Table 6, over the considered period of time, the number of households with a monthly average expenditure less than or equal to the poverty threshold remains well above 10%. It should also be reported that the proportion of families in this class has reduced to little more than 2 %, but since we refer to a decrease occurred over a quarter of a century, the result seems negligible. In 2009 those Italians who spent less than or equal to the threshold of RPL were still 7.7 million! But what strikes us most is that perhaps another ample 20% of families have constantly been extremely close to this class throughout this period of time, that is, with an average expenditure that exceeds the RPL of one and a half times. Moreover, it is evident that every year more than 50% of households shows an expenditure two-folds below the poverty line, despite a slight decrease between the two extreme years.

The situation is not much better if we look at the households with the highest expenditure level (over 3.5 times the poverty line). They were the 16.8% of households in 1985, a major proportion that has however been declining over time (decrease concentrated in the first period) until reaching 15.7% in 2009. The remaining half of the households is distributed into 4 intermediate classes with decreasing weight from the lowest to the highest average expenditure.

Overall, it appears that just under one third of Italian families has a very low spending power, thus continuing to present modest lifestyle levels, while even the

⁵ Detailed figures can be found in the data Appendix which is available on-line.

wealthiest families have decreased. Consequently, the number of families belonging to the middle class - at least in terms of expenditure – has increased by just 3 percentage points over the considered period, mainly because of the growth in number of the two central categories. This situation, as well as showing the persistence of in the country, has certainly and therefore growth.

Table 6 – *Distribution of Italian households by expenditure class, 1985, 2000, 2009 (%)*.

Year	Expenditure class							Total
	1	2	3	4	5	6	7	
1985	12.9	20.5	19.1	14.2	9.8	6.6	16.8	100.0
2000	11.2	20.1	20.2	15.1	10.5	7.0	15.9	100.0
2009	10.6	20.6	19.6	15.5	10.9	7.1	15.7	100.0

To complete this first picture we can also look at the equivalent average monthly expenditure calculated for 2 people in €2009 (constant prices)). The levels of such expenditure in 2009 prices increased substantially (45%) and this result, at least in absolute terms, clearly attenuates the framework outlined above, however, also in this case it should be noted that almost all growth took place by the year 2000 and after that date, the spending power of the Italians grew just 80 Euros. This increase has affected all categories but with very different rates. The expenditure of wealthiest families has increased of just 8%, while that of the poorest families has had a major leap (+35%) which is nevertheless far from the increase that has taken place for the intermediate categories that have increased their average expenditure by over 45% with peaks of 48% and 47%.

This result well reflects the situation that is captured by using the concept of RPL: all families have greatly increased their spending power, but the relative position of households in different expenditure categories has not changed, indeed it is even worse for the poorest families. The only exception is the strong decrease in the gap with the highest expenditure category even if the gap between the latter and the one with the lowest expenditure has decreased by just half a percentage point.

If we accept that consumption is a reasonable proxy for the social condition of families, the data show the image of a country where a significant gap in the levels of wealth persists affecting the dynamics of domestic demand and suggesting a blocked social structure that is likely to affect the dynamics of the country's economic development and also its social and civil growth.

6. Household consumption

6.1.1 Characteristics of expenditure classes

The criterion employed for households classification is empirical and exploratory and it certainly does not adopt any specific social theory. For this reason and in order to try to understand whether there are conditions that cause a family to belong to one of these classes we have further analyzed their social and demographic characteristics and whether and how these have changed in the quarter-century we have taken into account.

In table 7 some of the main features of families whose expenditure falls below the poverty line (hereinafter "poor") are summarized.

Table 7 – *Proportion of household types within the lowest expenditure class ('poorest households'), % of household within the same expenditure class, 1985, 2000, 2009.*

	1985	2000	2009
Single over 65	16.9	14.9	14.3
Couple* over 65, no children	13.8	14.7	12.1
Couple* with one child	11.6	14.6	15.6
Couple* with two children	15.5	21.5	22.8
Couple* with three children or more	15.3	11.0	8.4
Single parents	6.2	9.1	8.5
35-64 years old^	48.7	49.8	53.3
65 and above^	37.7	41.1	39.0
South and Island	58.1	64.0	67.6

Notes:

*Both individuals belonging to the same age bracket

^Age of the household reference person

First, time is considered. The changes occurred between 1985 and 2009 in the composition of "poor" families are evident and have materialized in large part in the first fifteen years. Age, presence of children and location were the three aspects that most characterized this group in 1985. In 2000 and even more clearly in 2009, the number of children emerged as a factor - the drop of couples with 3 or more children is indeed mainly attributable to the decrease of this category throughout the country. On the other hand, the relevance of age for the "poor" is attenuated, while the already high number of those who are in the central age groups (53.3% in 2009) significantly increases. The proportion of 'elderly' Italian households (whose head is aged 65 years or more) which fall in this class decreased from 21.3% in 1985 to 14.5% in 2000 and 12, 5% in 2009. Then does not seem exaggerate to say that "older" does not necessarily mean "poorer" even if it cannot be forgotten that

over a third of the "poorest" families has an elderly head and this proportion has increased to reach up to 39% of households in this class in the period taken into account. Age thus continues to be a main feature of the poorest families, but it is not the dominant one.

What seems to indisputably play an important role and becomes increasingly relevant over the quarter of century is the influence of households location. It is not a discovery to claim that living conditions in the South are on average the worst, but certainly detecting that 58% of the poorest families lived in those regions in 1985 and in 2009 they became 67.6% is even more shocking. A deep chasm seems to divide more and more Italian families.

The number of households in the lowest expenditure category is not to be underestimated but it is not yet so high as to raise public alarm, even during the period taken into account its weight was reduced by more than 2 points. The situation is certainly much more positive if we consider a class of poor people that could be called "enlarged"⁶ (by merging together the first two classes in our distribution). That is, considering those families with expenditure less than one and half times the poverty line. In fact, although between 1985 and 2000 there has been a significant improvement in spending power of this latter class, in the next decade this trend has not been maintained. It is therefore difficult to avoid the impression of having to deal with families living in conditions of great economic and social difficulty. So we defined "poor" those families belonging to the first two classes of the distribution: the 31% of Italian families in 2000 and 2009 were in this situation, about two and a half points below the value of 1985. Absolute values in this case say much, in fact, while in 1985 we find 6.3 million families with an expenditure of less than 999€ 2009 in 2009 families below an equivalent value (1,475€ 2009) reached almost 7.7 million.

From the point of view of the composition of this macro category, formed by the first two classes of distribution (see Table 8), the framework outlined above results confirmed and strengthened, but also enriched with new elements. Old age loses a little relevance but this time the fall happens in the last decade, whilst until 2000 there was an opposite trend and in any case age is a factor that characterizes these classes. The number of children is an important factor throughout the period taken into account, with a tendency to grow, and the single-parent status becomes quite relevant. The territorial factor becomes prominent: the proportion of households living in the South and the Islands falls sharply compared to the class

⁶ When we take into account the first two classes together the extremes become: 1985: ≤ 999 €2009; 2000: ≤ 1420 €2009; 2009: ≤ 1475 €2009.

of families that we have defined "the poorest" even if it should be noted that in the half century taken into account their weight has increased by almost 5 points.

At the extreme opposite of the "poorest" families there is a category of families characterized by a high level of expenditure we can define the "wealthy" families. The difference observed in the average expenditure of this class, as we have already seen, compared to those coming before it, is very high and this difference has certainly not decreased in the period taken into account. Also, if we consider inter-class differences (between each class and the one immediately before) we can observe that the one relative to the last two classes is very high, so that the relative position of "wealthy" families appears much more favorable. The difference is of 1500 €2009 in 1985 and rises to nearly 2000€ in 2000, to remain at this level over the next decade⁷ when it comes to 5167 €.

Table 8 – *Proportion of household types within the two lower expenditure class ('poor households'), % of household within the same expenditure classes, 1985, 2000, 2009.*

	1985	2000	2009
Single over 65	14.5	15.0	14.3
Couple* over 65, no children	11.2	12.9	12.2
Couple* with one child	14.1	16.8	17.1
Couple* with two children	18.2	22.0	22.4
Couple* with three children or more	15.6	8.6	6.4
Single parents	6.0	9.0	8.5
35-64 years old [^]	54.7	51.3	54.9
65 and above [^]	31.8	38.5	36.9
South and Island	49.3	52.0	53.5

Notes:

*Both individuals belonging to the same age bracket

[^]Age of the household reference person

Single status is one of the more obvious connotations of families that could be defined "wealthy"⁸ (see Table 9), it should also be noted the importance of the temporal dynamics of this characteristic. Already in 1985 over a quarter of wealthy families consisted of single families, and their number has increased steadily to constitute almost half of the wealthy families in 2009. A large part (more than one quarter) of these single households in 2009 consists of subjects in the central age

⁷ It has to be noted that whilst the differences between the first six classes are tied by the extremes chosen, the last class is instead open and includes also families with very high incomes. This emphasizes the gap between this class and the others, in particular the one immediately before.

⁸ The extremes of this class: in 1985: ≥ 2332 €2009; in 2000: ≥ 3314 €2009; in 2009: 3341 €2009.

classes, a component that has more than doubled compared to 1985 when it was only 12.6%. But the most important rise is that of single people over 64 years old whose weight in the class has tripled compared to 1985 and in 2009 reached up to 15% of the families in the class. To confirm the relevance of single and of the shift towards older ages of the “wealthiest” families we can observe the very high, but decreasing, weight that have in this class those families composed of single people younger than 35 years old: 49% compared to the total for this type in Italy in 1985, down to 30% in 2009.

A second important aspect concerns age. It is evident that intermediate age groups are characterizing this class. In fact, households whose heads are in the intermediate age group form the largest group (about two-thirds of the households classified by age of the head), even if their weight was attenuated in the 25 years taken into account - in particular until 2000, when they lost 4 points compared to 1985 - in 2009 they returned to grow slightly. This trend was also confirmed by the fact that the share of this family type is among the highest (17-18%).

The other aspect that characterizes the dynamics of the composition for this class regards couples with children. Their number has decreased systematically: it halved for couples with two children (their weight does not reach 8% of the families of the class in 2009) and lost more than six points for those with one child (getting to 14,5% in 2009). On the contrary, the presence of couples without children increases from 14.2% to 18.2%; among these the weight of couples aged between 35 and 64 years old remains stable, while that of couples over 64 years old almost doubles.

Thus it is clear also for this class the importance of children and age factors: more children means less couples who enter the wealthiest class, and the possibility of belonging to the class with the highest expenditure for people over 65 has improved significantly over the period of time taken into account.

Finally, the territorial dimension in this class also does not dispense surprises confirming the country's dualism that sees the South as particularly disadvantaged, but also shows a weakness in central Italy which remains at around 20% of the class. The vast majority of families in the “wealthiest” class lives in the north of the country (in 1985 about 62% with a prevalence of North-west, which came to 38%) and over the period taken into account this presence was further strengthened so that in 2009 became more than two thirds (68%) of the class. By contrast, families in the South and the Islands in this class in 2009 slightly exceeded 11%, five points below the level it had reached in 1985.

A quarter of a century, therefore, of important changes showing also from the point of view of consumption how young people are disadvantaged and wealth is something that is more and more associated with elderly people and the North of the country, while families with children suffer the most economically than others.

So far the criterion employed to classify households has proven effective on the heuristic level because it has allowed to characterize clearly enough the extremes classes of the distribution. Now let's see if an equally clear connotation also appears for the intermediate expenditure classes. We initially grouped the four intermediate classes, whose aggregation and average expenditures are shown in Table 6.

In these four central classes that express what we might call the "middle class" in the country, are grouped about 50% of Italian households. However, the equivalent average expenditure in the four classes varies in a rather wide range that goes from about 1000€ in 1985 to about 1500€ in 2009⁹. So there are differences that should not be underestimated, but also many similarities - as we shall see - suggesting us, in particular for the purposes of this discussion that focuses on the characteristics of families, to deal with these four classes together.

Table 9 – *Proportion of household types within the highest expenditure class ('wealthy households'), % of household within the same expenditure classes, 1985, 2000, 2009.*

	1985	2000	2009
Single	23.8	36.0	47.0
Single 35-64	12.6	18.3	26.4
Single over 64	4.8	11.9	14.9
Couple with one child	20.7	18.4	14.5
Couple with two children	15.6	11.7	8.1
Couple 35-64, no children	9.4	10.3	9.9
Couple over 64, no children	4.8	7.5	8.3
Age HRP 35-64	66.4	62.1	63.3
Single <35**	49.3	39.4	30.2
North-West	38.0	39.7	41.7

Note:

** Percentage of all Italian households of the same type

It is true that the gap in average expenditure for families in the various classes in the period 1985-2009 has increased by 50% showing a rise of the differences in living conditions even within these categories. In fact, while in 1985 the equivalent average monthly expenditure between each expenditure class and the next one was between 300 to 350 €, over the years the distance between the classes increased: in 2000 it is between 400 and 450 € and in 2009 it comes to about 500€, placing the families belonging to the highest expenditure class in a much more favorable

⁹ In more detail, the extremes of the difference between the highest and the lower average expenditure observed in the four classes, in 2009 prices, over the three years are: in 2009, 1700 - 3180; in 2000, 1650 - 3061; in 1985, 1159 - 2149.

position than the first two classes. However, and this is why we kept the four classes together, the distance compared to the class of the families that we have defined "wealthy" is so high (2000 euros) that does not allow their assimilation.

Some aspects of the composition of the families belonging to this intermediate macro-class emerge as a result of what we have already seen in the two extreme categories of the poor and the wealthy families. Generally, households in this macro-class show intermediate characteristics in-between the poorest and the richest ones, characteristics that are close to those of the extreme classes depending on whether the different subclasses that make up the macro class that we have formed present expenditure levels closer to those of two extreme classes.

Table 10 – Average expenditure level by class (2009 prices).

Class	Year					
	1985	2000	2009	1985	2000	2009
	Non-equivalised expenditure			Equivalised expenditure		
1 (<i>Poorest</i>)	644	942	989	509	738	778
2	1109	1470	1507	837	1190	1241
1+2 (<i>Poor</i>)	929	1281	1331	710	1028	1084
3	1561	1975	1917	1159	1650	1701
4	1972	2475	2388	1489	2118	2196
5	2385	2903	2799	1822	2590	2686
6	2767	3411	3172	2149	3062	3179
3+4+5+6 (<i>Intermediate</i>)	2001	2493	2403	1516	2158	2246
7 (<i>Wealthy</i>)	4305	5054	4781	3704	5024	5167
<i>Total</i>	2031	2522	2442	1615	2261	2341

However, the aspect that emerges in a more obvious way is the change that took place over time in the composition of this class with respect to two family characteristics. The first concerns the presence of couples with children: in 1985 this type family used to characterize the class with a weight that came to 54.3%, but over the years there has been a gradual shift in the prevalence of such households in the classes with a lower expenditure. As early as the year 2000 in the intermediate class only couples with one child were predominant, while the other two types (with two and three and more children) had the greatest weight in the two lower classes. In 2009 also the weight of the couples with a child was now nearly equal to those of the lower classes. On the other hand, even by observing the distribution of all couples with children in the classes considered, we can see that in 1985 the absolute majority of couples with children was in the intermediate macro-class (with the only exception of couples with more than three children,

which however had the greatest weight in this class)¹⁰. In 2009, however, the greater number of couples with three children (54.6%) had slipped in the classes with the lowest expenditure and in the intermediate category it remained only the 38.3% of these families. The presence of couples with two children had fallen to 49% due to a shift toward the two extreme classes, and especially toward the poor families, and the only type of family that continued to be predominant in the intermediate macro-class was that of couples with one child (54.9%), although losing more than two percentage points always in favour of the poorest classes. The significant rise in couples without children, whose weight in 25 years rose from 16.8% to 20.9%, is supporting these findings. The presence of children thus proves once again a factor that has heavily influenced the level of family welfare and their relative position within the Italian society.

The second aspect, which also shows a significant quantitative importance, concerns age. Households whose head is in a central age class (35-64 years old) and belongs to the intermediate class, in this quarter of a century have suffered much by losing seven points even if they remain prevalent (compared to the total for the country) in this macro-class. Instead it increases rather dramatically the weight that have in this class those families whose head is in an advanced age class (65 years old and over), which in 1985 accounted for 19.7 of households by age of the head in the macro-class, and in 2009 had come to 33.7%! So much so that in 2009 the 53.1% of this family type (made 100 the Italian total of these households) was in the intermediate class, compared to the 42.9% in 1985. Therefore a sensible aging of the middle class in the country arise.

Connected to this aspect is the increasing and relevant importance that have acquired during the period taken into account those households composed by single both aged between 35 and 64 and over 65 years old (from 5.40 and 7.35% respectively in 1985 to 12,6 and 15.4% in 2009).

6.1.2 Changes in household consumption structure

The analysis of expenditure patterns for various categories of goods provides some further information on the nature of heterogeneity across Italian households, as well as the most prominent changes over time. To this purpose it is necessary to summarize the vast amount of disaggregated information available on household purchases for various goods. The rationale is that consumption choice and the

¹⁰ This is the 56,7% of the families with one child and the 54,7 of those with two children, while the weight of couples with three children or more was of 47,5%.

allocation of total expenditure reflect both economic constraints and lifestyle choices.

Some further aggregation of the 12 expenditure categories listed in Table 2 helps to emphasize heterogeneity across household consumption behaviors. This relates to the standard idea that consumers move from inferior to luxury goods as their wealth rise. However, when a relatively long period of time is considered, the classification of goods as inferior or luxury is unstable. Furthermore, globalization and the growing influence of marketing has increased heterogeneity across goods belonging to the same category, so that comparisons over time may be affected.

As a starting point, we consider the perspective taken in the historical analysis by Barberi (1961) and later reinvestigated and extended by Viviani (1987). Following Barberi, purchases can be classified in terms of their necessity, as primary needs for living (food and drink, tobacco, clothing, housing, fuel and energy), secondary goods (furniture, health, education) and tertiary goods (leisure, transport, communication, other goods). This approach has been deepened by the exploration of purchasing patterns based on a Principal Component Analysis (PCA) run on 13 variables, the 12 original expenditure categories plus the equalized total expenditure

Anyway, because of the evolution in communication goods and services, together with the changes in the public provision of health and education services (which are affected by the 1997 structural break), it was advisable to test an alternative (more disaggregated) grouping strategy. Thus, we have adopted a second classification of purchases to explore the following categories with a lower level of aggregation.

6.1.3 Composition of consumption, an overall picture

The synthetic approach suggested by Barberi is based on the idea of "necessity" and helps to compare over time the behavior of significant groups in which to classify the different expenditure categories.

The goal is to capture the aspects connected to the structural changes in spending patterns, always referring to 7 classes of expenditure (socio-economic type). It is interesting to note that the interpretative framework adopted (the one, indeed, relative to different groups of households), highlights a marked heterogeneity in each year against a moderate variation among the three observations. This highlights issues related to important differences between socio-economic groups, together with the change in the composition of the various items of expenditure within the same class.

A constant, perhaps the only one, may be the decline in primary consumption against the growth of global expenditure, for all three years. It should be noted,

however, that only for the classes with higher expenditure (from 5 onwards) the component relative to non-primary consumption tends to approach that of primary consumption, reaching an equal importance only for the richest households. If we look at the overall figure we are able to note how in 1985 the expenditure for primary consumption was lower than the same expenditure in 2009 (63% and 65% respectively); this figure, in addition to highlighting a substitution effect within consumption categories, shows that the gap between the wealthiest and the poorest families has reduced according to the relative importance of these types of expenses. Since 2000, secondary expenses tend to grow in importance for the families belonging to the increasingly richer classes, while tertiary expenses are increasingly important only for the richest classes.

Table 11 – *Expenditure shares for aggregation of goods according to the classification by Barbieri.*

Expenditure class	Primary goods			Secondary goods			Tertiary goods		
	1985	2000	2009	1985	2000	2009	1985	2000	2009
1	.83	.74	.76	.05	.07	.05	.12	.20	.19
2	.73	.67	.71	.06	.09	.07	.21	.24	.22
3	.66	.63	.67	.07	.10	.08	.27	.27	.24
4	.61	.59	.63	.07	.12	.09	.32	.30	.27
5	.57	.56	.60	.08	.12	.11	.35	.32	.29
6	.53	.53	.58	.09	.14	.12	.39	.33	.30
7	.44	.47	.50	.10	.18	.15	.45	.34	.35
<i>Total</i>	.63	.61	.65	.07	.11	.09	.29	.28	.26

Considering the crucial role of primary needs for living we carried out a PCA analysis checking for a further evidence to confirm the previous analysis. Application of PCA is suggested both by the nature itself of the tool, and by the exploratory aims of this part of the analysis.

In order to ensure consistency for backward comparisons, the PCA was applied to 2009 data and the first two components were retained. The component loadings are shown in Table 12. The first component is related positively to total (equivalized) expenditure and expenditure in other goods, leisure, clothing and transportation, and negatively to food and drinks, housing, fuel and energy. Following the rationale behind Barberi's classification, this first component (which explains 17% of the variability of the 13 original variables) is associated (inversely) to necessities for living. In other words, the highest is the score on this component, the lower expenditure on necessities and the higher total expenditure. It is straightforward to associate this first component with a measure of wealth. The second component (11% of variability) has strong positive correlations with food and drinks, tobacco, communications, and transportation and correlates negatively

with total expenditure, housing and furniture. Thus, it may be interpreted as a measure of day-to-day (high frequency) expenditures vs. less frequent purchases.

The component loadings estimated in 2009 were used to compute component scores for 1985, 2000, and 2009, hence maintaining the 2009 component structure and interpretation to make comparisons straightforward. The component scores have a zero mean and a unity variance in 2009 only, while in previous years their average and variance can be different from zero, and there's no guarantee of orthogonality.

Figure 3 plots the two principal components on a bi-dimensional graph, where the Y-axis represents wealth and the X-axis high frequency expenditures. The component averages for all classes in each year are the co-ordinates for points in the graph, while the point size reflects the relative dimension of the class.

