EMPLOYMENT AND REGIONAL DEVELOPMENT IN ITALY

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Abstract

We present an interregional econometric model for Value-Added and Employment in 20 Italian regions, which has into account the effects of several factors of development such as industry, tourism and public sector activities. We also analyse the evolution of employment in Italy during the period 1960-2000, in comparison with EU, as well as the regional distribution of employment and development by sector in the period 1985-98. The main conclusions point to the convenience of fostering the rate of employment, which is below EU average and shows an stagnation in comparison with Ireland and other EU countries, specially in the less industrialized regions. This article is part of a research project on regional economics of EU countries.

JEL classification: C5, C51, E24, J2, O18, O52, R23

Key words: Employment in Italy, Italian Regional Development, Regional Econometric Models, European Regions, Regional Tourism

1. Introduction

Although Italy has experienced a high increase of non-agrarian employment and development during the 20th century, and has a level of Income per capita very similar to European Union average, the country has experience, as well as France, Spain, and another countries with a high level of agrarian activity at the middle of that century, an important reduction in agrarian employment.

As a consequence of the diminution of agrarian employment and other features of Italian economy, regional employment rates vary among Northern and Southern regions, and the Italian economy as a whole has an average rate of total employment per one thousand inhabitants below EU average.

As EU has a lower rate of employment than the USA and Japan, it seems convenient to improve EU economic policies in order to increase employment, specially in countries with levels below average and in the less advanced regions, but for the moment the employment policies of EU have not been very successful.

We have found several relevant papers and articles on Italian employment and development, that we summaries in this section, before to present our data, econometric models and analysis.

Battagion and Tajoli(1999) present an interesting paper on the Italian industrial sector, which is characterized by a number of peculiarities compared to other advanced countries, being one of these is the small average size of its firms.

These authors recognizes that small dimension very often guarantees flexibility and a high degree of specialization, two key factors of the Italian economic performance, but they also analyse some limits due to small dimension: 1) one being related to the ownership structure and governance of firms, 2) its weakness in high-tech industries: innovative activity is still far from the level reached in the major industrialized countries, and Italian trade deficit in the technologically-advanced sectors is persisting

Besides that, in the second part of the paper, they present a probit model over a sample of firms from the precision tools sector, the pharmaceutical sector, the glass and ceramics sector and the furniture sector to test how the probability of patenting an innovation is affected by the ownership of the firms, among other variables, and their conclusion is that the innovative output is affected by the ownership structure, as this variable turns out to be significant in many specifications of the model.

Kostoris, F.D.S.(1994), presents an analysis of public intervention in the Italian economy. This author illustrates the internal contradictions and weaknesses of public action in Italy. New policy proposals to solve old structural problems are then discussed.

Among them, a major privatisation programme decided since 1992 is analysed, together with drastic budgetary cuts aiming at curbing public debt to maintain sustainability.

Finally, the paper tries to explain why, in spite of all the excesses and limits of the policy-making, the performance of the Italian economy is apparently quite brilliant, thanks to the what the Italians call "l´arte d´arrangiarsi", and their generalized talent for improvisation and flexibility. This adaptation is easier in small firms but it is largely failing to do so in larger companies and in the public sector. In short, the country is developing thanks to what the Italians call "l'arte d'arrangiarsi", their generalized talent for improvisation.

Although we share the preoccupation of this author on the bad consequences of excesses of public intervention we do not share the view that the less is the best, regarding public activities, as the empirical evidence shows that many public financing, both of public and private activities, have large positive effects on regional development, such as education and health services, the level of education, the improvement of infrastructures, and others.

Bonaglia, F., La Ferrara, E. and Marcellino, M.(1999) apply different methodologies to Italian regional data for the period 1970-1994, for the assessment of public investments role in regional development. The results are presented for Italy as a whole and for different macro-regions, and for individual categories of public capital. The methodologies employed indicate a positive contribution of infrastructures: railways in the North and roads in the Centre and South are the categories that mostly contributed to TFP growth.

Cuñat, A. and Peri, G.(2000), show their concern on the recent dismal performance of overall job creation which has left Italy, as of the end of the 90's, with very low participation and high unemployment rates. Moreover, Italy exhibits a large regional dispersion of those variables when compared to similar European Union economies. Their paper, using Census data on employment from 784 Local Labor Systems (LLS's), covering the whole Italian territory, analyses job creation and its determinants, including input/output linkages, pool of local workers, technological spillovers and infrastructure provision.