Table 12 – *Principal component loadings.*

	Component 1 Wealth	Component 2 Frequent purchases
Total expenditure (equiv)	0.47	-0.28
Other goods	0.38	-0.01
Transportation	0.29	0.22
Leisure	0.26	0.14
Clothing	0.23	0.20
Furniture	0.18	-0.09
Education	0.11	0.04
Health	0.02	-0.01
Tobacco	-0.02	0.36
Communications	-0.24	0.21
Fuel and energy	-0.32	0.01
Food and drinks	-0.34	0.47
Housing	-0.34	-0.64
<i>% Total variability</i>	<i>17%</i>	<i>11%</i>

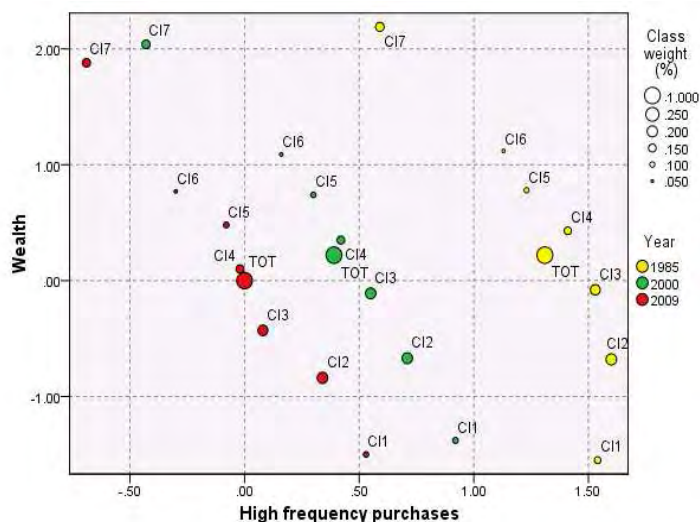
The two components identified (wealth and High Frequency Purchases - HFP) show the position of each expenditure group in the three years taken into account. Between 1985 and 2009 we can observe a general and noticeable reduction of the HFP component for all classes, while the wealth component is substantially more stable, despite a slight decline in 2009.

The information resulting from comparing the positions in relation to the two "conceptual" categories expressed by the components is that of a general improvement in wealth, taking into account the content of the components in terms of original variables. Overall, the most obvious fact is that in the three years taken into account the relative positions were maintained between the different classes of

expenditure, as evidenced by the substantial parallelism for the seven groups in three stages, from which emerges also the important role of the decrease in HFP (aspect that confirms what was previously observed concerning the dynamics of primary expenses in the period).

It should, however, be noted that the figure for 2009 shows a situation of increased unease compared to the year 2000, in the sense that, even for the richest families, there is a minor effect of the wealth component, however, for the poorer classes, it is largely attributable to what has been previously observed.

Figure 3 – Plot of the two principal components.



6.2.2 Some further insight on the allocation of consumption expenditure.

The most important – but not obvious in advanced economies¹¹ - evidence that emerges (also) from the two synthetic approaches previously observed is that different economic means (measured by the level of overall expenditure across the 7 classes) result in increasingly different expenditure patterns. This is not only detectable when comparing the spending "model" between the poorest and the richest, but also between them and the middle and upper expenditure classes (i.e.,

¹¹ In fact, until 2000 it has been observed a trend toward a higher similarity of expenditure patterns (not obviously in the levels of expenditure), see Cuffaro, Cusimano, Vassallo, (2003).

those between 2 and 3 times above the poverty line). To further explain the evidence that emerged, the changes in expenditure composition were also analyzed with a descriptive view, taking into account a wider breakdown of the types of expenditure and expenditure classifications previously identified.

Overall, *food expenditure*, which in 1985 was the highest (33%), tends to decrease significantly as early as 2000 (23%) and shows a substantial stability in 2009 (22%); on the other hand, housing expenditure raises (from 16% to 26% to 31%), and starting from 2000 it becomes the main expense. Again with reference to food expenditure, in 1985 there were strong differences in the average propensity to consume food between the different classes of expenditure. A propensity which tended to be much less divergent in 2009: from 48% and 29% in the extreme dates for the two "poorest" classes we have a correspondent value of 33% and 22% respectively for the two "richest" classes.

If we consider the incidence of the two most significant shares of expenditure together (food and housing) as a proxy for a hardly compressible demand, we can observe two aspects of particular interest. Firstly, for the two types of less wealthy families (the "poorest" one and the class immediately next to it) the overall rate rose from 65% in 1985 to 60% in 2009, with a different internal composition as for relevance, in the sense that spending on housing becomes really very consistent with 33% over the previous 19%. Secondly, for the wealthiest families (represented by the last two expenditure classes) the average expenditure share for these items becomes even higher, rising from 33% in 1985 to 44% in 2009: in this period, food expenditure (mainly in 1985) is considerably reduced (from 21% to 17%) while the share of spending on housing, already very important also in the 2000, almost tripled (from 11% to 28%). The role of the housing expenditure component therefore reveals a considerable change from what was observed in the past (Viviani 1987) concerning a detected distortion in consumption due to a sustained growth in the consumption of "not indispensable" goods over "necessary" goods and services. The rise of food and housing expenses, as opposed to other items, is necessarily affected by the changes in the dynamics and structure of the Italian socio-economic system: in specific, one should consider the role of land revenue and its related market characteristics.

The third component is *transport expenditure*, showing a constant rate (10%, 12% and 11% respectively in the three years) on consumer spending. This type of expenditure is significant for all types of families with the exception of the poorest families in 1985, which show fuel and energy as a third source of expense). We note, however, a systematically greater consistency in transport expenditure among the upper classes. Since this expenditure category includes a variety of items (purchase and care of means of transportation, tickets and subscriptions, etc.), it may hide the satisfaction of very different needs.

On the other hand, the expenses related to what we might call *education* and *culture* are always minor or not even detectable. The variability over time and between groups of families still denotes the unwillingness of Italians to invest directly in improving and updating their education and competences, for these expenses instead households still heavily rely on the services provided by the government.

Health expenses are quite low as well, but some differences across time and classes need to be pointed out. First of all it is important to note that in 2000 the weight of this expenses had increased significantly in all classes: from 1% (2% for wealthier) to 3-4%. Secondly, in the last ten years the wealthier households maintained the level reached in 2000 (4%), while the three classes with the lower total expenditure reduced this rate (2% for the poorest and 35 for the others)¹².

Expenditure on *telecommunications* (not higher of those for education and health) presents a pattern similar to the two previous categories: it was very low in 1985 (between 0-1%), and their incidence increased to 2-3% over time but in this case their incidence on the lower classes becomes higher compared to the upper classes (3% in the first 4 classes and 2% in the last 3). Moreover we should stress that there is no distinction between the poorest class and the others.

Expenditure on *clothing, furnishings and furniture*, on *leisure* and *other expenses* are very important elements of differentiation between social classes. In particular, this is true for *other expenses* and *leisure*, which include very diversified expenses (personal items, holidays, etc.). The gap between the lowest and highest expenditure classes ranges between 8% and 29% in 1985 and they have experienced a conspicuous reduction over time (6% and 19%, respectively, in 2009), showing these items are the most sensitive to the economic cycle.

In this part we have considered as object of analysis, the structural dynamics of household expenditure; the results have highlighted elements of heterogeneity through the recognizable effect in the structure and level of consumption. We should ask how expenditure dynamics are affected by prices fluctuation and, in particular, by relative prices in each category of consumer goods and services, even if it is not easy to quantify their effects. There is no doubt that, by adding these elements, the cause-effect relationship between offer (production) and demand of consumer goods would be significant, producing important effects on the other elements of the economic system (employment, investments, collective consumption, etc.).

¹² We cannot exclude the existence of problems related to the definition, classification and measurement of such expenses, which can reasonably be the cause of the observed low level of the expenses on education and health.

7. An econometric extension

So far, the analysis has been limited to three points in time. We conclude our study by exploiting the full data-set in order to expand our results to the whole time span. To this purpose, we have estimated a set of Engel curves in the basic Working-Leser form, augmented by year dummies as intercept and expenditure coefficient shifters, as follows:

$$w_{it} = \alpha + \sum_{j=1985}^{2008} \tau_j 1_{j=t} + \sum_{s=1}^3 \gamma_j d_s + \left(\beta_0 + \sum_{j=1985}^{2008} \beta_j 1_{j=t} \right) \log(x_{it}) \quad (1)$$

Where w_{it} is the expenditure share devoted to a given good or an aggregation of goods by the i -th household in the survey year t (t : 1985, ..., 2009), x_{it} is the level of total equivalized expenditure for the same household, $1_{j=t}$ is an indicator function which is one when j equals the survey year t , and d_s is a set of three quarterly dummies (one is excluded to avoid the dummy trap) to capture seasonal effects.

From equation (1) it is possible to have a different estimate of the intercept and expenditure elasticity for each year. After scaling to the (overall) mean the total expenditures x_{it} , expenditure elasticities for a given year are obtained from the following equation:

$$e_j = 1 + \frac{\beta_0 + \beta_j}{\bar{w}_j} \quad (2)$$

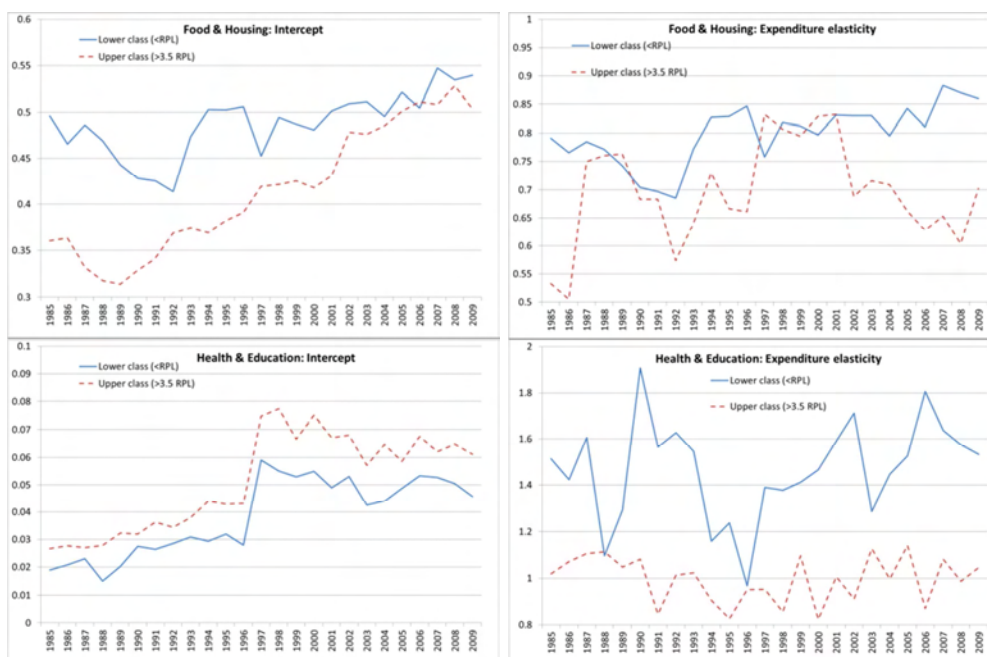
where \bar{w}_j is the mean of expenditure shares over households surveyed in year j .

Equation (1) can be estimated for specific sub-set of the overall sample (e.g. for a given household type and/or geographical location), so that elasticities become group-specific. Estimates were produced for a variety of household characteristics and for different aggregation of goods and are available from the authors on requests. Here we focus on two particular aggregates which are especially relevant for our analysis: (1) food and housing; (2) education and health. The former aggregation is especially interesting to monitor the evolution of disparities in expenditure for essential goods. Instead, since health and education expenditure were especially affected by the 1997 restructuring, the extension to all years in the sample allows to explore whether the time patterns for these expenditures have changed over time, regardless of the absolute expenditure level which depend on the varying definitions.

Figure 4 shows the year-by-year evolution of intercepts and elasticities for the poorest and richest expenditure classes, for the food and housing category, and for the education and health category. Given that the total expenditure is scaled at the

mean over the whole sample, the intercepts are adjusted average expenditure shares for a fixed expenditure level which may be compared across classes.

Figure 4 – Trends in intercepts and expenditure elasticities.



Several conspicuous elements emerge, in line with the findings so far. The expenditure share for food & housing has risen for both the lower class and the upper one, although the latter has grown to a faster step until reaching the same level, around 50%. On the other hand elasticities are generally lower for the upper class, and divergence has grown after 2001. If food and housing are considered as primary goods as in Barberi, growing intercepts suggest an overall shift towards necessities, although differences in total expenditure elasticities and the recent divergence still indicate that the lower class is lagging behind and more sensitive to economic turns. Some caution is needed, since housing expenditure also includes expenditure for second homes.

The interpretation of the health & education group also needs some caution because of the 1997 structural break, but there are strong consistencies across the two sub-periods. The intercepts run in parallel (with a slight upward trend) and are regularly higher for the upper class, and elasticities are sensibly higher for the lower class and show larger fluctuations. Again, if health and education

expenditure are seen as a progress towards a wealthier society, this progress seems slow and disparities persist.

8. Concluding remarks

This paper has focused on changes which have occurred in Italian consumption expenditure patterns over the last 25 years. The analysis was based on a classification of Italian households, using a large data set of micro data from the household expenditure survey. Households have been grouped in seven expenditure classes which evolved over time depending on the time-varying relative poverty line. Patterns over time of household characteristics and consumption behaviors within and between the classes have been compared and discussion essentially focused on the relative conditions.

The picture we have drawn presents some interesting features. In spite of the growth of the Italian economy and the significant increase of the expenditure levels experienced over the years by all classes, the relative position of households has not shown signs of a real improvement in terms of cohesion. In fact, richest average expenditure in 2009 compared with the expenditure of the poorest is about seven times higher, a mere 0,6% less than the 1985, and about 1/3 of households still show a low expenditure capacity, while the number of the households in the richest expenditure class has decreased as well. Moreover, over this period of time, the distance in terms of average expenditure between each class and the lower one has had a dramatic increase. As far as consumption is assumed to be a proxy of life conditions, the evidence suggest that the differences among the social groups have increased under many respects and the Italian social stratification has been basically static over 25 years, hence preventing a real economic and social improvement of the country.

Dynamics of demographic patterns in each class are interesting as well. The traditional Italian divide between North and South, at least from the point of view of the expenditure capacity, has not been bridged: in 2009 two out of three households living in the South of Italy can be considered “relatively” poor, but the crucial point is the 10% increase compared to 1985. The elderly households are prone to have low expenditure levels but a larger number of elderly in 2009 belongs to the class of households with the highest expenditure. On the other hand, households whose members are in the central classes of age, which characterized the intermediate classes of our classification in 1985, have partially lost their weight. Single households and those without children are two relevant aspects towards explaining a positive consumption capacity. From this evidence it seems clear that the affluent society includes even less people living in the South, young

people and households with children. In particular it highlights the difficulties for Italian households, especially over the last ten years, to maintain their living conditions when children are born.

Finally we have considered the allocation of consumption. From this point of view we would like to stress the role of time patterns. In fact, household rankings according to the 'well-being' component does not change over time, while the weight of frequent purchases decreases proportionally in all the seven classes. The second aspect is the structural break observed in 2000: most changes have taken place up to this year, while frequent purchases rise again in the new Century and the proportion of tertiary goods decreases. More in details, considering 12 purchasing categories, it should be emphasized that food and housing maintains a very important role over time, more or less for all classes, but especially for the poorest. Even more interesting is the general shift in the weight of the two components: housing expenditure has emerged as one of the key issues for households to the detriment of food, with the only exception of the poorest household. Expenditure for transport has gained a relevance position for all classes.

Expenditures for leisure, clothing and furniture, together with other expenses emphasize the differences among classes. The distance between 'rich' and 'poor' households for this expenditure categories is conspicuous and is relatively stable over the sample period, although it should be pointed out that after 2000 the residual category for other expenses has shrank, capturing the increasing difficulties met by the Italian economy over the last decade. An important change over time and across expenditure classes is captured by the evolution of expenditure for health services: until the year 2000, no differences emerge for this category, at least in relative terms, among Italian households. Between 1985 and 2000, expenditure on health service has increased four-fold in all classes, reaching the same share. Again, over the last decade some differences have arisen: poor households have conspicuously reduced their expenditure share, while richer households preserve their standards.

Furthermore, aggregate household expenditure on education and health. From the HCS data, it seems that the challenges of the knowledge society have not influenced the expenditure allocation towards the improvement of education and professional skills. There is no clear sign of change not only for poor households, but also for the rest of the sample. While they have increased until the year 2000, this trend has turned into a new decline over the last ten years, when they have been emphasized as more and more crucial for economic and social development.

The econometric extension of the analysis to consider all available years and all individual observations basically confirmed the descriptive analysis, although it was useful to control for the effect of the 1997 restructuring of the HCS on expenditure categories like health and education. The estimated Engel curves

confirm little progress (if any) in terms of reducing the gap between the lowest and the highest expenditure classes. The results also suggest that education and health expenditure are still a luxury good for the lowest class (but not for the highest) and that elasticity has sharply increased over the last decade.

Turning to the opening questions, is it still useful to look into consumption data? Is there something new in consumption data which could enable us to deal with the difficulties faced by western economies and Italy in particular? The few but strong pieces of evidence we have collected through a mere descriptive analysis seem to prove that the answer is nothing but positive. It identifies the most critical situations and where it would be necessary to design effective policies.

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SUMMARY

The main object of this paper is to give a contribution to overcome the lack of studies on consumption structure dynamics analyzing changes in consumption behavior, composition and lifestyles of Italian households, by looking at their expenditure levels and budget allocations over time.

For this purpose, we adopt a simple exploratory strategy, based on the large amount of household expenditure data available from the Italian Household Consumption Survey. These are micro-data available in electronic form for the years from 1985 to 2009.

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LIFESTYLES AND QUALITY OF LIFE OF ITALIAN PEOPLE: AN HISTORICAL PERSPECTIVE

Elena Pirani, Silvana Schifini D'Andrea

1. About the title

The use of the expression *quality of life* to title a review referring to 150 years of Italian life, as well as ambitious, will be undoubtedly mistaken. In literature, we find two terms mostly used in order to indicate different aspects of life conditions of a population: *level of living* and *standard of living*.

In the first decades of the last century, these expressions have been used by a lot of Authors referring to consumptions. For example, Bowley (1923)¹ titled the eighth chapter of his book "*The Nature and Purposes of Measurement of Social Phenomena*" as "*The Standard of Living*". Around 1925 one identified two possible meanings of *level of living*. In a first interpretation the level of living depended on goods and services consumed in a time interval by a person or an household having certain social characteristics and dimensions; secondly, following ILO (1926)¹ and its utilitaristic meaning, the term *level of living* can be interpreted as the whole of the satisfactions of economic utilities that a person (or a family) benefited from goods and services consumption.

In 1954 the United Nations (ONU)¹ proposed in its "*Rapport sur la définition et l'évaluation du niveau de vie du point de vue international*" a series of objective indicators for measuring the *level of living* of a nation.

Following the movement of Social Indicators in the '60s, the principle that the *level of living* cannot be exhausted just considering goods and services consumed, but a lot of other dimensions of life had to be accounted for, was established. Afterwards, M.K. Bennet (1973)¹ criticized the terminology relied to Standard of Living and used the terms Scale of Living Plane and Level of Living.

During the '70s, the term *quality of life* has been jointly used together with, but not substituted to, the term *level of living*. Subjective measures entered in the conceptualization, and so in the modelization used. They become fundamental

¹ See Schifini D'Andrea S., 1988.

components of quality of life, with the aim to integrate objective measures using evaluation, concern, satisfaction, expectation or happiness measures.

The structure of this work follows an historical perspective, referring, where relevant, to specific situations and issues.

The first part, concerning the period from the unification of Italy to the second postwar period (paragraph 2), presents a picture of objective social situations depicted from data often partial, incomplete and not always comparable. It would be incorrect to label them as *quality of life*, and the term *level of living* would be too ambitious in this case, since it implies a scenery, even if objective, wider and more exhaustive of what available data enable to do. We think, instead, that it is more appropriate to use the expression *lifestyle*, in the sense of standard of living, habits, behavioral models, life situations and choices.

Lifestyle, which may be circumscribed even only to some social issues, is a more appropriated term to describe a long historical period during which different cultural, social, political, economic and environmental factors have had a determining weight on life conditions of the populations.

Lifestyle:

- expresses the social stratification of a society, important aspect to assess its evolution during time, mostly whether so long as in our case;
- may be considered even without introducing economic factor;
- may manifest differently in presence of similar economic and environmental conditions;
- in absence of subjective measures, it is a valid substitute to interpret social conditions relied to individual choices.

Aiming at describing a so wide historical framework, we point out to the identification of some social aspects that we can assume as *slices of lifestyles*, even if with limitations due to data availability. These domains, that represent elements of quality of life, are analyzed considering the last decades (paragraphs 3-5), and referring to well defined aspects, namely participation (political, associative and religious), spare time, and lifestyles strictly speaking (smoking habits, alcohol consumption). Using data coming from Istat survey *Aspects of Daily life (Aspetti della vita quotidiana)* – limiting to the 1993 and 2009 editions – these aspects are analyzed in a complete and detailed way also using subjective measures and satisfaction indicators, essential components of quality of life.

In the historical framework, a link between the measure of the lifestyle and the quality of life is possible thank to the first survey of Doxa (1947), where the level of happiness of the population was investigated (paragraph 6). Referring to the last decades, more exhaustive sources based on ad hoc surveys, enable a more detailed and complete analysis. Only basing on these data it is correct the switchover from

the measure of the lifestyle to the measure of quality of life, both at terminological and at content level.

2. A difficult unification

Italy, become a political unit following the annexation to the kingdom of Sardinia of regions separated since centuries, different for their histories, level of education, culture, economic development, traditions and, more important, the language, had a dimension exclusively regional, where political, social and economic relations were scarce and difficult. These regions represented a variegated and complex territorial state of affairs, an aggregate of subjects that had very little to share and that suffered of prolonged foreign settlement.

The local administrations often favored these various local identities, so making the integration more and more difficult. At the time of unification, a sage, able and suitable administration, expert of deep regional differences in terms of life conditions, quality of civil society and cultural life, was missed. In almost all fields one registered a deep gap between north and south of Italy; for example, in the south, income was generally lower, unemployment higher, and birth and mortality rate greater than in the north.

We consider meaningful and interesting to focus on some aspects related to culture and standard of living, since the Italian unification to the first decades of last century.

2.1 Culture: illiteracy and degree of education

At the time of Italian unification, the percentage of illiterates was impressive, with strong differences by gender and geographical areas. In 1861, the 75% of the population over the age of 6 years was illiterate; in 1871 this percentage dropped to 69% but strong regional differences remained (e.g. 88% in Basilicata, 43% in Piedmont). This level halved before the First World War. The rate of female illiteracy (76% in 1871) evidently decreased over time, but until the eve of World War I it has maintained a deviation from the males around 12-14%.

In 1877, with the introduction of compulsory primary education, the situation improved little. The school attendance was compulsory only for two years, participation was very low, and evasion reached 80%. The attempt to introduce compulsory education did not contribute to raising the level of literacy in the population. Even after raising to three years the compulsory education in 1888, an evasion of more than 80% remained in many areas of the south. The causes of this

absenteeism could be attributed to several factors: the level of illiteracy of the parents, lack of cooperation of the families who saw school enrollment as a disappearing contribution of the children working the family economy, the long distances, inconvenience and road conditions towards the schools, and the absence of an adequate school building.

A survey conducted in 1907 on education in Italy became the public opinion aware, and in 1911 led to a reform that passed the responsibility of primary education from municipalities to the Provincial Schools Council through the figure of the inspector.

In the '50s the initiative of the Ministry of Education known as Plan D (Plan for improvement of primary school) to conduct investigations in various Italian provinces identified the following causes of the level of school evasion: poverty (31.9%), illness or handicap (18.7), family negligence (17.4), lack of schools (17.1), child labor (14.9). A study on school evasion in primary school for the period 1947-1952 showed that between 6 and 14 years old the 6.4% of children evaded compulsory education (2.8 in the north, 11.2 in the south). Out of 100 students enrolled in first grade in 1947-48, only 54 came to the fifth grade, with strong regional differences (77% in the north, 37% in the south).

Among the southern peasants, illiteracy was virtually complete, but also in the cities most of the population was in this condition – even with profound differences among the various cities – and this situation also had repercussions on the presence of a variety of cultural activities. For example in 1881, Naples, the largest Italian city (415,000 inhabitants in 1871), had only 5 libraries, compared with 12 in Florence and 10 in Turin. A similar situation existed also with regard to banks, which in the early '80s were 193 in the north against 31 in the south. The popular press was minimal.

In 1951 the illiteracy rate had dropped to 13% with a gap of 4 percentage points between males and females. However, the rate of illiteracy in the south (24%) was still four times that of the north (6%).

For nearly a century, the illiteracy rate has represented the (negative) level of culture. It is a contextual indicator essential for evaluating and interpreting the lifestyles of a population. After the Second World War and in early '50s his role in this sense has failed: even if the lifestyles of the population are strongly influenced by illiteracy, no longer meaningful to speak in terms of alphabets and illiterate, and their consistency no longer has the social interest which he had previously. At the level of detection of the phenomenon, the 1951 Census is the first one that did not limit to distinguish among literates and illiterates, but introduced alphabets levels of education.

Focusing on the school and education system, we see that profound changes have been involved also this area during the last 150 years. In the 1870s, the higher

education included two kinds of schools: the lyceum (the high schools or *liceo*) and the technical schools. Attendance at school, especially for lyceum, was attributable to a small segment of the population and was a real privilege. The technical schools, whose duration was less than lyceum and had a less theoretical profile, were less selective. In addition to public schools, there were private schools usually run by Catholic religious orders, attended from a large part of children and youth². In 1870-71, 12,000 young people were enrolled in lyceum-gymnasiums; in 1881-82 they passed to 20,000, and ten years later to 34,700. About the same student population was enrolled in technical schools.

In the first decade of 1900, the enrollment in technical schools greatly increased: from 55,180 to 123,909 units, while lyceum enrollments remained stationary. Technical schools, presented a scientific face and they found a broad development in northern Italy, while in southern Italy lyceum specializing in classical studies (*liceo classico*) was attended mostly. A new separation was determined between north and south: the north was technical education oriented, the south privileged schools oriented towards literature and humanities education.

At the top of the education system there was the University, and wonder that in a country where the primary education system was particularly backward there were so many universities (in 1860: 19 public, 4 private), often with very few students. The most popular were law (40%) and medicine (30%) faculties. The approximately 13,000 students of 1880s doubled at the end of the century, after which the registrations increased albeit with fluctuations related to historical events and social policies of the country. A just unified Italy required a new ruling and qualified class and encouraged this trend that lasted until the end of the century. Then, it slowed down but returned particularly strongly during the war (in 1940 there were over 127,000 students and over in the first post-war 231,000).

At the end of the century, Italian education system was very unbalanced: too illiterates and too many graduates with respect to a market demand which needed doctors, but not so many advocates. Graduated in law was the largest group, especially in the south. This group of people poured on Public Administration or went to swell the pool of unemployed³.

² M. Barbagli estimates that in 1981-82 students in religious school in convents or seminaries were about 27,000.

³ M. Barbagli estimates that in the period 1901-1914 about 50% of new graduated emigrated. However, he notes that law graduated cannot even completely exploit this work possibility abroad.

2.2 Life style in Italy at the beginning of XX century...

Over the last decades of the nineteenth century and the early of twentieth century, in European societies began a process of socio-economic changes, with characteristics that differentiated the bourgeoisie from the working class. Even in Italy, the period of economic recovery started in the early '90s and continued during the Giolittian period (1901-1914) except for brief intervals, is referred to, by historians and economists, as a time of great wealth for the Italian society.

The first decade of the century represented a new era for the political, intellectual and cultural Italian life, characterized by a widespread improvement in standards of living and a new prosperity that was manifested in all the different social classes. In particular, in that period raises the figure of the petty bourgeois who attaches great importance to the values of comfort, convenience, ease and prosperity. These values are showed through a lifestyle that designate one's own income towards clothing, entertainment, sport, an active social life, etc. The clothing, in particular, was a symptom of the living standards of the bourgeoisie, and the ladies of this middle class showed their social advancement with hats of different shapes. The bourgeoisie also began to pay particular attention to the care, management and furnishing of living space. The house took a very important role in terms of status symbol; the house and its furnishings were a sign of respectability, decorum, differentiation from the working class. Particular emphasis was given to the *living room*, a distinctive feature of the house, a room to socialize and to receive guests: the calling card of the master of the house. Over time, all this has turned into a requirement, to the point that, faced with economic difficulties, the petty bourgeoisie (e.g. white collar) did not hesitate to reduce consumptions of food items rather than to give up an appearances considered socially important. In this period, the house is becoming more and more functional, resulting in a growing gap with the lower-level segment of the population. The spaces became increasingly customized according to the characteristics of the family, and depending to its interests and hobbies, such as the presence of the piano.

Differences in consumption between the working and the middle class did not simply depended by a lower disposable income, but by the presence of different lifestyles and patterns of behavior. Even with an increase in income, the interest of the working class was not oriented towards an increase in spending on housing, but towards an increased spending in the food industry with improved quality and diversification of types of consumption.

Moreover, it has to be considered that at the beginning of the century the lower classes included a high incidence rate of women and children obliged to participate in labor market and that, even in the presence of the Law 242 of 19 June 1902 regulated the work of women and children, there have not been significant

improvements in the workplace and work conditions. The percentage of children under the age of 15 who worked was still high. Women spent many hours of their day outside the home to help the family budget and assigned obviously less important to the care of the house.

2.3 ...and in the '50s

In 1948, nearly 4 millions of Italians were enrolled in the "local lists of the poor people", of which 57% in the south and the islands. On the basis of these data a summary measure of social depression was developed. This measure was based on four elementary deficiencies (economic, cultural, social and hygienic), expressed respectively by the following phenomena: pauperism, illiteracy, crime, and lack of water supply and sewerage. Assuming the north as a base=100 for each phenomenon, the south took on values, respectively: 163 (pauperism), 480 (illiteracy), 150 (crime), 69 (lack of pipelines); 89 (no drains) (see D. Miani-Calabrese).

The survey on living conditions conducted in 1953 on behalf of the Parliamentary Commission of Inquiry about poverty in Italy represented an essential source to learn about the social situation of the country. The study of poverty, in collaboration with Istat, was addressed in a rigorous way. Three components were considered in order to evaluate the standard of living: housing, food and clothing.

The survey showed that:

- about a quarter of households lived in overcrowded or improper houses (basements, attics, sheds, etc.).
- 869,000 families (7.5% of total) had a *null* standard food, the diet was completely devoid of meat, sugar and wine, foods assumed as indicators of a standard and adequate diet. 36% of households had a low or moderate diet;
- as indicator of living standards in terms of clothing the condition of the shoes was chosen: 5.1% of families (n=591,000) had poor or worse shoes conditions.

A synthetic index of standard of living ranked household living standards into four categories: poor, disadvantaged, medium, high. Overall, 11.8% of households (1,357,000 households for a total of about 6,200,000 people) were found to be in a position of complete misery, and 11.6% in difficult conditions.

The informative objective of this parliamentary investigation led to the reporting of social consequences to which these realities could have brought in absence of interventions: social ills, crime, juvenile delinquency, illiteracy shooting, begging, etc.

3. 150 years of participation

As mentioned, in order to describe lifestyles and quality of life in a broad historical context, we have identified some areas of quality of life, which will be described with reference to the last decades, but extended, where possible, to the past. In particular, in this and next paragraphs, we consider the participation in different domains of life, the spare time, and some lifestyles in the strict sense. The following analysis is based on data from Istat surveys *Aspects of Daily Life* carried out in 1993 and in 2009, respectively the first and last available. These surveys were introduced just in order to assess and monitor the conditions and quality of life of the Italians, in their various domains, and from a multidimensional and subjective perspective (Istat 2010).

3.1 *The active vote*

The meaning we can assign, historically, to the expression political participation is deeply different from the meaning used in present surveys. In the context of the end of 1800, referring to this expression we have to consider only the part of population that is eligible to vote (active vote). The recently unified Italy, where the liberal Democratic Party (*partito liberale democratico*) was at power – the *Historical Right-wing (destra storica)* which followed Cavour's political ideas – experimented a dramatic financial situation, and monetary entries did not cover not even an half of current expenses. A restrictive political economy and a set of fiscal measures, like the flour tax, reported the break-even in 1875, but created a widespread discontent which led the Left-wing to come to government the following year.

The existing election law involved a carefully selection on active voters: only the male population who could read and write and who paid a certain amount of direct taxes (40 lire) had right to vote. Both plebs and petty bourgeoisie was excluded from active vote. Persons eligible to vote did not reach 2% of the population (about 530,000 units).

Among the interventions of the Left, there was also the extension of suffrage. The electoral reform of 1882 extended the voting right to people who did not pay direct taxes, while maintaining the exclusion for the illiterates. Whereas in 1881 the 62.8% of the population was illiterate, almost all the peasants, artisans and many urban workers remained excluded of the electorate, which rose to about two millions.

In 1912, during the Giolittian period, the Parliament approved the almost universal male suffrage. The electoral law was extended to almost the entire male

population with at least 21 years able to read and write, to people aged 30 and more, even if illiterates, as long as they did their military service. The electorate went from 3,300,000 to 8,443,205, of which 2,500,000 was illiterates, the 23.2% of the population. Italians having the right to vote thus passed from 9.5% to 24.5%. Bearing in mind that based on the Census of 1911, male illiteracy rate was still 33%, the actual degree of participation still excluded a great part of population. At the same time, the Parliament rejected the granting of the vote to women who, as known, finally became active electorate only in 1946.

It is interesting to combine the achievement of this political goal with the result of a DOXA survey 1951 (see Luzzatto-Fegiz P., 1956), which posed the following question to the female population “Do you consider desirable that women have a precise political opinion? Or that women could enroll in a political party?” 52% answered that “it is better that women are not interested in politics”, with a maximum of 57% in lower-middle classes and 56% in the south.

A surprising result, considering that the 1951 Census showed a significant reduction of illiteracy and an increase in the level of education of the female population.

3.2 The political participation nowadays

As already said, the current conceptual content of political participation is somewhat different with respect to one century ago, when it was substantially linked to the possibility to vote in public elections. The meaning today attributed to the term political participation concerns, beside the active and passive vote, to attend a political rally or speech, to participate to a public assembly or to a demonstration of political parties or trade unions, or simply being informed witnesses even if not participating in the game (Putnam 2000). However, notwithstanding progresses registered in last decades in terms of civic engagement and consciousness in one's own rights and obligations, the political participation does not seem yet a result completely established. On the contrary, in recent years, a detachment of citizens from institutions and a lower involvement in public and political life seems to be in course.

In 2009, with respect to 1993, we register a moderate decrease referring to all these aspects, above all for men aged 25 to 54 (more or less 3 points percentage for the participation to political party assemblies and 5-10 for the participation to trade-union initiatives, depending on the age class), while for women, who started from lower level, we register the tendency of a little increase, even not too marked, above all for political party assemblies. In general, the reduction has been stronger for lower levels of education.

About 8 men out of 100 have participated to an electoral meeting in 2009, on average 2 fewer than in 1993; in this case, women participation is lower, and it holds substantially steady in the period.

The participation to demonstrations and parades involve in 2009 the 13% of young men and the 15% of young women under 25 years old, a proportion basically equivalent with respect to 16 years before. At major ages, however, this kind of participation is lower, and in 2009 we register a further reduction of about 2 percentage points for men and an increase of equal size for women. Considering the level of education, we see that this participation is prevalent among graduated people.

Most relevant variations, even if negative variations, are found referring to the listening of political debates and speeches. While in 1993 on average 40% of Italian people performed this activity, arriving to 50% in central ages, among women this reduction is less marked, probably due to the lower starting level. Nowadays, one woman out of five declares to have listened a political debate during last the 12 months, with respect one out of three in 1993.

Also in this case, educational differences are present. The reduction of the attending of political speeches has been registered for all, however, it has been more marked for the lower levels of education, both for men and for women. This fact has comported an increasing educational gap in this issue.

Involvement for free in an activity for a political or trade-union party was, and still is, a very marginal form of political participation (carried out by a little more than 2% of Italians).

This disaffection and disinterest versus political life is confirmed also by the reduction of the frequency with which people talk about politics. Referring to men, the percentage of whom talk about political issues decrease of about 5 percentage points in 2009 with respect 1993, while the percentage of people talking about politics one or more times per weeks increases. In particular, the reduction refers mostly to middle ages, while adult and old people talk about politics more frequently. For women we register a generalized increase of the interest towards politics or, even, they talk about it more frequently than 16 years before. This augmentation comes from less educated strata; on the contrary, it seems that in 2009 graduated women discuss about politics more frequently than in 1993. For men, it does not emerge an educational gradient.

3.3 Associative participation

Whether political participation has seen a slowdown in last 16 years, positive variations have been registered for associative, cultural, recreational and voluntary

participation. Most relevant variations are found for women, who in 2009 declare to have participated to meetings of voluntary groups or to have carried out activities for free in this domain in a higher measure than in 1993. This higher participation is spread to all ages, even if it is more frequent among adult women (from 45 years old). Also for men this form of participation increases, particularly from 45 years old (in 2009 about 11% participated to associative or voluntary assemblies, and 13% carried out voluntary activities).

We highlight that these forms of participation increase in the referred period tendentially owing to the increased participation of adult and old people, and thanks to the increased feminine participation more than the masculine one. Moreover, the differences between 1993 and 2009 are more relevant among higher educated people, who increase their participation, with respect to a substantially unchanged participation behavior of the less educated.

Considering the participation to cultural associations, we register for men, on average, a moderate reduction, notwithstanding age differences. For women, instead, this participation increases in all age classes (except for under 24) and, once again, major increases are for adult and old women (+3.5 percentage points for 45-54 years old and +6 percentage points for 65 and over).

As regards participation to associations involved in ecological issues, in civil or peace rights, the only relevant information, and constant in time, is the marginality of interest and of participation (less than 2%).

Considering the financial contributions to political parties, this aspect of participation, whether it was already low in 1993, in 2009 it reduces further (overall from 3.7% to 2.5%). However, we register gender differences. The percentage of women that have given money to an association in 2009 raises with respect 16 years before, with variations also of 10 percentage points between 45 and 64 years old. On the contrary, among men, the financial contribution to associations decreases for people aged 25-44 with respect their coetaneous of 16 years before. It thus seems that people who were most generous some time ago, are still the same but, obviously, today they have grown.

3.4 Religious participation

Another fundamental aspect in the study of individuals' participation, and particularly relevant in Italy, is the religious participation. In this case, we measure it on the basis of the participation to church services, as declared by individuals.

As expected, strong age and gender differences stand out to be relevant: old women are the group who go to church more frequently, differences that were present already in the past. A survey of Doxa revealed that in 1953, the 51% of

men and the 73% of women attended Sunday religious ceremonies. On the contrary, it showed that there were no religious attendance differences in terms of social classes.

Looking to a more recent period, between 1993 and 2009, we observe a general tendency towards a reduction in religious attendance. This trend, even if common to all ages, is more marked among youth. The proportion of men who participate to services some times a month or a year remains substantially equal, as well as the percentage of men who go to services every day, while there is a reduction for men who attend regularly; on the contrary, for women we note a reduction also for those who go more frequently (every day or some time a week), also among elderly, but this percentage still remains the double with respect to men.

It seems that the higher educated, the lower the church attendance.

4. How the spare time has changed

4.1 An historical picture

One problem putted by the study of leisure time is that of its definition. In terms of concept and terminology, over time, different uses and progressive changes are found. It is therefore natural that the concept has taken over time different contents and facets.

In a historical-retrospective perspective, the concept of *spare time* rises with the emergence of wage and factory labor, and with the juxtaposition between time and place of work on the one side, and times and places of everyday life on the other side. The spare time was combined with the reduction in working hours and thus concerned only some segments of the population. Typically, the working time were shorter in presence of more highly qualified jobs, and was particularly low for public employees. The productive sectors of skilled labor were characterized by a high percentage of female labor and child labor, and the work time reached the 15-16 hours. In the early decades of the unification of Italy, most people had neither the resources nor the opportunity to have free time.

In the countryside, the time that remained after working life coincided with the day off and was dedicated to religious practices: religious festivals, processions, sacred representations. The non-religious entertainment took place in taverns. In the streets, especially those in the villages, one attended performances of traditional singers, street musicians, trade fairs, circuses, all popular entertainments that had already beginning before the Italian unity.

The available data and analysis of economic history in the last years of the nineteenth century and early twentieth century show some qualitative changes in

the working condition place which have impacted strongly on the conditions of life and consequently on the lifestyles of the population. Welfare conditions that characterized the Giolittian period and greater availability of free time increased, differentiating the types of leisure.

At the turn of the two centuries the bourgeoisie led an active social life involving the participation in theatre plays and operas (it was the golden age of Italian opera), attended the cafes and clubs where they read the newspapers, argued, spread the *principles* and opinions of the middle class. There was also a portion of the population – a social élite – who lived on private revenues and a portion of the bourgeoisie that was beginning to enjoy the pleasure of occupying their time with various sports: fencing, archery, climbing, cycling. Just cycling was the first sport that had a circulation of mass, followed by football. They represented the first football clubs over the years, initially attended by the nobles of English origins.

In 1897 the first films were projected in circuses and fairs. Then, first cinemas were built, and they became a mass detention of the decades that followed. A comparison about the distribution of spending between the period before World War I and the period that follows the Second one (see Miani-Calabrese) shows the increased participation in the film shows, rising from 71% in 1938 to 79% in 1955 (77% in the north, 86% in the south).

According to a survey of Doxa (1954) on the use of free time, 61% of women and 51% of men stated that they had no interests. Among the favorite hobbies and pastimes there was being with friends for 44% of males (31% females), and listening to the radio for 34% of females (23% males) (see Luzzatto-Fegiz P., 1956).

4.2 *What Italians do and where they go in their spare time, nowadays?*

The fascination of Italians for cinema started long time ago, and it continues till today without registering any crisis. In fact, going to cinema represents one of the activities mostly carried out by Italian people in their spare time. In 1993, 30% of Italians declared to have gone to cinema from 1 to 7 times during the previous year, and another 8% more often; today these percentages have risen respectively to 40 and 12%. If we consider differences in time, we see that these variations concern mostly adult population, while the youth went often to cinema also in the past. Between 45 and 64 years old, the quota of people going to cinema (sometimes or often) has increased for men and women respectively of 16 and 22 percentage points, and, even to a lesser extent, also beyond this age.

To follow, among most frequent activities, we find the visit to museums or exhibitions, an activity carried out sometimes or often by just shy of one Italian out of three, without gender gaps. Also in this case we register an augmentation in the participation through the period, on average of 5 percentage points for men and 8 for women. Most relevant variations are registered for young people (from 30 to 44% till 14 years old, probably during their school and educational activity) and for 55 years old and over (for women also the 45-54 age class registers an increase of 14 percentage points).

One Italian out of five declares to have attended to at least 4 music concerts during the previous 12 months, and just shy of them to have gone to theatre. In the first case, the participation decreases with age, and from 55 years old the value is under the average. Referring to the theatre, instead, we found a greater intergenerational homogeneity, which become more marked in 2009 due to a marked increase of adult and women participation.

Among activities carried out by a limited proportion of Italian people we find the sporting exhibitions and the dance. The sporting exhibitions was and remains an activity typically for men, even if we register two tendencies: on the one side the proportion of men who declares to attend often sporting events decreases, but the occasional participation increases, mostly among youth; on the other side, the percentage of adult women who participate increases. Also referring to the dance, we note a reduction in the assiduous participation, particularly among medium educated, and an augmentation of the occasional participation (1 or 3 times per month). Notwithstanding these variations, youth participation (15-24 years old) still prevails.

Finally, just a marginal proportion of Italian population declare to assist to classic music concerts or to opera, notwithstanding a moderate increase in recent years, without gender differentials.

Overall, for most of the activities carried out by Italians in their spare time (and investigated in the questionnaire) – i.e. go to cinema and theatre, museum, exhibitions – the feminine participation increases more than the masculine one, and basically today women declare to carry out these activities most often than men. This increased associative participation, even more marked among adult and elderly, is generalized to the whole population, and it has been detected for all levels of education, too.

Referring to the reading of newspapers, it emerges a general reduction in this activity between 1993 and 2009, mostly for young and adult people. On average, in 2009 the 36% of Italian men and the 50% of women declared to never read newspapers, with respect to the 27 and 44% in 1993. In particular, we found a general reduction of the proportion of people who read the newspaper every day (minus 7 percentage points), while the “occasional readers” are nearly equal.

However, we find age differentials, in fact, while the reductions are strong among youth and adult, people aged 55 and more show an increase in the newspapers reading.

The books reading is typically a women's activity, and the gender differential has heightened in recent years. In fact, whether in 1993 the 35% of men and the 42% of women declared to have read at least on book in the last year – with higher percentages among youth and decreasing with age – in 2009 these proportions have increased respectively to 39% and 53%, and for women aged 45 and over the increase have been of more than 20 percentage points. Furthermore, we register also an educational based gap.

4.3 How much frequent Italian people go on holiday

To go on holiday represents a relevant aspect of the leisure time of Italians. Between 1993 and 2009 we find moderate changes in the behaviors in this domain. Overall, in 1993 about half of Italians declared not to have gone on holiday not even one time in the previous 12 months, while one tiers was gone one time, about 8% two times and a residual 3% three or more times, without gender differences. Generally, these proportions do not change in 2009, even if we note a moderate decrease of people who went on holiday just one time, to advantage of more frequent movements. These variations present age differentials, particularly for men aged 55-74 and women aged 45-64: in these cases, the proportion of people who have had two or more periods of holiday in the previous year has increased from 11 to 17%. The analysis by educational levels shows that high educated men and women (particularly the graduated) go on 3 or more holidays per year most frequently than the average (in 2009 about 16% with respect 4% of less educated people), while the proportion of people who never gone is proportionally higher among lower levels of education (about 70% with respect to the 25% of the graduated).