They found that Southern Italian economy is rather differentiated within itself, because some parts of the Southeast show characteristics compatible with good job creation, particularly if helped by investment in infrastructures, while most of the Southwest is still lacking characteristics for self-sustained job creation and has been penalized by the cut in public investment in the 90´s.

Fiorentini, R. and Tamborini, R.(2000) analyse the impact of monetary policy and credit on the supply side of the Italian economy. The paper relates to the macroeconomic and monetary policy aspects of the so-called "credit channel" of monetary transmission and present an inter-temporal macroeconomic equilibrium model which relates current production with bank credit. They find the evidence that the "credit variables" identified by the model, the overnight rate and a measure of credit risk, have permanent effects on employment and output through the supply side of the economy by altering credit supply conditions to firms.

Ferrera, M. and Gualmini, E. (1999), analyse Italian social policies under the new conditions of internationalisation. They consider that the turbulent 1990s have been a successful decade for Italy, because through an impressive sequence of reforms, this country has been able to put in order its battered public finances, to start an incisive modernization of its backward bureaucratic apparatus, its rigid labour market and its unbalanced welfare state, without seriously jeopardizing social peace not the overall competitiveness of its economy in the global context.

They conclude that the dynamics of internationalisation and, especially, or European integration have been crucial for fostering these positive developments.

Tondl, G.(1999) analyses the determinants of the uneven growth of European Southern Regions, by means of an empirical study with panel data. He found that since 1975 the extent of catching-up has been very different across Southern regions, and wishes to show whether differences in regional income and growth can be attributed to differences in endowment of human capital.

That panel data consists of a sample of regions from Greece, Spain and the Italian South, for the period 1985-94. The results indicate that the income level of Southern EU regions is largely determined by employment/education levels and past public investment. The author recommends to maintain EU regional policies focused on the human capital factor, but he considers that private investment incentives should be curbed.

Another interesting papers, among others, are those of Fabiani, S. and Pellegrini, G.(1997), who focus also on the important role of education and infra-structure on the development of Italian provinces and the paper by Faini, R. and Galli, G.(1995), who analyse the question of financing and development in Southern Italy.

Our experience with econometric models of regional development in EU regions show many coincidences with some important conclusions of the Italian economy research, giving to the human capital and infrastructures an important role in explaining the differences in real production and non agrarian employment.

We think that those variables have a large influence on investment determinants in industrial production, and that industry, together with another activities like tourism, public valued-added and public transfers, have an important positive influence on the development of market services and building, through a system of a inter-sector relations, as we show in our econometric models of section 4.

Before that we present a general view of employment evolution in Italy and the territorial distribution of employment, and another variables related with economic development, in Italian regions.

2. Employment and Economic Development in Italian Regions

Italy as whole have experienced an important development during the second century, very similar to France although with some differences.

Before presenting our analysis of regional development in Italian regions we present a general comparison of Italy with another EU countries.

A comparison of Italian development with EU countries

During the period 1960-2000 Italy has experienced, like European Union (EU) countries, an important increase in real Gross Domestic Product per head (Gdph, or Ph), usually at a level very similar to EU average and United Kingdom value, and a little below France.

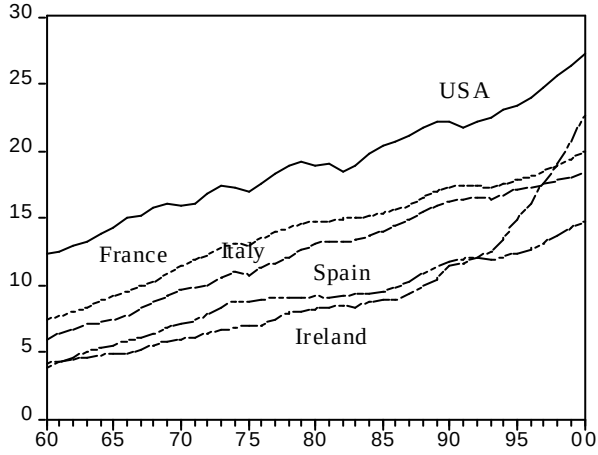
Graph 1 shows the evolution of real Gdph in Italy in comparison with France, Ireland, Spain and the USA, in terms of Purchasing Power Parities, PPPs, in thousands of dollars at 1990 prices and PPPs. There we can see that two countries like France and Italy, very near EU average, are experiencing a rate of growth lower than the USA, while a newcomer to high level Gdph, as Ireland, has shown a high capacity of improving the real Gdp per inhabitant, in great part thanks to the improvement in education as it is shown in Guisan et al(2001).