Another important aspect to highlight is the relationship between the holiday and the adequacy of economic resources. As expected, in both periods, the frequency of holidays increases with the increase of economic satisfaction – which is a proxy of economic resources of individuals. However, this increase is detected, even in a lower measure, also for people who asses their financial resources as scarce or inadequate. On the one side, this result highlights the fact that to go on holiday at least one time per year represents an aspect that cannot be renounced by Italians; on the other side, it emerges how the socioeconomic differential has sharpened in last 16 years whether considering a major frequency of holidays.

4.4 Friends

To see regularly friends represents a fundamental aspect of relational life of individuals, an important moment of aggregation and socialization, which cannot be disregarded talking about behaviors and lifestyles.

The description of this aspect will be limited here to the frequency of contacts of friends, owing to the lack of useful information in the surveys. In this case, two aspects stand out to be relevant: first, it is evident the existence of gender differences, with men who see most often their friends with respect to women. Second, in 2009 it emerges a reduction of the frequency of contacts with friends with respect to 1993.

Referring to men, in 1993 about one tier of Italians declared to see their friends every day, with a decreasing gradient for age (two tiers for the youth and one fifth for adult and elderly), while in 2009 this proportion has fallen of 7 percentage points, in undifferentiated way for age classes.

On the contrary, in 2009 on average only the 18% of women sees their friends every day (however these values are around 50% for women aged under 25 and from 9 to 14% in the following age classes), and an half sees them one or more times per week. A worthwhile aspect is the high proportion of elderly women declaring to never see their friends (or not to have friends). Even if it seems to note a moderate decrease of this value in the 16 years considered, this value remains too high and it should cause concern from the point of view of social cohesion and elderly quality of life.

5. Lifestyles of Italian people: smoking and alcohol

Important aspects traditionally relied to the individual lifestyles refer to smoking habit and alcohol consumption.

5.1 Smoking habit

Smoking habit historically presents a strong gender differential. A Doxa survey carried out in 1949 found that out of 100 men 72 were regular smokers and 10 light smokers. There were the 18% of nonsmokers among men against the 75% among women. Furthermore, proportionally, there were more young smokers (between 18 and 40 years old the 42% were smokers) than adult smokers (38% among 40 years old and older). The proportion of occasional smokers, quite high till 40 years old

(16%), decreased among adult people (9%) and was virtually inexistent among elderly.

Considering occupation, among employers, peasants, agricultural laborers and factory workers the 55-60% were frequent smokers, and the 50-54% among managers, artisans and white collars. The percentage was a little lower among retired persons (35%), and decreased again among students (29%), till the 9% among housewives.

Arriving to nowadays, from 2009 Istat data, it emerges that young men (till 44 years old) smoke more than their coetaneous of 16 years before, while there is a substantial stability (even if not a reduction) among adult and old smokers; on the contrary, among women the increase of the number of smokers is distributed more uniformly in all age classes. On the other side, it is true that men and women who quitted smoking have augmented with respect to 16 years ago, with relevant variations mostly among adult and elderly (45-74), and also heavy smokers have decreased in all age classes, both for men and women.

Percentages of men and women who smoke increase mostly among medium educated, while with respect to 1993 the percentage of never-smoking today is higher among both higher and lower educated. The highest proportion of ex-smokers is registered among the lower levels of education. Among graduated women, who in 1993 showed the 6% of heavy smokers, today has reduced this percentage, and among them we find the highest proportion of ex-smokers.

5.2 Alcohol consumption

On the eve of the first world war there has been a great expansion of cafés and taverns, where the consumption of wine reached very high levels, also considering its quite low price. An estimate of per capita consumption of wine sees the consumption increasing from 80 liters in 1870-80 to 125 liters in 1911-14. In the cities the consumption was higher with respect to villages and countryside. In Milan one estimates a consumption of 213 liter per capita in 1906; in Turin there were 2500 taverns in 1907 (one each 150 inhabitants):

In the immediate post-war period, the alcohol consumption, particularly of wine, concerned about 50% of population (Doxa 1951-52). Differences relied to occupation was strong: from a maximum of 64% for peasants to a minimum of 33% for professionals, managers and governing. The consumption of hard liquor, instead, indicated an inverse trend: higher for privileged classes (57%), lower for the inferior ones (35%). The alcohol consumption was gender differentiated: 54% of men against 30% of women regularly drank alcoholics. In the second postwar

period, also the consumption of nonalcoholic and soft drinks, like bitter orange, coke, ginger soda, syrups and other sparkling drinks began to spread over.

Referring to the current alcohol consumption, we focus on the consumption of beer, wine and alcohol between meals, aspects investigated in Istat surveys *Activities of daily life*. These drinks are different from various points of view, e.g. the frequency of consumption or the age of consumption. In 1993, generally, the beer was drunk some times per week or per month by one fourth of Italians, and seasonally by another fourth; in 2009, the frequent consumption is increased of about 10 percentage points, while the seasonal one is decrease to less than 20%: the result is an augmentation of beer consumption. The beer is consumed mostly by young people, and in fact most of the increase may be ascribed to them (today the 62% of young men between 25 and 34 years old are usual drinker, while in 1993 they represented less than 50%). Referring to women, the beer consumption was, and is, lower with respect to men, but also in this case we register an augmentation of social drinker (women who drink beer at least one time per week represent the 30% between 25 and 44 years, with respect less than 20% of 16 years ago).

Referring to the consumption of wine, in this case we find a moderate increase of people who never drink, with the most relevant differences between 35 and 54 years old for men and 45 and 64 for women, and a strong reduction of the percentage of people who declare to drink wine every day, mostly in the younger age classes (on average reduction of 20 percentage points between 25 and 54 years old). This reduced frequency in wine consumption, however, does not imply a “no consumption”, but just a reduction in the frequency, and we find that the youth are mostly occasional drinker, contrary to the elderly for whom the proportion of every-day drinker are higher.

Considering the between meals alcohol consumption, we see that both for men and for women there has been a reduction in the proportion of people who never drink, while the proportion of people who drink one time per week is increased, mostly among the youth. The variations are more than 10 percentage points between 14 and 34 years old, and for women also in the following age class.

Differences in alcohol consumption emerge also considering the educational level. Referring both to beer and wine, the decrease has been found particularly for the lower educated, both for men and for women, while among graduated we found a strong increase of people drinking beer at least one time per week. The educational level represents today a discriminant factor also in alcohol consumption between meals: among men, while before who drank some time a week was mostly the low educated persons, nowadays the situation is inverted and this association persists also for women, even if the phenomena is lesser relevant in absolute terms.

Concluding, in the last 16 years, we register an augmentation in alcohol consumption, mostly beer and alcoholic drinks between meals, above all among youth (till 35 years old and in some case till 44). Women generally register a lower alcohol consumption with respect to men, but in recent years they registered the major increases.

6. Subjective components of quality of life: happiness and life satisfaction⁴

A transition from the concept of *lifestyle* to that of *quality of life* is identifiable in the first survey of Doxa (December 1947), which posed to the interviewed a question about *happiness*. Using a different formulation, the question was repeated in 1955⁵.

Two questions formulated in a different manner and with different categories of response, but with a great interest since they represented a first measure of happiness, that can be inserted in analytical models directed to study and understand the life conditions of Italians. An indicator of happiness may join the measure both of lifestyle and of quality of life, bringing a value added to their interpretation.

An attempt to compare the two surveys (aggregating responses of 1947 to only two categories, happy and unhappy) shows a situation of gender parity in happiness domain and a level of happy slightly higher – but this is straightforward – in the immediate end of the war. Lack of happiness increases with the increasing of age. Furthermore, factory workers, peasants, agricultural laborers and artisans was the categories registering highest levels of unhappy in 1947, a result confirmed in 1955 for the “inferior” social class.

With the introduction of the Eurobarometer (EB) surveys in 1973, the subjective measures did begin to assume an increasing relevance. Happiness indicators and satisfaction measures were used jointly in the beginning, however, subsequently, the latter – referring to specific domains of life – was privileged.

⁴ It has to be noted that the expressions *happiness* and *satisfaction* express two different concepts. The former has reference to a state of *being*, whether the latter to a state of *having*. Satisfaction is often investigated with respect to specific domains (work, housing, spare time, and so on), and a certain kind of correlations with objective data could be hypothesized. In conceptual and statistical models of quality of life is essential to register information about satisfaction. Finally, happiness does not have an external referent (see Luzzatto-Fegiz P., 1956).

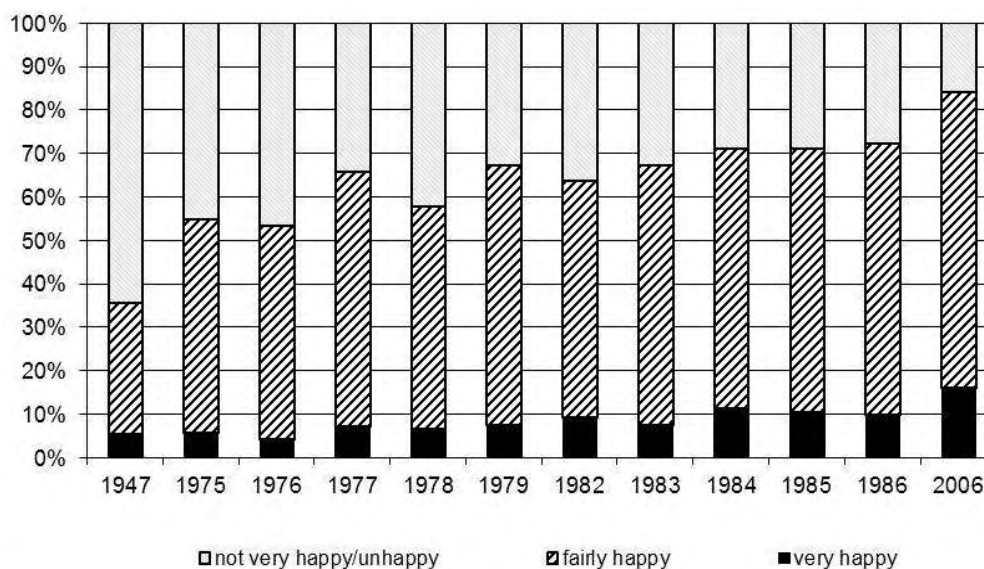
⁵ 1947: In this period do you feel happy or unhappy? Answer categories: very happy, fairly happy, neither happy nor unhappy, unhappy, don't know.

1955: In the last 6-7 days, did you have a moment of complete happiness? Answer categories: Yes, No, Not indicated.

Even if the sources of data are different, it is interesting to compare data coming from the survey of Doxa in 1947 and the subsequent EB surveys, Public Opinion, European Commission (Figure 1).

In fifty years, the proportion of “very happy” plus the proportion of “fairly happy” is noteworthy raised: starting from the 34% in 1947, it exceeds 80% in 2006. Bringing forward explanations or considerations on these two questions – separated by almost 60 years, in so different social contexts and historical moments – would be, however, a too daring and rash attempt. Anyway, it is interesting to observe the increasing prevalence of a moderate happiness, represented by the category “fairly happy” during time.

Figure 1 – *Level of happiness of Italian people, various years.*

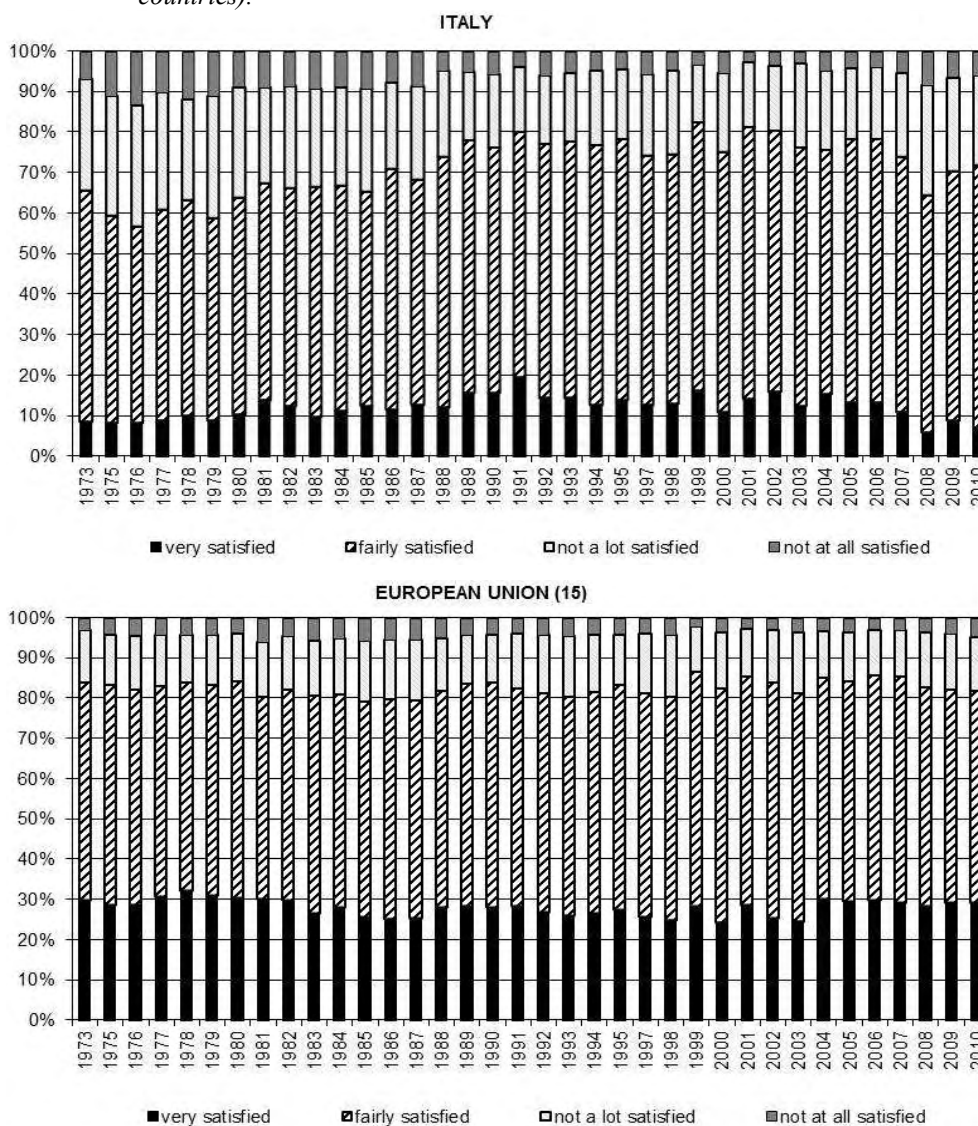


Source: Doxa (1947) and our elaboration on Eurobarometer data (1975-2006).

Another interesting comparison arises from the use of Eurobarometer survey data. Even if with some discontinuity, they give the possibility to analyze for a period of about 40 years, from 1973 to 2010, the perception of individuals about their life satisfaction (Figure 2). In this case, we consider Italy and 15 countries European Union (EU). People were requested to declare whether they were a lot, fairly, not a lot, or not at all satisfied about their life in general.

Above all, it is straightforward that the average level of satisfaction in Italy is lower than that in EU-15. In particular, at the end of '90s and in the first 2000s Italy almost filled the gap, but then it followed a new period of low satisfaction.

Figure 2 – Answers to the question “How much are you satisfied about your life in general?”, 1973-2010, Eurobarometer, Italy and European Union (15 countries).



Source: our elaboration on Eurobarometer data.

The percentage of people declaring to be very satisfied of their life, after a positive phase with a peak in 1991 (20%) and values around 12-16% in the

following decade, is nowadays under the values registered at the beginning of '70s, oscillating between 5.8 and 8.6%.

In Europe, very satisfied people amount to more than the double with respect to Italy (and they are three times as many as Italians in recent years, due to the strong reduction in Italy).

In general, however, we note that the EU-15 presents a very differentiated and heterogeneous panorama in terms of life satisfaction. Already in '70s, but still nowadays, Italy presents a level of satisfaction similar to Germany, France, Belgium and Spain; higher levels are registered in the Netherlands, Denmark, Ireland and Luxembourg, while the lowest are those expressed by Greeks and Portuguese.

Another aspect differentiates Italy from the rest of Europe: in Italy "very satisfied" people represent a low proportion on the total, while the positive evaluations are unbalanced toward the "fairly" satisfied: this answer, in fact, has always collected the consensus of more than 50% of Italian people, and in recent years it has arrived to about two tiers.

Considering answers related to a lack of satisfaction, we note that the percentage of people who is not completely satisfied is progressively diminished during years, and nowadays in Italy they correspond to 20-23%. In the same way, also the proportion of people not at all satisfied about their life has fallen in the considered period, and starting from levels higher than 10% in the first '70s, today they represent a low quota (2-4%). Apart from the most recent years, the percentage of people who is not at all satisfied is rather similar between Italy and the rest of Europe.

It remains to verify whether the rise of dissatisfaction registered in the recent 2-3 years (and the corresponding collapse of very satisfied people) represents the beginning of a new period of general and generalized dissatisfaction, or it just represents a transitional situation related to contingent factors, e.g. the economic crisis.

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SUMMARY

In literature, different terms have been used in order to indicate different aspects of life conditions of a population: *level of living*, *standard of living*, *lifestyles*, *quality of life* and so on. During time, subjective measures entered in the conceptualization of living conditions, with the aim to integrate objective measures using evaluation, concern, satisfaction, expectation or happiness measures.

In this review, our aim is to provide an overall picture of the life conditions of Italian people during the last 150 years, in terms of standard of living, habits, behavioral models, and life situations. In this sense, we will refer mainly to the *lifestyles*. Lifestyle, which may be circumscribed even only to some social issues, is an appropriated term to describe a long historical period during which different cultural, social, political, economic and environmental factors have had a determining weight on life conditions of the populations.

In the first part, concerning the period from the unification of Italy to the second postwar period, we give a historical description of social situations depicted from objective data. Secondly, focusing on the last decades, but extending where possible to the past, we point out to the identification of some social aspects that we can assume as *slices of lifestyles*, namely participation, spare time, and lifestyles strictly speaking, and finally, considering the *happiness* of individuals. Using data coming from Istat survey "Aspects of Daily life", these aspects are analyzed also using subjective measures and satisfaction indicators, essential components of quality of life. Only basing on multidimensional and subjective data it is correct the switchover from the measure of the lifestyle to the measure of quality of life, both at terminological and content level.

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DATA AND MODELS FOR A SPATIALLY EQUITABLE DISTRIBUTION OF TRAFFIC FLOWS IN HIGH POPULATED AREAS

Paolo Dell'Olmo, Antonino Sgalambro

1. The impact of Transportation on High Populated Areas

The effects of the congestions arising from transportation activities within major urban networks are very well known, as well as the consequent social and environmental costs. More recently, travellers and drivers are getting more familiar with the new capabilities for reducing such phenomena or for improving public transportation, which are based on telematics services both for detecting traffic flows in real time and for transmitting and visualizing information to users (e.g. Advisory systems, fleet management systems, Variable Message Signs, Information panel, and the like). Moreover, the travellers are starting to adopt innovative transportation services, integrated, in several cases, with telecommunication tools, mobile phone service (e.g. SMS) or Internet, so to improve the coordination between demand and supply. Consequently, the attitude of local authorities is changing too, since the potentialities offered by the traffic control and infomobility systems become more and more interesting, not only for every day management but also for big events (emergency plans, strikes, big celebrations, etc.) which, as a matter of fact, are relatively frequent and, indeed, very important for security and public order. At the same time, there is the necessity of new decision models specialized enough to capture the specific characteristics of the different problems, yet easy to integrate in a common framework to allow a coordinated management of interventions on the same area where different flows share the same resources. The growth of transportation demand we have been seeing in the last years, especially in the urban areas, depends on several economic, demographic and social factors. The costs and time required to realize new infrastructures and the existing spatial and environmental constraints have not permitted an adequate growth of the offer of transport. This is especially true in Italy where the major cities are subject to several constraints of different nature. As a consequence, high levels of congestion, with well-known social and environmental costs, characterize our transportation networks. The

increase of urban congestion and the related augmentation of direct and indirect costs for the single users and the collectivity pose traffic management as one of the most urgent and important problem to be solved in the urban areas. In several urban areas in Europe, North America, Australia and Japan, the choice of handling the traffic congestion by using systems for the management of the private and public traffic flow based on the usage of telematics technologies and devices for the control and the transmission of the information has been successful and economically convenient. In addition to this, this approach appears to be, in the Italian case, the only viable; this is especially true for art cities and coastal cities. The recent diffusion of telematics, both for the monitoring in real time of the network conditions and for providing information to the users, are ensuring the opportunity to optimally exploit the capacity of the existing infrastructures, the management of flows according to the variation of the demand, the services coordination for the mobility and the freight transportation. It is quite clear the need of decision models capable of making the best use of these new sources of information. From a technological point of view, the tools required to build these systems are progressively becoming more affordable and well established. On the other hand, there is a lot of room for improvement in the whole process of gathering, organizing, filtering and analyzing the data in order to obtain the information needed for the traffic planning and management. The objective of such an improvement is progressively becoming clearer and more evident as long as new optimization and management models are introduced in these systems thus giving raise to new informative needs. In this scenario, the part concerning the "Intelligence" of the system defines the requirements for the whole process and determines the type of integration and analysis to be performed on the raw data. While from one side the availability of information makes it possible (at least in theory) the identification of multiple strategies of intervention, on the other side the complexity of the problem calls for a new generation of decision models and algorithms with the following characteristics: i) use of (real time) information; ii) models integrability in a common architecture; iii) efficient algorithms with an acceptable running time despite of the computational complexity of the problem.

2. Freight Transportation Systems and City Logistics

Freight transportation represents a significant part of traffic and traffic related problems in urban areas. The phenomenon is not new but, traditionally, it was rarely considered as a major issue in the analysis and planning of urban transportation. This point of view is rapidly changing, however, due to continuously growing awareness of citizens and authorities alike concerning the

contribution of freight transportation to congestion, noise and emission pollution, infrastructure degradation, and other traffic related nuisances [see for instance the report by A.T. Kearney and Confetra, 2011]. As a consequence, the need to study, measure, plan for and control these phenomena is increasingly acknowledged, and a growing attention is devoted to the development of methods for planning and managing freight distribution in urban areas, particularly related to location of distribution hubs, routing of different classes of vehicles depending on the zone of the urban area, and scheduling issues. Moreover, some existing passenger planning methods integrate freight vehicles (trucks) into their urban transportation model but at a very aggregated level, losing much of the “flavor” of freight city logistics. Planning tools for multimodal, multiproduct freight transportation systems are not numerous and are mainly dedicated to inter-city movements. Although some could be applied to urban settings, they lack the capabilities to address location and transportation issues in an integrated manner. To adequately address freight transportation issues in urban areas will certainly require public-private understanding, collaboration, and innovative partnerships, as well as creative combination of vehicle and communication technologies, advanced traffic control and guidance systems, and planning and management methodologies and systems. The flow of goods related to urban logistics deeply affects the Italian cities in particular, where space is a very scarce resource, especially in the historical central areas. In this environment it is crucial to adapt all logistic activities to the different categories of goods. Recent studies [see for instance Caramia *et al.*, 2008, Crainic *et al.*, 2009] have been devoted to freight distribution in urban areas, addressing optimization and decision problems such as location, routing and scheduling of the related activities. Yet, most of these efforts are mainly representing the enterprise point of view and more effort should be introduced for what concerns the institutional point of view. In order for these systems to be really effective, the information to be taken in account should comprise as much as possible of the traffic flows interesting a congested urban transportation network.

3. A Decision Support System to support spatially equitable oriented policies

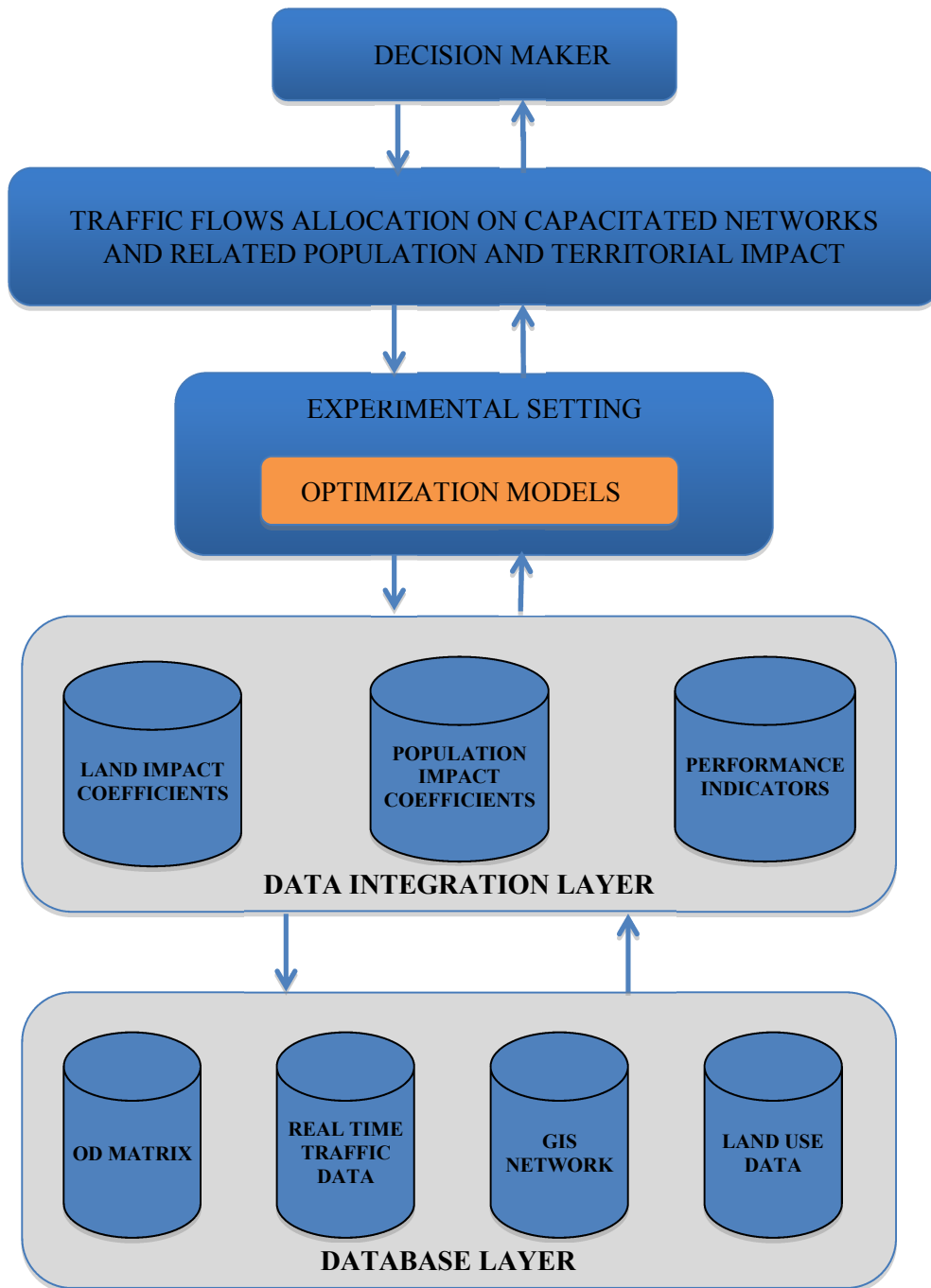
The negative effects arising from the concurrent presence of people mobility and freight distribution within urban areas can be reduced by following the general principles of City Logistics, defined as the process of “totally optimizing the logistics and transport activities by private companies in urban areas while considering the traffic environment, the traffic congestion and energy consumption within the framework of a market economy” (Taniguchi *et al.*, 2001).

To this aim, a crucial role is represented by the integration among the different actors and stakeholders of the public and private transport, and hence by the chance to define and support transportation policies oriented to pursuing a common and general interest while not penalizing the social and economic activities.

One of the main targets in this field is therefore represented by the optimization of the fleets utilization, by increasing as much as possible the average load level and by reducing the number of *vehicles·km* while satisfying a given transportation demand. The studies for new models and tools in the field of City Logistics are oriented to improve the general efficiency of the transportation system, and to provide a sustainable and equitable use of territory. A major topic in this field regards the spatial distribution of the impacts of the transportation activities with respect to the land and the balance of the population exposure to the risks and damages arising from the presence of congestions and polluting emissions in urban areas. As for similar optimization issues in the field of logistics and transportation, it can be of great interest to design and develop advisory systems to help local agencies in the definition of policies oriented towards the distribution of network flows in a spatially equitable way, while satisfying a multicommodity transportation demand on a capacitated network.

The Architecture of a Decision Support System in the field of traffic and freight distribution management within large urban areas assumes the presence of a main decision maker interested in a spatially fair distribution of the flows and their negative impacts with respect to the land and the exposed population. The Advisory System must therefore take into account the different perspectives of the whole integrated transportation system, such as in particular the environmental issues, the economic efficiency and the overall sustainability of the proposed solutions. In most of the cases, it is not possible for local agencies and governments to directly dictate the routes for the trucks and private drivers, but it is still important to define the best tolling policies and network design approaches in order to push the drivers towards a correct behavior (see for instance: Bianco *et al.*, 2009, Marcotte *et al.*, 1998). To this aim, it is fundamental to be able to compute the effects of a given traffic flow assignment on a fixed and capacitated road network. The basic blocks of such a system are presented in Figure 1, where the main active components are depicted, together with the arrows connecting the blocks and representing the information flows.

Figure 1– A Scheme of the Advisory System Architecture to support Spatially Equitable Traffic Flows Policies.



The *database layer* is composed by those sets of organized data required to properly represent the transportation problem, that is:

- the origin-destination transportation demand matrix;
- a set of data describing the current state of the traffic network, collected in real time;
- a description of the physical traffic network and its geographical and spatial attributes, thanks to the use of geographical information systems;
- additional data concerning territorial characteristics, such as land use and regional partitioning of the network area.

The *data integration layer*, starting from the above described basic information, permits the extraction of useful information by means of statistical and analytical tools, such as the coefficients needed to compute the impact of the traffic on a region starting from a given flow assignment on a certain road, the arising effects on the exposed population, and several sets of additional key performance indicators, such as the overall load of traffic impact interesting particular regions of the network area.

The *experimental setting layer* is the block of the decision system, in which the current allocation of traffic flows – that is, the incumbent solution - and all the data provided by the data integration layer and the underlying database layer interact dynamically to produce better solution according to the objectives defined in the planning process, and expressed within the optimization models that are embedded in the experimental setting block. We will see more in detail the core of the optimization process for the case of the spatially equitable distribution of the flows in the next section. The experience of the decision maker can be considered as a major enabling factor for the real suitability of such a DSS architecture, being the results of the decisional process in general very sensitive to the choice of the quantitative parameters that must be set in order to produce useful solutions. This is the case for instance when multiple criteria approaches must be evaluated and considered in order to find a proper tradeoff between sustainability and economic efficiency of the transportation activities.

4. Linear programming approaches to model the Spatial Equity in High Populated Areas

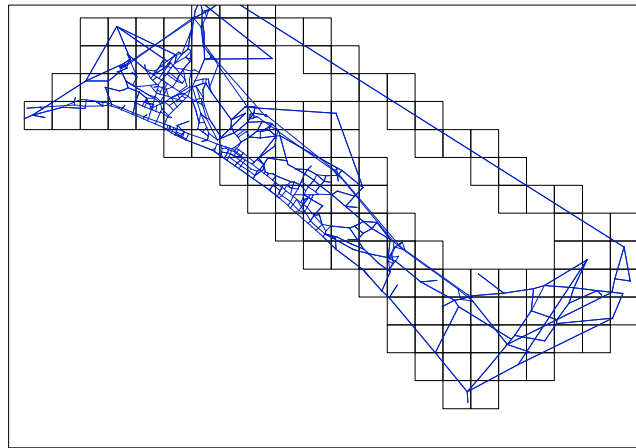
The Advisory System proposed in this paper is thought to cope with the complexity of a real use of optimization models in the context of large urban area transportation. The design of such a system takes into account the presence of tools and indicators to elaborate and compute the huge sets of data, coefficients and parameters needed to feed the whole Decision Support System. Still, the core of the

whole architecture is enabled by the use of mathematical programming models, represented by the optimization block in Figure 1.

The topic of optimization models to meet spatial equity criteria in network flow problems can be found in the contributions by Gopalan *et al.* (1990), in which the general problem of defining equitable sets of routes for hazardous materials shipment is treated. The objective is to minimize the total risk of travel and spread the risk equitably among the zones of the geographical region in which the transportation network is embedded, by means of integer programming formulations. Several additional and important contributions were then presented in the last decade (see for instance Akgun *et al.*, 2000, Dell'Olmo *et al.*, 2005, Carotenuto *et al.*, 2007) concerning optimization models and algorithms to define spatially dissimilar routes for hazardous material transportation. Some of the above mentioned contributions adopt dissimilarity indexes between couple of paths as a measure of the cumulative exposure for the land and the interested population to the risk induced by hazardous materials transportation. The choice of the set of best paths among those possible is performed in such a way to reduce as much as possible the concentration of the risk on the same portion of the land, in particular by introducing the notion of *Buffer Zone*, defined as the area obtained by moving a circle along a path whose center is the vehicle while the radius is proportional to the impact area due to possible accidents. Nevertheless, a generalization of this topic is indeed needed in order to overcome some of the main limits of those approaches from the point of view of the dependence of the results from the topology and shape of the specific transportation network. Moreover, an additional effort is required to ensure a generalized suitability of such models, in which the field of application is not limited to the transportation of hazardous materials, but encompasses also the urban transportation system as a whole. To this aim, a novel approach was recently presented in (Dell'Olmo and Sgalambro, 2011), in which an extension of the topology considered in the network optimization problem is considered. More in detail, the area in which the network is embedded is partitioned by a grid of cells of uniform dimension and shape, and the impact of the flows on each cell is considered to be proportional to the length of the portion of the arcs that interest the cell itself. In this way, it becomes possible to consider an explicit measure for the cell load when routing the flows in the context of the multicommodity capacitated network flow problem, and a spatially equitable distribution of the flows can be obtained by minimizing the maximum cell load while satisfying the multicommodity demands and respecting the capacity constraints on the network links. The latter optimization problem is referred to as the Spatially Equitable Capacitated Multicommodity Network Flow Problem. In the following the bi-objective variant of this model is recalled, where the objective function to be minimized is expressed as a convex combination of both the

traditional routing cost function and the maximum amount of traffic impact registered on each cell of the grid.

Figure 2 – A grid of uniform cells overlapped to the underlying road transportation network of the city of Salerno, Italy.



4.1. A model for the Spatial Equity

In order to give a mathematical representation of the network flow optimization problem, let us consider a directed graph $G = (V, A)$ with $|V| = n$ and $|A| = m$, with arc capacities $u_{ij} > 0, \forall (i, j) \in A$, arc costs $c_{ij} \geq 0, \forall (i, j) \in A$, and a set D of commodities, each associated with a certain amount of demand d_i , a source node $s_i \in V$, and a destination node $t_i \in V \setminus \{s_i\}, \forall i \in D$. In most of the network flow models, the typical objective is to minimize the total routing cost function:

$$TC = \sum_{k \in D} \sum_{(i,j) \in A} c_{ij} x_{ij}^k \quad (1)$$

while satisfying all the demands without violating arc capacity constraints. In the Spatially Equitable Multicommodity Capacitated Network Flow Problem, a set Z of cells of uniform shape and size is considered and overlapped to the underlying network, as depicted in Figure 2. A set of weights $\{w_{ij}^z\}$ representing the cell load coefficients is introduced and defined as follows:

$$w_{ij}^z = c_{ij} l_{ij}^z \quad \forall z \in Z, \forall (i, j) \in A \quad (2)$$

where the coefficients $\{l_{ij}^z\}$ are defined in $[0,1]$ and express the fraction of the arc (i,j) that is included in the cell z . By adopting such a notation, the spatial distribution of the flows can be quantitatively evaluated by introducing an additional measure for the *cell load* f_z , that is, the impact that the routed flows yield on each cell z of the grid Z , as follows:

$$f_z = \sum_{k \in D} \sum_{(i,j) \in A} w_{ij}^z x_{ij}^k \quad \forall z \in Z \quad (3)$$

The objective function of a pure spatial equity model would require the simple minimization of the maximum cell load value λ registered among all the cell loads of the grid, that is:

$$\lambda = \max_{z \in Z} f_z \quad (4)$$

Since the interest of this paper lies in the development of an Advisory System for real application purposes, it can be recommended to take into account both the objective functions above introduced in (1) and (4) by adopting a multi-objective optimization approach within the context of network flow models (see Hamacher *et al.*, 2007, for a review on this topic). Expressing the general bi-objective function as a convex combination of the total cost function and the maximum cell load value, the decision maker will be allowed to balance Spatial Equity and Total Routing Cost by properly choosing and calibrating the convex combination coefficients, evaluating the trade-off between the positive effects on the land and the population arising from the decrease of the maximum cell load and the related increase of the overall transportation costs expressed by the TC function. The whole linear programming model for the bi-objective variant of the Spatially Equitable Multicommodity Capacitated Network Flow Model becomes:

$$\min \quad \gamma_1 \cdot \lambda + \gamma_2 \cdot TC \quad (5)$$

$$s. t. \quad \sum_{j \in FS(i)} x_{ij}^k - \sum_{j \in BS(i)} x_{ij}^k = \begin{cases} d_k & i = s_k, \forall k \in D \\ 0 & \forall i \in V_{\{s_i\}}, \forall k \in D \\ -d_k & i = t_k, \forall k \in D \end{cases} \quad (6)$$

$$\sum_{k \in D} x_{ij}^k \leq u_{ij} \quad \forall (i,j) \in A \quad (7)$$

$$\sum_{k \in D} \sum_{(i,j) \in A} w_{ij}^z x_{ij}^k = f_z \quad \forall z \in Z \quad (8)$$

$$f_z \leq \lambda \quad \forall z \in Z \quad (9)$$

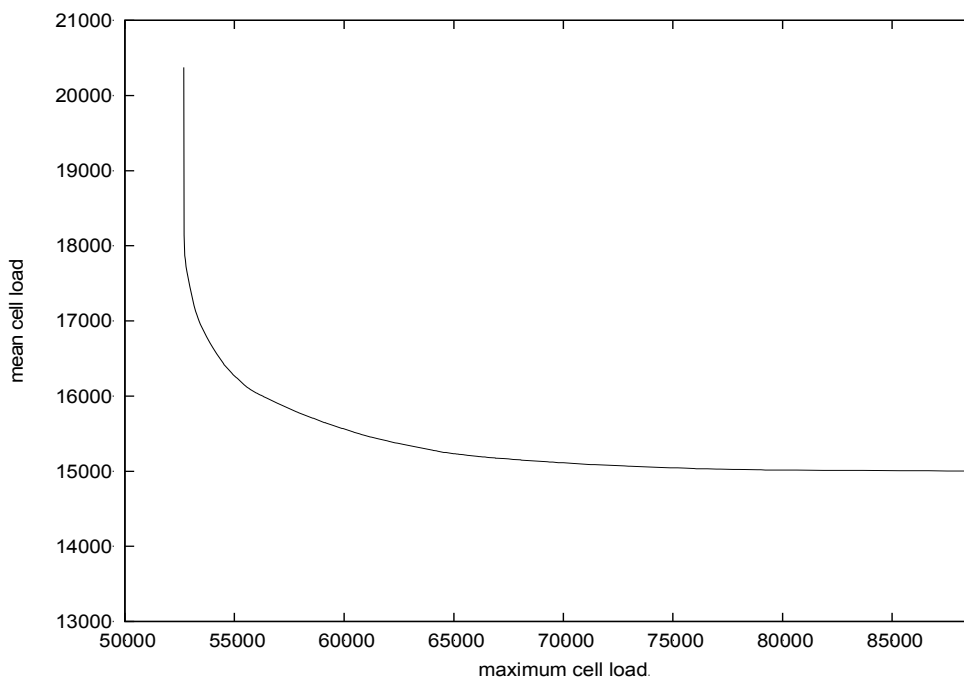
$$x_{ij}^k \geq 0 \quad \forall (i,j) \in A, \forall k \in D \quad (10)$$

$$f_z \geq 0 \quad \forall z \in Z \quad (11)$$

$$\lambda \geq 0 \quad (12)$$

In the model, the objective function (5) is the convex combination of the functions (1) and (4), where γ_1 can range within the interval $[0,1]$ and γ_2 equals $1 - \gamma_1$. Constraints (6) impose the satisfaction of the demand, while (7) refer to the arc capacities. Constraints (8) assign the cell load of each cell z to the variable f_z , while constraints (9) define the maximum cell load as already expressed in (4).

Figure 3 – Numerical results for the mean cell load and the maximum cell load at varying the convex combination coefficients for the traffic network of Salerno with a 500 meters cell side grid.



In Figure 3 an interesting set of experimental results is presented for the above presented model: the values of the mean cell load and the maximum cell load are depicted for each optimal solution at varying the convex combination of the γ_1 and

γ_2 coefficients for the traffic network of Salerno. More in detail, the network presents 556 nodes and 1186 arcs, a set of 100 commodities was considered for the experiments and the real lengths of the traffic roads were used for the set of arc costs. 122 cells with a 500 meters side compose the grid implemented in this experiment. The optimal solution for each convex combination of the objective functions was computed through the commercial LP solver IBM ILOG CPLEX 12 within a few minutes of CPU time.

The empirical evaluation of the results in Fig. 3 highlights how it is possible to reduce the impact of the traffic nuisances on the exposed population by decreasing significantly the maximum cell load producing a tiny and negligible increase in the mean cell load with respect to the pure total routing cost solution ($\gamma_2 = 1$).

In particular, the latter observation must be considered as an example of how an Advisory System based on quantitative methods can be used to evaluate and calibrate in real time the effects on the spatial equity of different transportation policies. The availability of such tools can therefore help in finding easily a proper trade off between economic efficiency and sustainability, avoiding an excessive exposure for the high-density regions, without increasing too much the overall transportation costs.

5. Acknowledgements

Partial funding for this research has been provided by the projects: PRIN-2007J49483 from the Italian Ministry of University and Research, Sapienza Università di Roma Ateneo Federato Research Fellowship 2009.

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SUMMARY

The impact of passenger transportation and freight distribution across urban areas represents a major issue in terms of the arising nuisances from the environmental, economic and social points of view. In this paper we focus on the concept of spatial equity in terms of the distribution of the negative outcomes of the transportation activities with respect to the environment, the land and the related population. Aim of this work is to summarize some modeling and architectural approaches underlying an integrated Advisory System oriented to the definition of local policies, analysis functions and solution design on this specific field. Some experimental results are presented as well, suggesting a high potential in terms of suitability and effectiveness for the proposed approach.

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ITALY'S ECONOMIC DEVELOPMENT SINCE 1945

Giovanni Palmerio

1. The general framework

During Fascism Italy moved towards protectionism and turned to autarky at the end. After all, this was the general trend prevailing during the 'Thirties of the last century throughout the world, which was struck by the Great Depression. The United States raised their traditional protectionism with the tariff of 1930 while the countries of Britain's Commonwealth created a system of trade preferences among themselves with the Ottawa agreements in 1932.

For a country poor in raw materials such as Italy this meant curbing industrial development. On the other hand, our industry was subsidized and protected by high tariffs. It was not competitive on international markets because it was inefficient and backwards in terms of technology.

With no industrialization, peasants had very few reasons to move to the cities. In turn, the Fascist government had enacted laws that *de facto* prohibited the urbanization of peasants. This was done to avoid the social tension that inevitably would have arisen following massive population movements from the countryside to cities (housing problems, urban transport problems in expanding cities, and so on). At the outbreak of World War II (1939) almost 50% of the population in Italy was still employed in agriculture. The latter was very poor, especially in the South of the country (the *Mezzogiorno*) where large estates and extensive cultivation methods were still present.

Consumption levels remained low throughout the Fascist period (1922-1943), given the poverty of our agriculture, the lack of industrial development and also the global crisis in the 'Thirties of the last century. On the other hand the lack of free trade unions and the ban on strikes allowed to keep social peace, despite low wages and low consumption levels. After the war, following the trend of all Western countries, Italy abandoned protectionism and autarky and adopted a policy based on the principles of free trade, putting its economy both in the Bretton Woods system by adhering to the International Monetary Fund and in the European system by acceding to the EEC in 1957.

The initial impetus to post-war reconstruction was given by aid provided to us by the United States through the Marshall Plan. This allowed us to import foodstuffs, raw materials and the machinery to rebuild our economy, which had been heavily damaged by the war. On the basis of estimates believed to be reliable one third of national wealth (housing, railroads, industrial plants, etc.) had been destroyed.

Another factor which positively influenced the evolution of the Italian economy was the “action for monetary recovery” implemented in the years 1947-8. Achieved through a restrictive monetary policy, which produced negative effects on production and employment, this action nevertheless managed to curb inflation, which, due to the war, had reached very high values.

American aid, the action for monetary recovery, trade liberalization are all considered to be the factors that led to the rapid development of the Italian economy in the ‘Fifties of the last century. The performance of our economy in that period was exceptional with respect to past records. A large number of small and medium enterprises was created in the country in various sectors (textiles, footwear, electromechanical, etc.). These firms exported large quantities of goods. In those years this triggered a virtuous cycle of the kind described by Lewis’ model (abundant labour supply) with exports playing a positive role.

The abundant labour force in agriculture (that employed more than 40% of the population) provided industry with workers and made wages grow slowly. In addition, technical progress and intense working hours, also due to a limited presence of unions in society, determined high productivity growth. In this situation a large part of income gains went to profits, which grew steadily. Firms reinvested profits and in doing so they financed the process of accumulation and expansion of the industrial sector.