Graph 2 shows the ratio between Italy and EU average in real Gdph, measured in PPPs at 1990 prices, in comparison with another four EU countries.

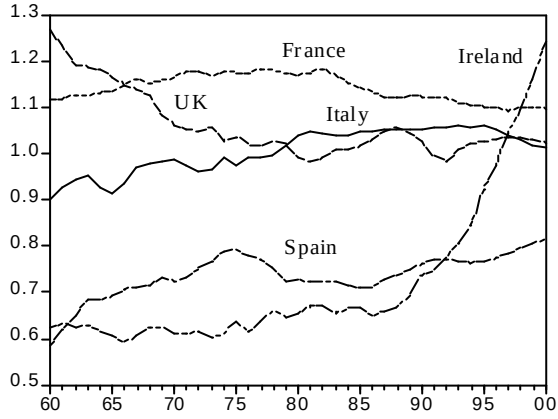
For Italy we can see an important increase in the ratio of Gdph during the period 1960-80, a very slow growth of this ratio during the period 1980-95 and a slight fall during 1995-2000. In spite of this diminution the performance of Italy has been very good with a value of Gdph very similar to EU15 average.

Graphs 3 and 4 present similar comparisons in relation with the rates of employment per one thousand inhabitants.

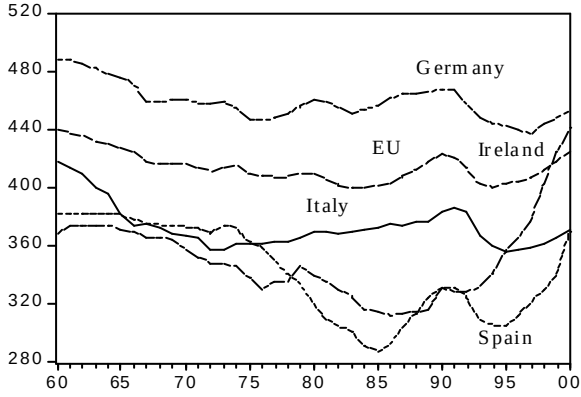
Graph 1. Gross Domestic Product per inhabitant in 1960-2000
(thousands of $US at 1990 prices and PPPs)



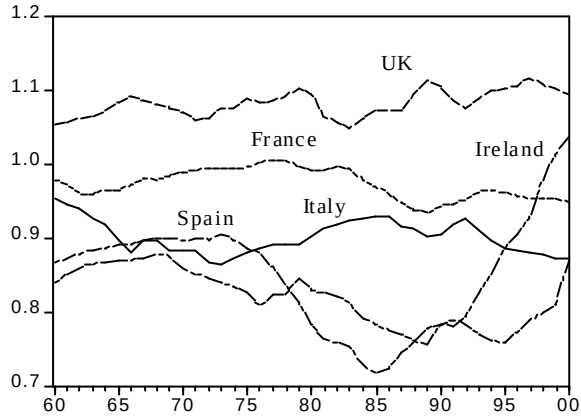
Graph 2. Ratio between Gdph of country and EU average
(values of Gdph in dollars at 1990 prices and PPPs)



Graph 3. Rates of Employment in 1960-2000



Graph 4. Ratio between Lth of country and EU average



We can see that the rate of employment per one thousand inhabitants has shown a diminution in Italy during the period 1992-2000, while countries with lower positions in this value, like Spain and Ireland, have shown an important increase during that period. The most outstanding difference in rate of employment is with UK, as this country has a real value of Gdph very similar to Italy.

Employment and population in Italian regions

Table 1 shows the Population, Gdp per inhabitant, Ph, rates of employment, and ranking positions of Italian regions.