Italian industrial enterprises, enjoying this favourable situation, produced goods at costs, and therefore prices, that were lower than those of the firms in other countries, like France and England, where wages grew faster and productivity slower due to social conflict. Since at the time the world economy was under a fixed exchange rate regime, export competitiveness depended only on prices and hence our country in that period recorded very high exports.

In addition, productivity growing faster than wages in many cases allowed firms to lower prices. This occurred for home appliances, television sets, cars, etc. Lower prices not only brought export expansion but also domestic consumption growth. Workers recorded a rise in real wages despite limited growth in money wages. It was in those years that durable consumer goods spread throughout the country.

The competitiveness of our exports coupled with low raw materials prices ensured that protracted income growth, which determined import growth, mainly of raw materials, did not determine balance of payments problems.

The rapid industrialization of Italy brought about a dramatic exodus of the population from the countryside to cities. Moreover, industries were located almost exclusively in the Centre-North, while the South remained out of this process. The shift of the population to cities gave impetus to construction, and most of the people who moved to towns were employed in the construction and in the tertiary sector, as well as in industry.

This rapid growth lasted until the early 'Sixties of the last century. It led to a sharp increase in per capita income and private consumption, but also generated social imbalances. In particular, it emphasized the traditional dualism between North and South of the country, and the backwardness of the South was even more manifest now that large parts of the country had achieved considerable levels of well-being. In addition, this determined phenomena of high congestion in metropolitan areas of the North, particularly in the so-called "industrial triangle", where firms were mainly concentrated. The congestion resulted in lack of social services, such as houses, schools, hospitals, public transport, etc.

The first interruption of the process of development occurred in 1963 and was due in part to wage increases that occurred for the first time in industry after more than a decade, but especially to the political changes determined by the centre-left government, which nationalized the electric industry and threatened a tax reform raising taxes and a reform planning to hit dramatically increases in land value of urban areas. These factors created apprehension in the better-off social classes and a slowdown in investment, while for the first time wage increases caused profits to fall. Companies tried to regain them by raising prices. This created inflationary pressures and capital fled from the country, putting the balance of payments in difficulty. The Bank of Italy reacted by tightening monetary policy and raised interest rates in order to curb inflation and to recall funds from abroad. The tightening of monetary policy accentuated the slowdown of investment and the growth rate of GDP fell.

A new crisis, far more significant than that of 1963, occurred starting in 1969. From this date on the conditions that had allowed the Italian economic boom of the 'Fifties of the last century came to an end. In fact starting from 1969 for some years there were growingly intense conflicts within industry and society. The unions had gained considerable power and managed to obtain strong wage increases. By obtaining reductions of working hours, of overtime and by curbing labour schedules, they determined a fall in productivity. Higher wages and lower productivity caused a drop in industrial enterprises' profits. Also investment fell, creating unemployment.

However, firms attempted to regain profits by raising the prices of the goods they sold. Authorities tried helping enterprises, especially the large ones, in order to contain unemployment. The Bank of Italy provided banks with liquidity, in order

to allow them to continue to grant credit also to indebted firms, to avoid them from closing down, that would have created further unemployment. The liquidity in the economy allowed companies to raise prices and thus determined cost inflation. The phenomenon of stagflation, that is the coexistence of unemployment and inflation, became manifest as well. Higher prices, however, made our exports less competitive, resulting in a balance of payments deficit. The Bretton Woods system of fixed exchange rates was still in force, and hence international competitiveness depended only on goods' prices.

The first sharp rise in oil prices in 1973 greatly exacerbated stagflation. In fact, the oil shock brought about a new fall in firms' investment resulting in higher unemployment and in a surge in inflation, because firms transferred the increases in oil prices to the prices of the manufactured goods they produced.

Given the mechanism of wage indexation, called *contingenza* or *scala mobile*, which guaranteed an automatic increase in wages every time prices grew, an inflationary spiral was created.

The increase in the prices of Italian goods made the latter lose competitiveness in international markets. In 1973 the fall in exports and the consequent balance of payments deficit led the government to float the *lira* on the foreign exchange market. The devaluation of the exchange rate initially allowed our exports to regain competitiveness, but, by making imports more expensive, raised the production costs of enterprises. These were then forced to raise prices even further, while wage indexation worsened the inflationary spiral.

The evolution of the Italian economy in the 'Seventies of the last century has these features. Moreover, at that time there was a huge growth in public spending and in the State deficit. The items that drove expenditure up were mainly those related to health, pensions, the growth in the number and in the salaries of civil servants and interest on public debt.

In 1979, following further increases in oil prices, the Italian economy suffered another inflationary push.

In all European countries in the 'Seventies of the last century, the State budget worsened sharply, due to an explosion of public spending that was not offset by a corresponding increase in taxes and in social security contributions. The decline in economic growth and the rising unemployment that characterized this period contributed to worsening the State budget. The reduction in the rate of growth of GDP also curbed the increase in revenues (taxes and social contributions in fact grow roughly at the same rate of income), while government spending continued to increase under the pressure of social categories. At that time different countries, as we have seen, experienced strong resistance against the excessive tax burden.

In the 'Eighties of the last century, however, almost all European countries changed their fiscal policies, aiming at pursuing sound public finance: the rate of

growth of public spending slowed in the first half of the 'Eighties and dropped further in the second half. This policy reversal was prompted by growing concern about the negative effects that an excessively large public sector can have on private investment and on economic development and about the increasing rigidity of public budgets due to the increases in interest expenditure and in current transfers. Italy, however, continued to have a growing deficit throughout the 'Eighties of the last century and only in the early 'Nineties began to implement measures to correct the deficit, based on higher taxes and spending cuts for health, pensions and salaries of public employees. Moreover, in 1992 the *scala mobile*, considered to be a mechanism that fuelled inflation, was abolished.

Industrial enterprises in the 'Seventies and even more in the 'Eighties of the last century, in order to remain competitive on international markets, implemented extensive restructuring, helped also by public funding. The phenomenon concerned mostly large companies, but also medium and small ones. Restructuring consisted mainly in introducing process innovations, which in many cases also changed the final goods.

In addition, large firms in the 'Seventies and 'Eighties of the last century increasingly decentralized production by reducing internal activity and purchasing components and finished goods as well as services from other firms (both small and medium-sized). Decentralization, which took the form of subcontracts, sub-supplies, work at home, etc. aimed at reducing conflicts, which in large enterprises were very strong, especially in the 'Seventies of the last century, and also at curbing labour costs.

The final effect of these processes was an increase of precarious and marginal workers. This created a dualistic labour market, with a category of protected workers on one side (those of large enterprises, which had some job security, although not complete security as that of public sector workers) and employees of small firms or those working in their own homes on the other, who were not protected by unions or by other mechanisms such as income assistance and were exposed to the immediate risk of unemployment.

Since the 'Eighties of the last century implementing a policy to raise employment has become increasingly difficult. In fact, authorities could not pursue an expansionary fiscal and monetary policy in the presence of exceedingly high deficit levels and therefore they had to restrain public expenditure and raise tax revenues. The need to reduce the deficit and not to finance it through money creation was also enforced by the need to comply with the rules of the European Monetary System.

On the other hand, it was observed, expansionary fiscal and monetary policies cannot solve the problem of unemployment when it has the characteristics outlined above. Therefore, from the end of the 'Eighties' of the last century, policies to

liberalize the labour market, making it more flexible, have been introduced to raise employment. These policies introduced part-time jobs, envisaged the possibility for companies to hire workers on an individual basis so that the company can choose the worker and is not obliged to hire workers following unemployment lists, and allowed the firms to hire young workers by means of special contracts that involve a salary below that of the majority of workers.

These measures, however, did not reduce unemployment to any significant extent, especially in the South. Indeed, since the 'Nineties migration from the South towards Northern Italy and also towards Northern Europe, which had stopped in the 'Seventies, picked up again. Certainly, now migration concerns skilled workers, who are looking for higher level and better paid jobs, given that it coexists with immigration into Italy of workers from Asia, Africa and Eastern Europe, that are directed also towards the South. Italy, which until the 'Sixties of the last century was a country of emigration, since the 'Seventies became a country of immigration. Immigrants take the manual, often hard, jobs that young Italians turn down. The same situation occurs in the developed countries of Europe and North America.

Italy cannot pursue an expansionary fiscal policy because under the Treaty of Maastricht (1991) and its later developments government deficits must be reduced. Moreover, with the introduction of the euro, monetary policy is decided by the European Central Bank and exchange rate policy (such as devaluation to stimulate exports, often used by Italian governments at the time of the *lira*) is no longer a tool in the hands of national governments.

The international financial crisis that began in 2008 proves that the sovereign debt of countries of the euro area can be hit by speculation. This phenomenon is particularly relevant for Italy, which has a public debt equal to 119% of GDP. It is extremely important that the public debt is reissued when it expires at not too high interest rates, otherwise it would worsen our debt situation.

Italy, since the 'Eighties, faced the challenge of competition from newly industrialized countries: first from South East Asia and later from China and India. The Italian economy was initially hit by this competition, but managed to adjust to it by industrial restructuring and by addressing production to the highest quality segments of international demand.

The Italian economy is still largely based on the manufacturing sector and, after Germany, it has the most competitive manufacturing system among the major countries in the European Union. Italy produces many non-standardized goods for which competitiveness does not derive only from prices but also by the relation between quality and price, and this allows our country to be competitive even compared to the goods produced by low wage countries such as China.

2. The economic development of the South

The economic development of the 'Fifties of the last century did not involve the South. There was, however, already at that time an active economic policy in favour of southern regions that carried on even later. The main tool of intervention was the Southern Italy Development Fund (*Cassa per il Mezzogiorno*), that was created in 1950 and closed in 1985. Since 1985, the activities of the *Cassa* were carried on by the Agency for the Development of the *Mezzogiorno*, which was abolished in 1993.

The tools that have been used for promoting development in the South are diverse. For many years the *Cassa* aimed at creating infrastructures, i.e. building roads, bridges, ports, etc. as well as irrigation works in agriculture, which raised the productivity of land enormously. At the same time other types of infrastructures were developed, such as gas pipelines, power lines, etc. But this type of intervention was not sufficient to trigger a process of self-generating development. Hence, governments resorted to direct investments by public (i.e. State-owned) enterprises and to policies aimed at stimulating private companies to locate investment in the South. State-owned enterprises did open in many areas of the South many plants, especially steel and chemical industries. Moreover, governments also negotiated directly with large private companies such as FIAT the creation of industrial plants in the South. To encourage private enterprise to invest, governments granted special incentives in the form of tax reductions, grants, etc. Over the years, several laws were enacted that gave financial incentives to enterprises (not only to the big ones) who invested in the South. Such incentives took the form of exemption from social security contributions, i.e. the government paid the contributions that companies should have paid to finance workers' health care and pensions, of tax cuts and low-interest credits, or grants.

Finally, another form of subsidy for the *Mezzogiorno*, which became increasingly important over the years, was transfers to households. The number of civil servants grew enormously in the South, especially in the local governments (regions, provinces, municipalities). Also the number of pensioners and of people receiving disability pensions increased greatly.

An evaluation of this policy overall is not easy since it has both good and bad points. Several authors note that the results of the massive investment by large companies, both public and private, were rather disappointing, especially in terms of employment. This was because investment generally occurred in capital-intensive sectors which created few jobs and were not able to generate a network of supplier firms or other economic initiatives. In the South the structure of small and medium-sized enterprises that constitutes the backbone of industry in the Centre-North of Italy and that has created so many jobs does not exist.

Today the production system of the South faces increasing difficulty in being competitive both domestically and internationally because its productivity is lower than in the Centre-North. Emigration from the South has picked up starting from the early 'Nineties and the South has been increasingly characterized by tax evasion, low compliance with laws such as those on job security and by growing diffusion of criminal organizations in production and in the social sphere. Today, multinationals prefer to invest in Spain, Portugal, Scotland but not in Southern Italy. Based on these considerations a view has developed in the country that maintains that it is no longer appropriate to continue a policy of transfers to enterprises and households. On the contrary, it is necessary to adopt measures to create an environment that is favourable to investment. Such actions should consist in the implementation of major infrastructure in the field of telecommunications, water supply, transport (railways and roads are still lacking), which create an environment that attracts investment both from the North of Italy and from abroad. This is the approach outlined by the European Union, which argues that financial incentives, inasmuch as they alter market factors, distort competition and therefore cannot be allowed. The commitment of national economic policy in favour of the South is greatly diminished and also the implementation of infrastructure meets major difficulties due to the lack of funding, given the need to reduce government spending.

3. Some considerations on public enterprises and on privatization

Starting from the Second World War and until the late 'Eighties economic development in the South has largely relied on investments from public enterprises, which were strongly present in Italy, in particular through the system of State Holdings (*Partecipazioni Statali*).

This was a mechanism by which the State invested in private companies' equity. The system lasted until 1992 and was then dismantled.

The system of State Holdings was formed by the Ministry of State Holdings, which provided general guidelines and submitted annually to Parliament a report on the activity of the whole system, and three government agencies: the Institute for Industrial Reconstruction (IRI); the National Institute for Hydrocarbon (ENI); the Financial Institute for Mechanical Industries (EFIM). These three institutes invested in companies by purchasing equities.

IRI, which was created in 1933, owned the majority of the shares of the major banks of national interest, such as the *Banca Commerciale Italiana*, the *Credito Italiano* and others. Moreover, it controlled RAI (the Italian Radio and Television) and Alitalia. Finally, IRI controlled some major financial companies, which, in

turn, invested in equity - not always reaching the majority – of corporations in various fields such as the mechanical sector, steel, food, etc.

ENI was created in 1953 to manage State intervention in the hydrocarbon sector; it controlled companies such as AGIP (the Italian General Petroleum Company), which operated in the distribution of oil products, SNAM (the National Society for Methane pipelines) which operated in the transport and distribution of natural gas, ENICHEM, specializing in the manufacture of chemicals, and other companies, operating in different sectors: mechanical, metallurgical, chemical, pharmaceutical, engineering services and design, etc. EFIM controlled mechanical industries, steel, electronics and others.

Until 1992, almost 1/4 of the Italian industry was in the hands of State Holdings. It can be seen that the Italian public companies operated in almost all sectors of the economy, exerting a major influence on the economy of our country. An account of their achievements is controversial, although currently the negative aspects are generally underlined.

Since 1992 a vast process of reduction of the presence of public enterprises in the Italian economy was undertaken. This was based on the belief that the number and the size of public enterprises in our country were too high. This was maintained both nationally and within the European Union. The process took the form of the transfer to private owners of large parts of public enterprises.

The reasons at the basis of the privatization process are essentially twofold: firstly, to provide revenue for the State in order to reduce the deficit and the public debt and secondly to restore market rules in the sectors in which public enterprises operated under monopoly or in a privileged position.

The government transformed the enterprises that previously were totally owned by the State, as the State Railway and the National Institute for Electricity (ENEL) into joint stock companies

Starting from 1992 the government abolished the Ministry of State Holdings, turned IRI and ENI into joint stock companies and put EFIM in liquidation, that is it closed it. Moreover it gave the ownership of the shares of the resulting companies to the Treasury (which is now the Ministry of Economy and Finance) and temporarily entrusted it to administer these companies and to prepare a plan for the sale of large parts of the shares to the public, which was later carried out.

In particular, IRI was closed and many of its companies (from banks to the financial companies we mentioned above) were sold to the public and are traded in the Stock Exchange. Even a large portion of ENI's shares was sold to the public and ENI is therefore quoted on the Stock Exchange too. However, the Ministry of Economy and Finance still owns a large proportion of shares and can therefore influence ENI's choices. The government rules out privatization only for few companies operating in sectors of strategic importance for the country, such as in

the field of defence. Similar considerations to those made for public enterprises apply to banks. The events that led to the creation of IRI in 1933 determined the public nature of our banking system, that persisted until the 'Nineties of the last century. Italy's adhesion to the process of European monetary integration gave life to a process of *concentration* and to a process of *privatization* of the banking system. The latter has now been completed.

The international financial crisis that began in 2008 showed that the Italian banking system is generally solid. It is true that it is less internationalized than in other countries, but the Italian banks, especially small and medium-sized ones, to a big extent still perform traditional intermediation activity, that is they simply collect deposits and issue loans, while they purchase and sell securities, including high-risk ones, only in limited amounts with respect to their overall business. In 2010 the EU applied the so-called stress test to European banks in order to test their resistance to possible losses on Greek government bonds. Italian banks appeared to be in good health and also in a better position with respect to German banks.

In general, financial activities are not exceedingly important in the Italian economy. Despite the high public debt, private debt, household debt in particular, is low and the banking system is solid. The production system is largely based on the manufacturing sector, which consists essentially of small and medium-sized enterprises that are highly competitive on international markets. The *Mezzogiorno* remains an important issue that should return at the centre of the country's economic policy.

SUMMARY

Italy, which at the end of World War II was an agricultural country from which workers emigrated, has become an industrialized country to which foreign workers migrate. The territorial imbalance between the Centre-North and the South of the country however has not reduced. Italian governments from the 'Nineties of the last century have privatized banks and almost all public enterprises.

THE EVOLUTION OF SOCIAL-ECONOMIC ITALIAN PROVINCES: 1861-2011

Alessandro Rinaldi, Giacomo Giusti, Carlo Massaccesi¹

1. Introduction

The main purpose of this research is to retrace the path of the Italian economy from the time of unification to the present day. During this period of time, in addition to the political events and changes in the institutional framework which have occurred, several phenomena have contributed to a radical transformation of our economy and drawn it from the extremely underdeveloped state of the time (only partially attenuated at the beginning of the twentieth century) and led it to the state of maturity and economic well-being where it is today.

Unfortunately, the data that have been collected, in addition to being scarce and fragmentary, are highly unreliable. They should be considered to be only a proxy of the phenomenon. Nor, from aggregated information at the national level, can one discern the gap that existed between various parts of the country and provide an accurate picture of the historic gap in that period between the South and the rest of Italy.

The scarcity and fragmentary nature of available information can be attributed to the fact that census statistics were at that time in a stage which could be described as "embryonic" and the very fact that the census was completed can be considered in itself a memorable event. On the other hand, it is also true that the assessments (and/or speculations) carried out by economic historians up to that time were not usually accompanied by the statistical background necessary to fill in the gaps to which we have referred. In fact, if we exclude the national income estimates made by ISTAT (see ISTAT 1957) in the years 1861-1956 (the degree of compatibility with the most recent series of GDPs is relatively limited) the consumer price index for families of workers and employees, also estimated annually since 1861 by ISTAT, and other available information have low relevance. And this is not only because the reference is almost always to Italy as a whole, but even when details or

¹ Data collection, processing, and cartograms.

partial evaluations are taken into account (as an estimate of a particular agricultural crop, the number of employees at a large company, and so on), or are exhibited in qualitative terms, the supporting documentation is not numerical.

In light of the situation just described, it is fair to ask what contribution we could expect to make toward providing a better and more detailed knowledge of observed reality and its changes through time. The answer to a question like this could not be found without recalling the fact that overly ambitious expectations would clash with the lack of appropriate statistical sources; this has led us to seek a compromise between the aims and knowledge desired and the availability of the statistical documentation deemed essential for an examination of this type.

With a awareness of the need to limit the range of our investigation, the decision was made to focus our calculations on only two of the most significant variables for the analysis of the economic process: the consistency of the number of the employed and the productive value added in the three main sectors of economic activity. Moreover, given the interest that users (particularly Chambers of Commerce) show for information related to their provinces, it was agreed that the calculations would include:

- First, the particular years (and only those years) when the population census was carried out and from which you can extract the basic data needed to estimate the employment figure;
- Secondly, the censuses carried out from time to time in the provinces, without trying to create a link between one census and the other, an attempt which would be doomed to failure considering that the initial 59 provinces have now become 110 through a series of modifications and changes which have radically altered the territorial boundaries and the contents in terms of population.

Examined such that for each census year we are able, with reference to the existing provinces at the time, to consider the measure of the two aggregates (employment and productive value added) and exclude a territorial linkage between one survey and another, the most readily acceptable processing method seemed to be that of aggregating provincial data in order to make a synthesis of the two great territorial divisions (the Centre North and the South), which are of the greatest interest to scholars. This does not mean, however, that we were not able to make some calculations at the regional and provincial level, as was done with some degree of approximation.

Limiting the analysis to the three main sectors of economic activity (agriculture, industry and the service sector as a whole) is due, finally, to the difficulty of identifying (especially regarding the early years of the period) well-defined and easily studied asset classes; the only ones that are easily identifiable are, in fact, the three main categories.

A very special thanks must be extended to Professor Paolo Quirino as the inspiration for the themes and methodologies which have made this analysis possible.

2. Problems related to employment and income estimates

2.1 Employment

To calculate the job numbers, only with reference to the censuses that took place between 1861 and 2001, is not an easy task. The difficulties that must be overcome in order to do so in some way that is compatible with the statistical methodology which has been developed since the 1960s are notable, and not only because of changes in the theoretical framework, but also due to essentially practical problems associated with the fieldwork.

Over the past 50 years, ISTAT, partly as a result of the harmonization work undertaken in the Community, has taken steps to refine the concepts and definitions concerning the position of individuals in relation to the labor market. As a result of these improvements, it would be inconceivable today to define the boundaries of the aggregate "occupation" without framing it in the broader field of the labor force where it belongs. These include, of course, individuals of age 15 or more, who belong in the category of the employed or those seeking employment: the first (the employed) are those who at the time of the survey carried out their activity in individual production units (firms and institutions) as employees or independent workers, the other, also known as the unemployed, includes people aged 15-74 years who are actively seeking employment at the time of the survey while the jobs on offer are insufficient to meet the demand for work of the labor force.

From the definitions elaborated in theoretical terms we can of course discern of two consequences of a non-trivial nature:

- If a child under age 15 holds a job he is not taken into account in the calculation of employment because these are people who should be attending school;
- The potential supply of labor can also greatly exceed the current official labor force because some individuals, despite having the necessary qualifications, do not appear on the labor market either because they lack confidence or because they belong to population considered to be, by definition, inactive (housewives, students, retirees, etc..).

Regarding housewives, the a priori exclusion from the list of employees can be explained if one bears in mind that their activity is not given a value in money

comparable to that enjoyed by domestic workers and for this reason they are not considered in the national income accounting. It would be useful in this regard, to recall the famous "paradox" of Pigou², according to which if a man marries his maid and she, while changing marital status, continues to take care of the housework, the mere fact that her activities no longer involve an exchange of money means a decline in national income.

We must add that people seeking employment should be distinguished, in turn, depending on whether they are:

- newly unemployed, i.e. people who have lost their professional status and a previous job and are seeking a new one;
- people looking for their first job, i.e. young people aged 15 and over who, with or without a qualifying diploma, are attempting to enter the labor market for the first time.

If these are the definitions currently used in Italy, and only if you consider the problems of evaluating of the so called "irregular work" (and the corresponding submerged economy), can you be fully aware of the considerable difficulties which must be overcome to extend the calculation to all the years in question.

On the other hand, even an aggregate that is close to today's concept of employment (the actively employed population) was until 1936 a matter only for the census which is limited to providing the general distribution of the population, and more specifically the condition at the time of the survey of those over 9 or 10 years old. In the absence of a correct and unambiguous classification of economic activities an aggregate of only approximations could be made. Suffice it to say that the early censuses spoke generally about people "without a profession", and introduced some terms (such as landowner, serving staff, poor, beggar, prostitute, prisoner, etc..) which did not fit into any existing category.

2.2 Income

Thorny problems also arise concerning the estimation of national income and its distribution at the local level. First, a reminder of the idea of 'value added' is necessary, given the changes and improvements in the national accounting system based on research undertaken by competent international bodies and, also, as a result of the adoption of the ESA (European System of Accounts) by the national statistical institutes of the European Union.

² Pigou A.C.: *The Economics of Welfare*, London, 1920.

In this context, with a truly pioneering initiative, ISTAT compiled (as already mentioned) a historical report of national income and its elementary components for the years 1861-1956. This initiative was unique, but the results would have to undergo revision in light of theoretical changes and the consistent revaluations to which the data were subjected, particularly to take into account the contribution from irregular employment to the gross national income³.

Concerning the theoretical aspects, one of the differences between the two visions of the gross national income, comes from the fact that while in the past the developmental indicator to which reference was made was usually the gross national income, defined as the sum of the wages earned by owners of production factors (from the perspective of distribution), in the current system, however, the emphasis is placed primarily on the value added by individual sectors of economic activity (from the perspective of training). The point of departure is the value added, which, both at the micro level (with reference to individual companies and institutions) and the macro-level (i.e. considering the respective business sectors), is defined as the result of the difference between input and the corresponding output. It is assumed that the excess of the value of goods produced with the raw materials and services purchased from other industries or from abroad is used in the production unit in question.

The value added by the single components plus the values obtained for agriculture, industry and services is the value added of the economy, and if, as often happens, we wish to estimate the gross domestic product (GDP), which is expressed at market prices, we need to also consider indirect taxes on production and net imports.

But if these are the main theoretical considerations, much more important are the practical problems associated with estimates of the economic aggregates considered, and this is especially true with reference to a rather remote historical period in which the availability of statistics on value added and corporate balance sheets was (as we have seen) quite scarce and fragmented. It is true that the census can furnish the basic information needed to estimate employment, but it is necessary to add up the total value added of each sector and to know at least the data on value added per capita: these are the elements which define the level of productivity of these sectors.

³With the intention of facilitating the comparison between the old system used during the years 1861-1936 and the one implemented during the last war under the new system of national accounting, the Tagliacarne Institute recalculated the value added data at the provincial level for the years 1951, 1961, 1971, 1981 and 1991. The model thus obtained, analyzed in the three main areas of activity, relates to provincial estimates for the years 1995-2008 released by ISTAT at the end of 2010.

Particular problems also arise in the process of attributing the value added to the individual divisions of the national territory. Needing to follow the principle of "territoriality" of events, it is necessary that data on the value added is attributed to the province within which the production was actually made, from which it derives. In the case of a plurality of locations, the value added should not be entirely recorded in only one location, but be distributed pro rata among the provinces in which the units operate through local correspondents.

A final consideration relates to how we treat data on value added. In the previous system of national accounting (the one followed by Istat for the construction of the report for the years 1861-1956) the services provided by the Public Administration were divided between final services and so-called instrumental services. And while the former did flow to the sector of final consumption of the families, the other was supposed to constitute a flow of intermediate services granted to companies and as such to be subtracted, like any other input, from the value added to the total of the latter.

But following the introduction of the SEC (and then with reference to the system available from 1951) the services of Public Administration were considered to be final and no deduction is made from the value added of any sector of production. Therefore, if, under the old system, the value underwent a "correction" which resulted in a slight decrease of total income, we can easily understand how, in order to facilitate the comparison of these data with those of the new series, they should be considered as they were before the above amendment.

3. Summary of the criteria adopted for calculation

3.1 The estimation of the reference population

In the preceding pages we have said that the aim of research is to arrive at an estimation, for each census year, of the provincial data on value added and the number of employed by sector of economic activity. That being said, however, in order to arrive at a synthetic indicator of the level of economic development, it would be sufficient to know the average per capita aggregate mentioned previously, considering that the second (i.e. employment) would assume a function purely instrumental, insofar as it was considered only as a necessary variable for the determination of the value added.

Because it is unavoidable a accurate assessment of the "employment" factor, upon which depends the reliability of the estimation, we must remain aware of the limits of the basic data available to us. The main difficulty stems from the fact that, except for the last two census surveys, the question of a person's employment

status has never been included on the questionnaires used. This information was gathered in terms of stated profession, even if it was not being exercised at the time.

Another problem (certainly less important than the previous one) comes from the diversity of criteria used for establishing a threshold age at which one can be considered part of the working population. It is in fact part of an initial period (the census years 1861, 1871 and 1881) in which, having set no minimum age, professional qualifications were attributed equally to all individuals surveyed (including children under the age of 15 years), before a later period in which progressively higher age limits began to be introduced, up to the present time when 15 years is the norm.

From the above it is clear that the actively employed population (which has been calculated through detailed reclassification operations which are not without serious problems) which includes both the individuals employed at the time of the survey and the unemployed, does not easily isolate the component relevant for the calculation. To be able to remove the unemployed from the count would require an adequate information base concerning those seeking work and those actually part of the labor force. which could be, for example, the list of those inscribed at employment offices, or even better, in the Labor force. These are data which, in the first 100 years of post-unification, were still hard to find.

Therefore, to use the data taken from the population census, it would be necessary to resolve the question of their reliability in the estimation of the employed population. In this regard we must note, however, that their influence on the results would have been rather limited for two reasons:

- On one hand the criterion could lead to an exaggerated estimation of the final results, the opposite effect could be seen due to under reporting, common during the census. It is likely that these two opposing trends would tend to offset each other, at least in part;
- Because, as we shall see below, even the average per capita value added for the entire country was calculated by assuming the same basic employment number, it is therefore clear that, in both cases, the per capita values were, at least formally, homogeneous. It remains true, however, that if these results were extended to all provinces, sector by sector it would exclude by implication any differences between the various provinces in levels of labor productivity . This hypothesis would lead to results which are not fully realistic, especially if the policy of uniformity were applied to both the developed North and the disadvantaged South⁴.

⁴ The difficulty of measuring productivity indexes which differ from province to province led authors such as Fenoaltea (author of an interesting research on the regional value added in industry in the

3.2 Estimation of value added by province

Before moving on to the criteria adopted for the calculation of value added by province, a look at tab. 1 shows the estimated population of the entire country for the years 1861-1936, which is followed by the corresponding data extracted from the censuses that have occurred since 1951, the year in which the system developed by ISTAT (1861-1936) was abandoned and the newer system developed by the Tagliacarne Institute (1951-1991) began to be used.

Table 1 – *Population of Italy actively employed in relation to the population census and its distribution by sector of economic activity.*

Census Years	Resident population			Working population by sector %			
	Total (thousands)	Of which assets (thousands)	Active % of the total	Agriculture	Industry	Service	Total
1861	22,182	13,355	60.2	65.3	20.5	14.2	100.0
1871	27,304	15,212	55.7	64.7	20.7	14.6	100.0
1881	28,953	15,879	54.8	61.5	23.4	15.1	100.0
1901	32,966	16,277	49.4	60.5	23.4	16.1	100.0
1911	35,845	16,696	46.6	56.9	25.2	17.9	100.0
1921	39,944	17,650	44.2	54.7	25.9	19.2	100.0
1931	41,652	18,313	44.0	47.3	30.3	22.4	100.0
1936	42,994	18,721	43.5	48.0	28.5	23.5	100.0
1951	47,516	19,577	41.2	42.2	32.1	25.7	100.0
1961	50,624	19,519	38.6	29.0	40.4	30.6	100.0
1971	54,137	18,831	34.8	17.2	44.4	38.4	100.0
1981	56,557	20,246	35.8	11.1	39.5	49.4	100.0
1991	56,778	21,323	37.6	7.6	35.7	56.7	100.0
2001	56,996	20,994	36.8	5.5	33.5	61.0	100.0

Source: Institute G. Tagliacarne on Istat data.

Given that the data calculated by the Tagliacarne Institute (and in subsequent years ISTAT) were reported only in order to complete the table and are based on the calculation of ‘standard’ work units (AWU), rather than on population, the problem that arises is to determine a set of average unit values for the years 1861-1936, which, multiplied by the number of the actively employed would allow us to estimate the total value added for each province.

1871 to 1911 censuses) to assume, for the individual branches of industry, levels of value added per worker equal in all regions. See: *La crescita industriale nelle regioni d’Italia dall’Unificazione alla Grande Guerra*, Quaderno dell’Ufficio Ricerche Statistiche, Banca d’Italia, 2001.

There are two questions which need to be addressed. Which criterion should be adopted to estimate unit values and to be applied to the entire national territory and is there a way to specify these values for individual provinces or regions.

Given that the two issues are closely related and that any action on one will be reflected to some extent on the other, it should be noted that the extensive literature available makes it possible (at least in broad terms) to act on an informed basis. It is known, for example, that it was only after the unification of our country that the process of industrialization began which, facilitated by the introduction of the steam engine and the progressive extension of the railway network (2,743 km in 1861, 9,326 in 1881 to 14,418 in 1901), led to an expansion of the market and the meeting of some other needs for the first time ever. The first industry to benefit from this growth was that of textile, followed by those of chemical and rubber (the latter especially with the founding, in 1872, of Pirelli), food (which saw, in 1875, the opening of Cirio) and, beginning in 1880, various mechanical industries and railway and tram rolling stock.

Appearing a little later were the ironworks which, conditioned by low production of coal (used, among other things, for steam engines), finally saw growth, initially in the Terni and Genoa plants in 1889, but was then involved almost immediately in a severe depression that lasted until the end of the century.

In a strictly statistical sense the data are particularly interesting regarding the value added of the Italian economy as a whole (and by sector of economic activity) which ISTAT calculated for the years 1861-1956.

Unfortunately, for reasons that were mentioned earlier and which led ISTAT to make revaluations of at least three of the data on the main aggregates of income, the most recent series on national income, as compared to the old, show upward deviations of around 25%, mainly concentrated in the tertiary sector and, more particularly, absorbed by the added value of intermediary activities and services in general. In order to make the above-mentioned data comparable with those for the period 1861-1936, it was decided to "spread" these percentages across the data, recalling the comments made by two noted scholars, whose considerations still seem quite convincing, that undeclared work and its retribution are bound to augment due to the increase in work related legislation and social security contributions.

Concerning the second question (that of the gap between the regions of Southern Italy and the rest of the country) much work as well as accurate historical research has been done by scholars who are cited in the bibliography at the bottom of the text. To limit ourselves only to the best-known, please note that Giustino Fortunato (1848-1932) was the first of the great southerners to fight the myth of the wealth of the South, helping to draw public attention to the actual conditions of the Southern provinces. And thinking in the same way are foreign scholars such

Dewerpe whose volume edited by Sergio Romano (*Storia dell'economia italiana*, Vol III) mentioned the fact that, at the time of unification, the per capita income of South was estimated to be 15-20 percent lower than the national average.

But back to the research of the two scholars mentioned above, it is significant to note that income differentials between the Centre-North and South are spread over four periods: "1861-1913: the formation of regional disparities with the start of the industrialization of the country; 1920-1939: accentuation of regional disparities and inequalities between North and South, 1951-1973: closing the gaps and differences in the North-South per capita income, 1974-2004: increase of the gaps, with a tendency toward a reduction in the most recent years".

However, while agreeing with the observation that the differences in terms of income per capita are likely to be accentuated over time, special processing has allowed us to better appreciate the magnitude of the North-South divide. The beginning of the period in which the Tagliacarne Institute carried out the reconstruction of the historical model by province (i.e. 1951) saw the second distribution settle on a average value added per person of 33% less compared with the same indicator before, and so distributed by sector: agriculture -3.9%, industry -42.8% and services -16.8%.

The parameters used to estimate the diverse performance of the value added at the local level have been different, having focused on:

- The distribution of the registered population between provincial capitals and other municipalities as a whole, based on the assumption that the first of these people have a higher level of income per capita;
- The number present by province of those with social conditions revealed by census data (such as retirees, the poor, people without profession or occupation unknown) who are usually at the margins of the income scale;
- The corresponding incidence of certain socio-professional people (entrepreneurs, landowners, government workers, etc..) who usually occupy the upper levels in the hierarchy.

Having three historical models of value added per employee, corresponding to the number of the employed by sector of economic activity, it was easy to find to the product of the two figures and reach the total value added of the sector and the individual provincial economies.

4. Analysis of the main results

4.1 In General

As already noted, the objective of the research is to examine the economic situation of the provinces during the years of demographic censuses. The aim is not to make a complete survey of the entire span of 150 years since the union of the nation or the process of going from the 59 provinces at the time of unification to the 110 of today. More simply, it aims to provide a static (or accurate) representation of the various provinces surveyed from time to time and with reference to the censuses conducted in the period 1861-1936 and to the census and non-census investigations carried out after 1951.

The difficulty of following the dynamics of progress made by individual constituencies is due not only to the discontinuity of the censuses, but also to sensitive modifications undergone by the borders in the nation and the proliferation of new provinces, all of which tend to alter the demographic structure reached over time; these distortions add to those arising from the fact that evaluations are expressed only in current prices at the time they are made.

However, even in the presence of these distortions some comparisons over time (with reference to the intercensal intervals) can be properly carried out, especially if we limit ourselves to the entire national territory or the two broad divisions of Centre-North and South (the Mezzogiorno). It's almost superfluous to note, however, given the imperfect homogeneity of the field, rather than in absolute value, territorial and temporal comparisons can be made by translating the figures into terms of average per capita.

We should note that, in order to summarize, in simple terms, the details of the research, the results essentially fall into four distinct periods:

- A first period, which extends from the census of 1861 to those of 1871 and 1881 and is characterized by the consolidation of state structures, in a context which is marked by bitter disputes with neighboring countries, and with an economic system based primarily on primary activities;
- A second period from 1881 up to the 1901 and 1911 censuses which sees the start of the process of industrialization when, in deference to the "law of the three sectors" as elaborated by Colin Clark, we find gradual movement of the weight of primary activities to benefit industry and subsequently the tertiary sector;
- The third period, covering the 1911, 1921, 1931 and 1936 censuses which saw the outbreak of the Great War (1915-18) and the advent and acceptance of the Fascist regime;

- Finally, since World War II and the lack of the census that was to have taken place in 1941, the postwar years have shown cyclical and structural trends of considerable intensity, which finally resulted in an economic crisis not unlike the one that occurred in 1929.

But before proceeding to examine the income levels achieved during these periods, a reference to the concept of the working population and the data processed for this purpose can help us interpret more correctly the results of the calculation. As mentioned above, the aggregate in question has an instrumental character in the sense that, in the absence of more appropriate data (such as, for example, the number of the AWU), they were adopted to calculate the value added of individual local economies in the period 1861-1936. And because the calculation was made in advance by estimating the per capita values of the various sectors, it is necessary to reiterate that these reports (obtained by using number of employed people as the denominator) adequately reflect neither the level nor the dynamics of productivity.

Accordingly, in Table. 1 (reported in the previous pages with respect to the whole country) it is still possible to detect the salient features of the subject matter. The first aspect that emerges from an examination of the table is the ratio between the employed population and the total population resident at the time of the survey: what we call, albeit with some approximation, "activity rate". Well, from the series we have calculated we see how, after a period (1861-1901) in which the activity rate was maintained at around 50-60 percent of the total population, the figure began to decrease at a more pronounced rate, until reaching, during the 60s of the last century (those of the "economic miracle"), a figure below 40 percent.

The trend towards a shrinking share of working people among the population is attributable to several factors, among which we highlight the thinning of the female labor force, due in part to the improvement of the living conditions of families, a growing tendency of young people to remain in school the swelling of the number of the retired.

But the most marked changes occurred in the areas in which working population was engaged, among which we highlight: the extraordinary decline in numbers engaged in agriculture, down from 65.3% in 1861 to 5.5% in 2001; while the increase registered by the industrial workers, in turn, went from 20.5 to 33.5 percent. We note the remarkable expansion of the tertiary sector, where the figure, equal to just 14.2% at the time of unification, reached 61.0 percent.

4.2 - Income distribution

Before describing the results of research we must bear in mind that the aggregate data focused on the data of the value added (or gross income, if you prefer) recorded at the regional level. This seems a reasonable choice, especially considering that only for the regions is it possible to specify, sector by sector, average values for the employed and not make ad hoc evaluations. There was a need to link to the average values to the region, with the consequence that, if their aggregation leads to differing results, this is due to the different composition of the sectors.

And with these necessary conditions that have been built into tab. 2, have been reported the data from 14 series (as many as the censuses conducted between 1861 and 2001) on the value added of each region, expressed, respectively, in absolute number (average per capita at current prices) and in percentage terms (with reference to the national average set equal to 100), and graph. 1.

Table 2 – Evolution of the gross income per capita of the regions (a) in the intercensal intervals.

Regions	Section A - Years 1861 - 1901							
	Per capita (lire)				Indices (Italia = 100)			
	1861	1871	1881	1901	1861	1871	1881	1901
Piemonte	362	397	413	493	111.1	107.2	108.1	112.5
Valle d'Aosta	....	....	....	....	....	....	....	....
Lombardia	356	408	432	515	109.3	110.2	113.0	117.5
Trentino Alto Adige	....	....	....	....	....	....	....	....
Veneto	....	353	374	453	....	95.3	97.9	103.3
Friuli Venezia Giulia	....	349	377	458	....	94.3	98.6	104.6
Liguria	356	423	447	506	109.3	114.1	116.9	115.4
Emilia Romagna	355	397	408	499	109.0	107.1	106.7	113.8
Toscana	332	393	398	456	102.1	106.0	104.1	104.0
Umbria	341	406	356	435	104.7	109.5	93.1	99.2
Marche	320	374	378	423	98.3	100.9	98.8	96.5
Lazio	....	382	407	452	....	103.1	106.4	103.1
Abruzzo	283	301	346	362	87.0	81.3	90.6	82.6
Molise	294	319	336	364	90.3	86.2	87.9	83.0
Campania	313	371	365	405	96.2	100.1	95.3	92.3
Puglia	287	325	338	359	88.2	87.8	88.3	81.9
Basilicata	309	313	347	367	95.0	84.6	90.6	83.8
Calabria	290	339	338	359	89.1	91.4	88.4	81.9
Sicilia	291	338	341	369	89.4	91.2	89.0	84.2
Sardegna	273	303	324	343	83.9	81.8	84.8	78.3
Centro-Nord	350	391	406	480	107.5	105.6	106.2	109.5
Mezzogiorno	296	338	346	373	90.8	91.2	90.4	85.1
Totale Regno	326	371	382	438	100.0	100.0	100.0	100.0

(A) the total value added at current prices per person resident at the time of the census

Source: Institute G. Tagliacarne on Istat data

From the results of the research it is clear that - to confirm what was previously mentioned - in the year of unification the value added per capita was low enough (326 lira at the time) to represent a sizable gap compared with the other European countries. A gap that was, among other things, closely related to the ongoing crisis in public finance, operational difficulties of the banking system and continuous innovations introduced by monetary and customs policies (forced currency, free trade and protectionism).

Table 2 (part 1) – Evolution of the gross income per capita of the regions (a) in the intercensal intervals

Regions	Section B - Years 1911 - 1936							
	per capita (lire)				Indices (Italia = 100)			
	1911	1921	1931	1936	1911	1921	1931	1936
Piemonte	713	3,614	3,822	4,420	117.1	119.4	120.3	122.9
Valle d'Aosta	....	....	3,230	3,802	....	....	101.7	105.8
Lombardia	733	3,681	4,020	4,644	120.5	121.6	126.5	129.2
Trentino Alto Adige	....	....	3,659	4,172	....	....	115.2	116.0
Veneto	628	2,953	3,225	3,572	103.2	97.5	101.5	99.3
Friuli Venezia Giulia	638	3,360	3,669	3,770	104.9	111.0	115.5	104.9
Liguria	729	3,625	3,977	4,698	119.8	119.7	125.2	130.7
Emilia Romagna	672	3,492	3,315	3,889	110.4	115.3	104.3	108.2
Toscana	647	3,110	3,332	3,726	106.3	102.7	104.9	103.6
Umbria	551	2,849	2,799	3,691	90.5	94.1	88.1	102.7
Marche	598	3,096	2,972	3,909	98.2	102.3	93.5	108.7
Lazio	672	3,338	3,688	3,989	110.4	110.3	116.1	110.9
Abruzzo	499	2,339	2,347	2,412	82.0	77.3	73.9	67.1
Molise	513	2,473	2,246	2,457	84.3	81.7	70.7	68.4
Campania	540	2,695	2,697	2,892	88.7	89.0	84.9	80.4
Puglia	480	2,326	2,302	2,542	78.9	76.8	72.5	70.7
Basilicata	487	2,474	2,129	2,350	80.0	81.7	67.0	65.4
Calabria	478	2,307	2,187	2,402	78.6	76.2	68.8	66.8
Sicilia	482	2,231	2,246	2,525	79.2	73.7	70.7	70.2
Sardegna	447	2,190	2,359	2,572	73.5	72.4	74.3	71.5
Centro-Nord	678	3,385	3,593	4,108	111.4	111.8	113.1	114.2
Mezzogiorno	496	2,390	2,368	2,590	81.5	79.0	74.5	72.0
Totale Regno	608	3,027	3,177	3,595	100.0	100.0	100.0	100.0

(A) the total value added at current prices per person resident at the time of the census

Source: Institute G. Tagliacarne on Istat data.

In the Centre-North, the South and the islands, the largest share by far of the active population (over 60%, a slight majority in the Centre-North) was employed in the agriculture and livestock industries. It is surprising to note that, compared to the above mentioned national average income per capita, the South differed "only" 15.4% from the rest of Italy, having settled on 296 lira, against 350 in the Center-North. The gap was entirely due to the lower level of development of non-

agricultural activities, since the average output per worker in the agricultural sector recorded an edge, albeit rather slight, in favor of the southern areas.