Table 1.Population, Ph and Employment rate of Italian regions, 1995

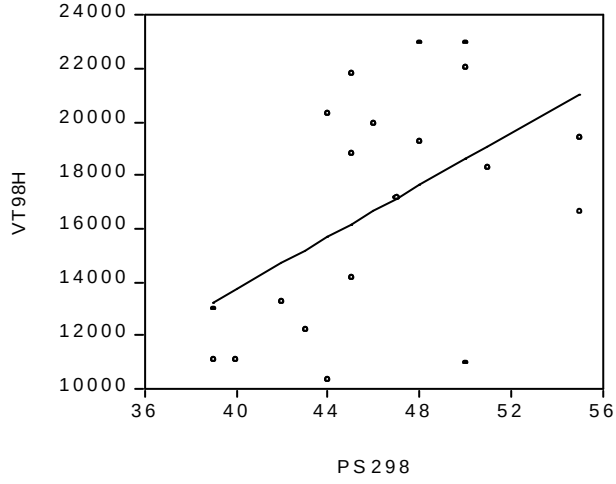
Region	Pop	Gdph	Rph	Lha	Lhna	? Lhna %
1.Piemonte	4298	22736	20	30	408	5.89
2.Valle d'Aosta	118	25096	12	44	444	-0.78
3.Liguria	1664	23083	19	22	364	-5.51
4.Lombardia	8910	25629	9	13	426	2.89
5.Trentino-Alto Adige	909	24322	17	43	458	4.97
6.Veneto	4422	23836	18	33	419	10.16
7.Friuli-Venezia G.	1191	24412	16	24	397	-2.27
8.Emilia-Romagna	3923	25458	10	33	426	3.94
9.Toscana	3526	21344	27	29	398	1.01
10.Umbria	822	19063	42	32	374	3.58
11.Marche	1441	20219	35	38	389	-0.92
12.Lazio	5193	21900	25	20	381	-1.07
13.Campania	5746	12784	93	39	261	-6.47
14.Abruzzo	1268	17399	59	49	322	0.41
15.Molise	332	14881	79	67	280	-2.89
16.Puglia	4076	13696	87	31	272	-1.56
17.Basilicata	611	13227	88	64	256	-0.59
18.Calabria	2076	11551	97	71	228	-0.80
19.Sicilia	5083	12819	92	42	264	2.84
20.Sardegna	1660	14402	85	37	289	8.88
Total Italy	57269	19821	-	32	357	1.97

Lha and Lhna are rates of agrarian and non-agrarian employment; Δ Lhna% is the percentage of increase in Lhna during 1985-95; Pop is population (thousands), Ph is real Gross Domestic Product per head (thousands of dollars at 1990 prices and exchange rates) and rph is the ranking position of ph, in descending order among 103 European regions, according to Guisan and Aguayo(2001).

In table 1 we can see that several regions belong to the group of Top 25 EU regions in Gdph, being the highest positions those of Lombardia with ranking number 9, Emilia-Romagna with 11, and Valle d´Aosta with ranking 12. Another regions, such as Piemonte, Liguria, Trentino-Alto Adige, Veneto, Friuli-Venezia Giulia, and Lazio, also belong to this group of Top 25 EU regions.

Besides that Graph 5 show the relation between Value-Added, at basic prices, per inhabitants (Ecus at 1998 prices) and the percentage of population with secondary and higher education, according to EU statistics.

Graph 5. Regional VT98H and Educational Level



There is an important positive correlation, of 0.52, between both variables, with the regions of Campania, Umbria and Sicilia clearly below the levels that correspond to the average behaviour, and that could be explained by several factors in a more detailed study, such as the structure of age of population and the relative importance of Agriculture in past decades, as well as the average level of education not only at present but also during past decades.

Table 2. Density of Population and Non Agrarian Employment

		DENSITY OF POPULATION				
		>300	200-300	100-200	50-100	<50
DENSITY OF NON AGRARIAN EMPLOYMENT	100-300	Lombardia (158/373) Lazio (113/302) Liguria (113/307) Campania (113/302)	Veneto(100/241)			
	50-100		Puglia(57/210)	Emilia-Romagna(74/177) Piemonte(68/169) Toscana(61/153) Friuli-Venezia(59/152) Marche(57/121) Sicilia(52/197)		
	25-50			Abruzzo(37/117) Calabria(32/138)	Umbria(36/97) Trentino-Alto Adige(30/67) Molise(21/75) Sardegna(20/69)	
					Basilicata(16/61)	Valle d'Aosta (16/36)

Density of non agrarian employment

Liguria, Lombardia, Veneto, Lazio and Campania, with more than 100 non agrarian employments per squared Kilometre occupied the highest positions in 1995, while Abruzzo, Basilicata, Calabria, Molise, Trentino-Alto Adige, Sardegna, Umbria and Valle d'Aosta,

with less than 50 non agrarian employments per squared Kilometre, showed the lowest densities among Italian regions.

Between densities of non agrarian employment of 50 and 100, around the Italian average of 68, are the following regions: Emilia-Romagna (75), Piemonte(69), Toscana(61), Friuli-Venezia Giulia(60), Marche(58), Puglia(57) and Sicilia(52).

Density of population

The first group is formed by the regions with high densities of population, higher than 225 inhabitants per squared Kilometre: Campania, with 423, occupies the first position, followed by Lombardia with 373, Liguria with 307, Lazio with 302 and Veneto with 241.

The second group, with population densities around the Italian average of 190 inhabitants per squared Kilometre, consists of the following regions: Puglia with 210, Sicilia, with 198, Emilia-Romagna with 177, Piemonte with 169, Toscana with 153 and Friuli-Venezia Giulia with 152.

The third group consists of the regions with population densities lower than 150 inhabitants per Km^2: Marche with 149, Calabria with 138, Abruzzo with 117, Umbria with 97, Molise with 75, Sardegna with 69, Trentino-Alto Adige with 67, Basilicata with 61. The last region is Valle d'Aosta with 36 inhabitants per Km^2.

Density of non agrarian Value-Added

The top positions, with densities of non agrarian Value-Added higher than 4000 thousands of US$ per Km^2 are occupied by the following regions: Lombardia with 8647, Liguria with 6135, Lazio with 5891, Campania with 4850 and Veneto with 4688.

The second group consist of regions with density of non agrarian Value-Added between 2500 and 4000 thousands of US$

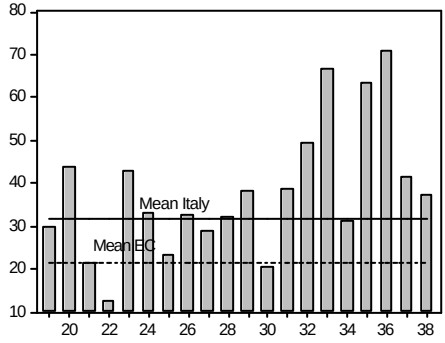
per Km^2, and includes the following ones: Emilia-Romagna with 3704, Piemonte with 3534, Friuli-Venezia Giulia with 3076, Toscana with 2887, Marche with 2596 and Puglia with 2515.

In the third group, with density of non agrarian Value-Added lower than 2500 thousands of US$ per Km^2, are: Sicilia with 2144, Abruzzo with 1677, Umbria with 1511, Calabria with 1304 and Trentino-Alto Adige with 1287.

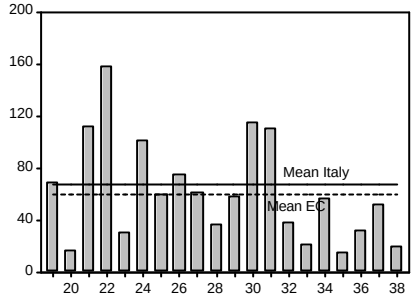
The last positions are occupied by the regions belonging to a fourth group with density of non-agrarian employment per squared Kilometre lower than 1000 thousand US$: Molise with 906, Sardegna with 834, Valle d'Aosta with 761 and Basilicata with 611.

Graphs 6 and 7 show the rates of agrarian and non-agrarian employment of Italian regions in comparison with Italian and EU averages, according to Guisan et al(2001), while graph 8 presents a comparison of densities of population and graph 9 shows the high positive correlation between the densities of population and non-agrarian employment. We include also three maps which represent regional densities of non agrarian employment, population and Value-Added.