Table 2 (part 2) – *Evolution of the gross income per capita of the regions (a) in the intercensal intervals.*

Section C - Years 1951-1971						
Regions	Per capita (thousands of lire)			Indices (Italia = 100)		
	1951	1961	1971	1951	1961	1971
Piemonte	369.3	670.4	1.552.0	153.7	131.6	123
Valle d'Aosta	372.8	643.8	1.465.5	155.2	126.4	115.9
Lombardia	370.7	733.3	1.687.0	154.3	143.9	133.4
Trentino Alto Adige	217.5	512.0	1.246.0	90.6	100.5	98.5
Veneto	194.5	514.2	1.264.4	80.9	100.9	100.0
Friuli Venezia Giulia	215.6	503.5	1.365.3	89.7	98.8	108.0
Liguria	429.1	675.4	1.677.7	178.6	132.6	132.7
Emilia-Romagna	238.5	591.0	1.424.7	99.3	116.0	112.7
Toscana	240.6	541.7	1.362.9	100.1	106.3	107.8
Umbria	179.1	438.5	1.160.0	74.6	86.1	91.7
Marche	163.1	431.1	1.106.2	67.9	84.6	87.5
Lazio	290.1	582.3	1.388.1	120.8	114.3	109.8
Abruzzo	134.0	348.2	955.1	55.8	68.3	75.5
Molise	110.4	281.5	776.1	45.9	55.3	61.4
Campania	172.6	354.0	891.5	71.8	69.5	70.5
Puglia	169.8	360.1	901.1	70.7	70.7	71.3
Basilicata	124.8	290.7	848.7	51.9	57.1	67.1
Calabria	125.2	278.2	753.6	52.1	54.6	59.6
Sicilia	165.6	339.0	905.3	68.9	66.5	71.6
Sardegna	202.3	377.6	1.018.6	84.2	74.1	80.6
Centro-Nord	287.2	607.3	1.463.5	119.5	119.2	115.7
Mezzogiorno	161.1	340.8	892.8	67.0	66.9	70.6
Italia	240.2	509.5	1,264.5	100.0	100.0	100.0

(A) the total value added at current prices per person resident at the time of the census

Source: Institute G. Tagliacarne on Istat data.

The greater number of agricultural workers in the North than the South continued until the census of 1881, when their shares of the working population were equal to 63.6 and 58.2 percent. But from that date onwards, some events occurred which tended to alter the balance that had been established in different areas. With the growth of rural areas, in particular, in the central and northern regions, led by the Piemonte and Lombardia, the process of industrialization began to intensify that was to lead in a few years to great national economic development. Together with Liguria - also placed at the top of the list of developed - the two regions of the North-West were in fact to form the "Industrial Triangle", which still represents the most economically developed area of Italy. Upon conversion of the aforesaid regions (Lombardia and Liguria, in particular) from purely agricultural economies to one of the main venues of large and medium size factories and of a

nucleus of expanding tertiary activities, which were, however, countered by the low mobility of the South which, still in 1921, had a proportion of agricultural workers equal to 60 percent. And since per capita incomes of non-agricultural activities were - and remain - much higher than those achieved by farmers, it follows that the gap between the South and the North-central regions was growing. In 1901 in particular, at the dawn of the new century, the area recorded a less developed value added per capita of 373 lira compared with 480 lira in the north, a difference of 22.3 per cent.

Within the Southern division, Calabria and Sardegna were to occupy the bottom position while Campania, with a mean value over 400 lira, did not differ much from the less developed regions of the Centre, among Marche occupied the lowest level (423 lira in 1901).

Table 2 (part 3) – Evolution of the gross income per capita of the regions (a) in the intercensal intervals.

Section D - Years 1981-2001						
Regioni	Per capita (thousands of lire)			Indices (Italia = 100)		
	1981	1991	2001	1981	1991	2001
Piemonte	9,240.8	26,754.3	40,821.2	116.9	112.8	110.7
Valle d'Aosta	10,017.0	29,832.4	43,032.9	126.7	125.8	116.7
Lombardia	10,318.6	30,519.7	49,002.8	130.5	128.7	132.9
Trentino Alto Adige	9,167.2	28,128.3	46,013.6	116.0	118.6	124.8
Veneto	8,584.5	26,805.8	43,539.7	108.6	113.1	118.1
Friuli Venezia Giulia	8,876.3	27,418.3	41,365.2	112.3	115.6	112.2
Liguria	8,750.9	27,792.9	37,906.8	110.7	117.2	102.8
Emilia-Romagna	10,354.9	29,246.5	46,726.6	131.0	123.4	126.7
Toscana	8,869.6	25,327.4	40,365.4	112.2	106.8	109.4
Umbria	7,835.0	22,921.8	35,678.1	99.1	96.7	96.7
Marche	8,330.2	23,930.9	36,841.1	105.4	100.9	99.9
Lazio	8,293.0	26,803.9	43,001.1	104.9	113.1	116.6
Abruzzo	6,679.9	21,129.4	31,585.3	84.5	89.1	85.6
Molise	5,893.1	18,051.3	27,079.5	74.5	76.1	73.4
Campania	5,257.8	16,166.4	23,266.5	66.5	68.2	63.1
Puglia	5,572.7	17,007.6	24,258.0	70.5	71.7	65.8
Basilicata	5,155.6	14,906.4	25,932.4	65.2	62.9	70.3
Calabria	4,841.8	14,045.2	23,107.5	61.2	59.2	62.7
Sicilia	5,321.5	16,365.1	23,394.9	67.3	69.0	63.4
Sardegna	5,560.2	17,992.4	27,947.9	70.3	75.9	75.8
Centro-Nord	9,277.4	27,734.0	43,847.2	117.3	117.0	118.9
Mezzogiorno	5,409.1	16,607.1	24,497.8	68.4	70.0	66.4
Italia	7,905.8	23,709.2	36,882.4	100.0	100.0	100.0

(A) the total value added at current prices per person resident at the time of the census

Source: Institute G. Tagliacarne on Istat data.

But this period, roughly coinciding with the first 35 years of united Italy, is also characterized by a series of important events, among which mention must be made,

albeit in no particular order, to the movement of the capital from Florence to Rome and the first boost to the tertiary sector of the country, the opening in 1871 of the Frejus tunnel and the exceptional expansion of the railway network and the introduction, in 1877, of free and compulsory primary education for all, the suppression in 1880 (with effect from 1 January 1884), of the "notorious" tax on flour, which was previously introduced by the then Minister Quintino Sella to stem the high deficit of the state, the re-introduction in 1887 of the protectionist customs reform, which at its first appearance (in 1878) had been vigorously opposed by southerners, and so on.

In the 10 years between the censuses of 1901 and 1911, in an alternating sequence of cyclical phases, during which the general price level remained stable, the value added per capita rose from 439 to 608 lira and the standard difference between the Center-North and the South further increased, rising from 22.3 to 26.8 percent. And this is the period in which the primacy of the two most developed regions of the North-West (Lombardia and Liguria) also consolidated the areas of Veneto and Friuli (which approached the levels achieved by central Italy) and began to exit from the unsatisfactory situation at that time in the history of the Italian State.

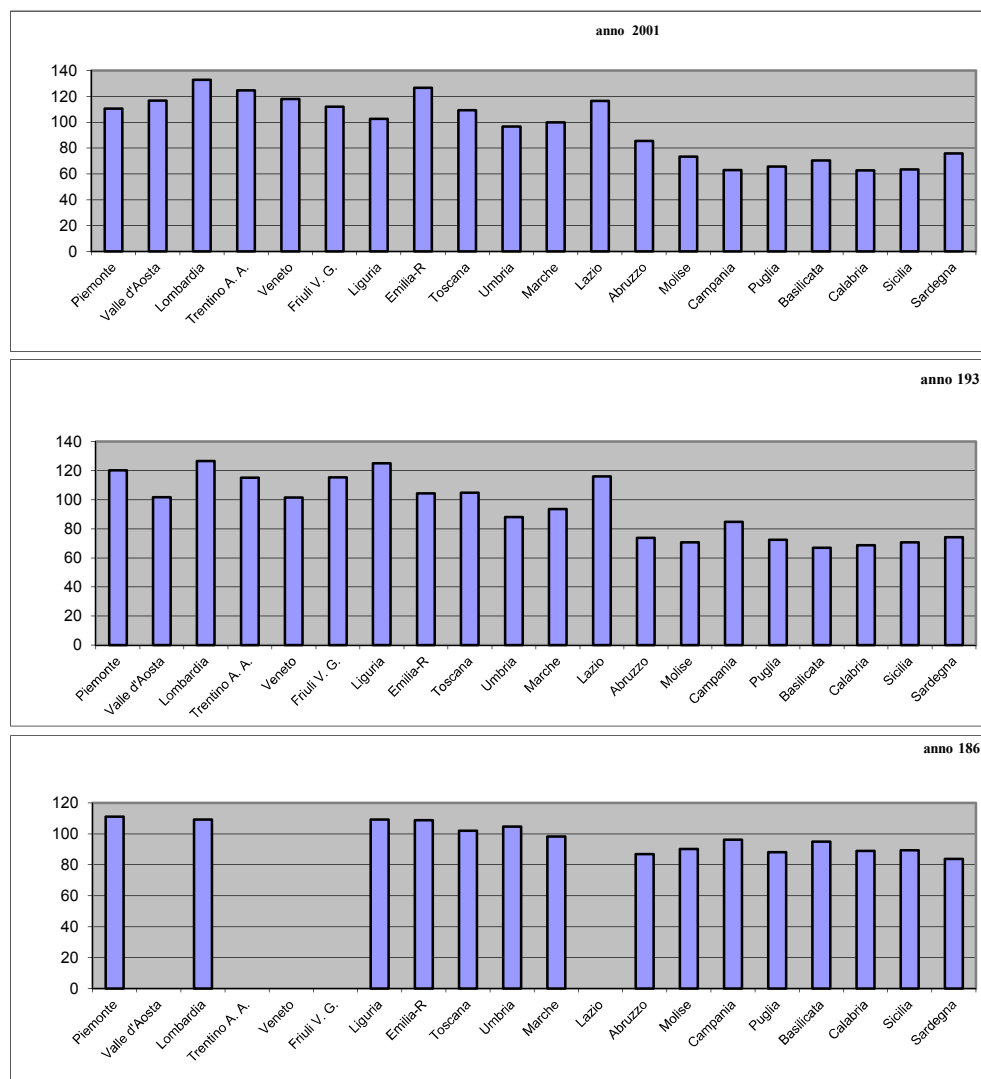
Appearing satisfactory are the positions reached in 1911 by Emilia-Romagna and Lazio, both at a level of 672 lira, and this despite the clear majority in Lazio's population working in services (30.6%), in the other region, agricultural workers (59.9%), in both regions the share in industry was just over 23%.

But in between 1800 and 1900 successive events, in addition to those mentioned briefly above occurred. First, one can not forget that on 29 July 1900 King Umberto was the victim of an attack perpetrated by an anarchist in Monza (Gaetano Bresci) and Vittorio Emanuele III ascended to the throne. Nor can we overlook the fact that government policy was almost always controlled at that time (even if not directly) by Giovanni Giolitti.

During the Giolitti period, which lasted until the eve of the Great War, various measures were issued in favor of the South and some areas of central Italy that were at a disadvantage. State interventions in various sectors of the economy were translated into an unprecedented increase in public spending, which also contributed to the extension of the legislation in the social field, from health to charities, from popular to affordable housing cooperatives, disability pensions and support for the aged and working women, etc.

Unfortunately, due to the first Libyan misadventure and then to World War II, the budget deficit underwent further, significant expansion and the consumer price index based on the 1913 figure (known as the cost of living index), which in 1911 was equal to 0.989, more than quadrupled, reaching a level of 4.168 in 1921.

Figure 1 – Index of the value added per capita of the regions in the years 1861 and 2001 to 1931 era borders (Italy=100).



Source: Institute G. Tagliacarne on Istat data.

But even in these years (60 since unification) the gross income per capita of the whole country increased in monetary terms to a level of 3,027 lira. And while there was a continued divergence between the per capita figures of the South (2,390 lira) and the Centre - North (3385 lira), the three regions of the "Industrial Triangle"

(Piemonte, Lombardia and Liguria) each surpassed the 3,600 lire mark, a bit more than that of the next region, Emilia Romagna and of Lazio, the most economically developed region of the Centre.

It's true, however, that the war of 1915-18 brought with it problems that gradually widened in later years: the difficulty of passing from a war economy to peacetime, the weakness of successive governments, the impoverishment of broad masses of workers, strikes and upheavals that lasted until the advent of fascism, etc.. The fascist regime lasted for about twenty years (until the end of the last world war) and this leads us to consider the period between the two censuses of 1921 and 1936, passing over that of the 1931.

Among the measures adopted during the Fascist period, many of which following the dictatorial nature of the regime, we must first make note of the creation of corporations, the prohibition of strikes, the establishment of a policy aimed at national self-sufficiency to produce domestically the largest amount possible of what had been imported (hence the "Battle of Wheat"), government control of money, foreign exchange, the banking system and import-export operations.

Moreover, there was a strong impulse (not without extravagance and ostentation) toward a policy for public works, with the construction of many public buildings and the study of many archaeological sites with where discoveries of some importance were made. Proving particularly important in this context was the construction of the EUR district in Rome and of the <<via dell'Impero>>, to which should be added the reclamation works aimed at the rehabilitation and development of vacant lands and marshes, such as, among others, the Pontine Marshes. The discourse on economic and statistical affairs of Italy closes however, at least for us, with the 1936 census. It closes after a crisis (that of 1929) which, together with the remarkable fall of stock market indices and the general price level, resulted in significant increases in unemployment, the further accentuation of regional imbalances and the failure of many companies, the rescue of which was provided in 1933 with the establishment of IRI.

The changes (compared to previous years) to the country's economic structure were not negligible. Thus, for example, while it is true that persons engaged in agricultural work were still a significant proportion of the total population (49.4%, of whom 45.6% were in the Centre-North and 58.1% in the South - Islands), it is also true that the shares of other activities were estimated respectively at 27.3% and 23.3% for industry and for services.

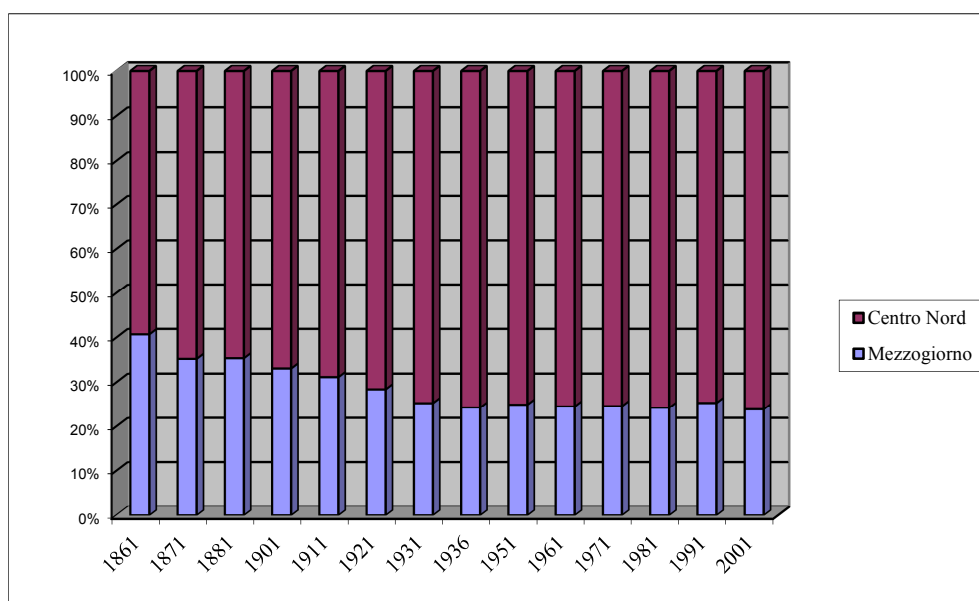
Finally, as the gross income per capita from tab. 4 shows the national average value amounted to 3,595 lira and the gap that separated the South (2,590 lira) from the rest of Italy (4,108 lira) rose to 37 percent. On a regional scale, in addition, two factors seem worthy of note: the first four places in the ranking of development are

Liguria (4,698 lira) Lombardia (4,644), Piemonte (4,420) and Trentino (4,172); while at the bottom we find Molise (2,457) and Abruzzo (2,412), followed by Calabria (2,402) and Basilicata (2,350).

Before to review the results of the census 4 November 1951, 75 years after the first census, two problems are brought to our attention: the first is to know the conditions of the Italian economy after the end of the war and the return to normal activities, and the other is to understand whether the historical dualism between the central regions (the North and the South Islands) remained identical to the level recorded in 1936 or had continued to be accentuated.

That question can be answered easily. Once the work of reconstruction had been carried out, Italy rose from the ashes of war completely transformed not only in terms of political institutions but also with regard to economic and social-cultural policy in its broadest sense. Without considering other aspects of reality, one notes that, according often cited research by ISTAT (Istat, 1957) the national income per capita, expressed in constant prices of 1938, would pass from 3,022 in 1936 to 3,512 lira in 1951, with a real increase of 16.2% which corresponds to a substantial improvement in the economic welfare of the community.

Figure 2 – *Distribution of value added by geographical area in the years of the census boundaries of the time (*)*.



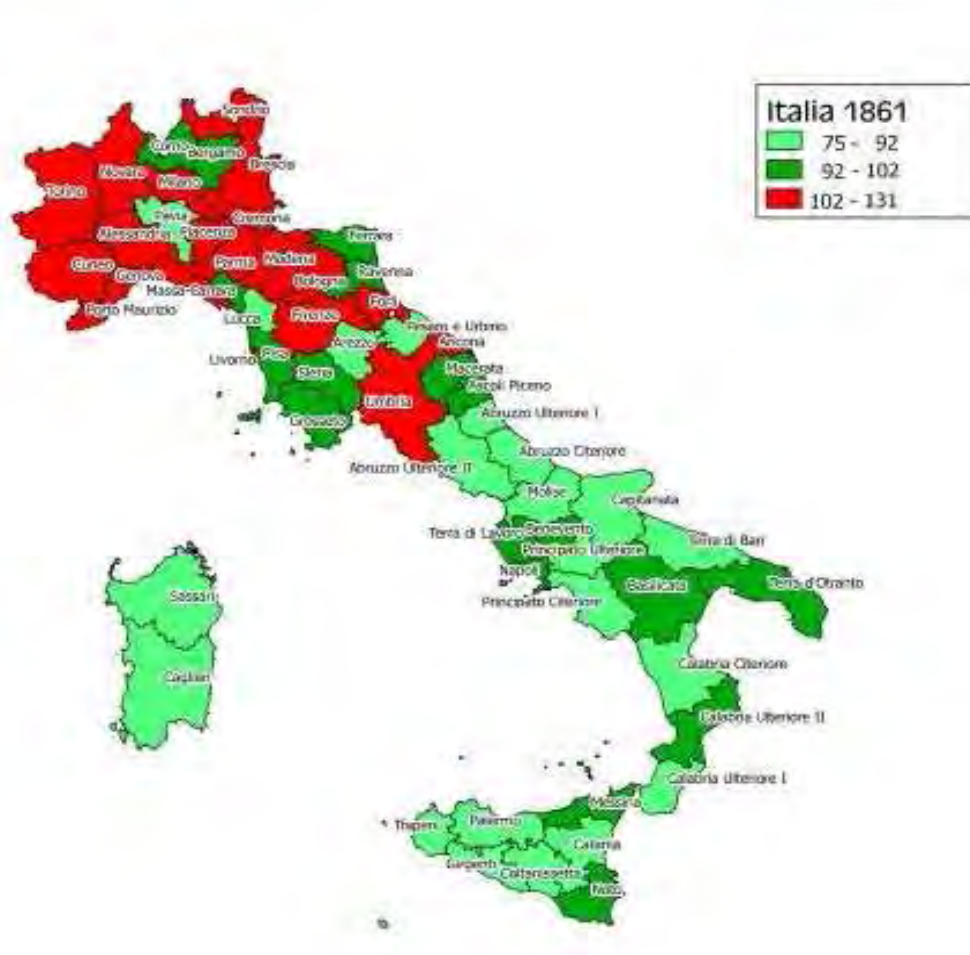
(*)The expansion up to 1936 of the relative weight of the Centre-North has depended on territories gradually annexed to Italy.

To the question about the gap between the two great territorial divisions on the other hand you can say that, as is clear from the estimates of the Tagliacarne Institute, compared with a per capita value added for the whole country in 1951 of 2,402,000 lira, the South was placed on a level (161,100) 43.9% lower than that of the Centre - North (287 200), from which we can deduce that the gap between the two areas of the country rather than being reduced, was further expanded. This trend was also confirmed by various economists, according to whom the reconstruction works were carried out mainly in the more industrialized areas of the Country at the expense of agricultural and residential construction, largely in the South.

It is not our intention to dwell on the changes in the economic area which have occurred during the intercensal intervals, especially considering the vast literature that has looked at the annual evolution of the Italian economy from the period of the "economic miracle" and ending with the serious crisis that is still being felt today about the negative impact. Rather, since one of the most studied topics in this office is the above-cited gap, we wish to close our comments with the presentation of a histogram (Figure 2) showing the percentage distribution of the total value added created in each of the 14 census years in the two major divisions of Italy.

It is easy to understand that we refer to a different, but equally important, viewpoint than hitherto considered: to calculate the ratio between the value added and the resident population. In fact, while the ratio in question tends to provide an indicator of the general level of the economic well-being of individuals, whatever their age, sex, nationality or position in relation to the labor market (housewives, minors, students, employed, unemployed, retired from work, etc..) might be, the first aggregate (i.e. value added) is meant to represent the result of economic activity by production factors, among which we highlight labor, capital and entrepreneurship. Therefore, as a generic indicator, we assume for the population we calculated the per capita values considered so far which can be linked with other reports that are a proxy of labor productivity. The same indicator at provincial level is proposed in 6 cartograms for the census years 1861, 1901, 1931, 1951 2001 and 2009.

5. Cartograms











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SUMMARY

The analysis in this study proposes a reconstruction of the economic history of Italy from 1861 to the present day through the use of census data. The reconstruction refers to two key parameters, the active population employed in the three major categories (macro-sectors) of the economy and the value added by province within the historic boundaries as defined during the census year. The choice was made to give many descriptions of the economic situation in individual territorial areas during census years. This excludes the possibility of making temporal connections while, from the administrative point of view, Italy has gone from 59 provinces in 1861 to the current 110 and the added value has always been calculated in the prices of the time. The process that seemed most appropriate was to aggregate the data so as to arrive at provincial summary results for the two main territorial divisions-North and the South Centre.

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SOCIETÀ E RIVISTA ADERENTI AL SISTEMA ISDS
ISSN ASSEGNATO: 0035-6832

Direttore Responsabile: Dott. CLAUDIO CECCARELLI

Iscrizione della Rivista al Tribunale di Roma del 5 dicembre 1950 N. 1864



Associazione all'Unione Stampa Periodica Italiana

TRIMESTRALE

La copertina è stata ideata e realizzata da Pardini, Apostoli, Maggi p.a.m.@tin.it – Roma

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