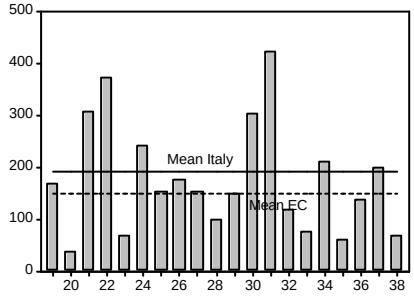
Graph 6. Rate of agrarian employment in regions of Italy, 1995



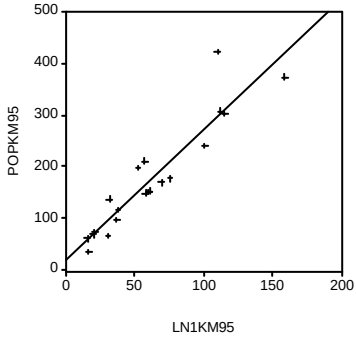
Graph. 7. Density of non agarian employment in regions of Itlaly, 1995
(employed per km2)



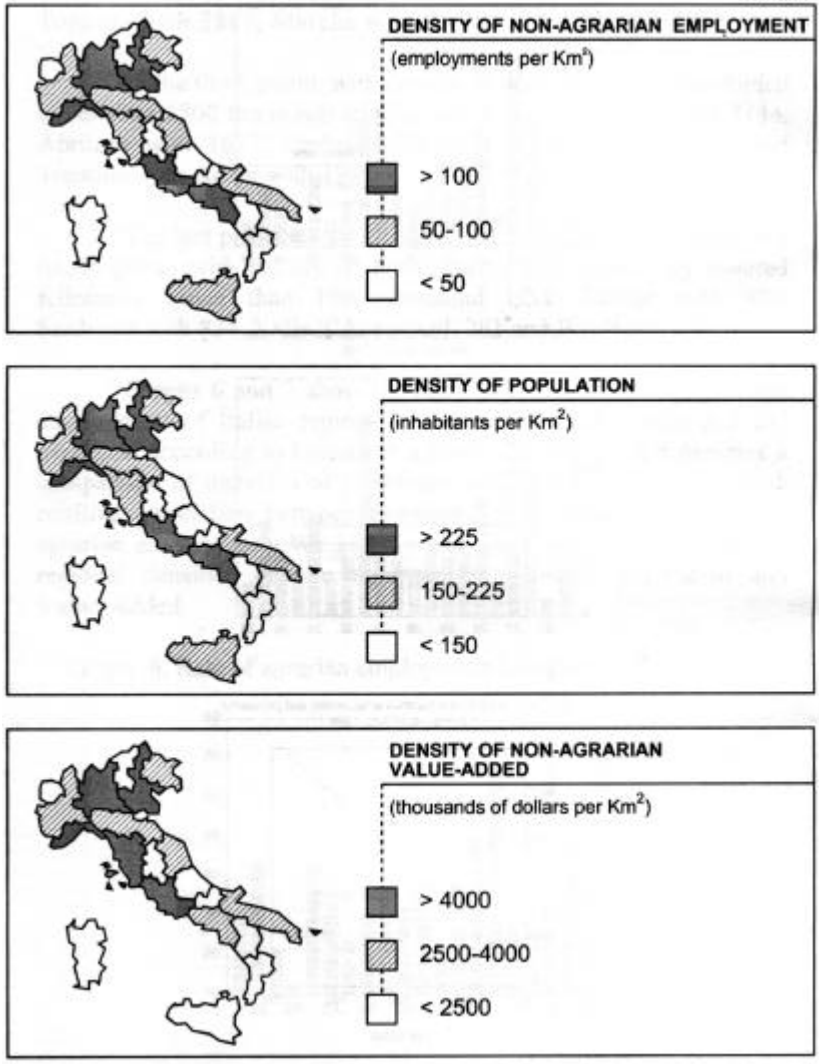
Graph.8. Density of population in regions of Italy, 1995
(inhabitants per Km2)



Gaph. 9. Density of non agrarian employment and population
in regions of Italy, 1995



ITALY


DENSITY OF NON-AGRARIAN EMPLOYMENT
(employments per Km²)
> 100
50-100
< 50
DENSITY OF POPULATION
(inhabitants per Km²)
> 225
150-225
< 150
DENSITY OF NON-AGRARIAN VALUE-ADDED
(thousands of dollars per Km²)
> 4000
2500-4000
< 2500

3. Regional Tourism

Table 3 presents the rankings of Italian regions among 100 European regions of former CEE12 countries, and the following data of tourism in Italian regions in 1995:

Ons = overnight stays in thousands.

Onsh = overnight stays, in units, per one thousand inhabitants.

Onshn = equal to Onsh, but only from national origin.

Onshx = equal to Onsh, but only from foreign origin.

Onskm = overnight stays, in units, per squared kilometre.

Rons = ranking of Ons, in descending order among 100 EU regions.

Rohsh =ranking of Onsh, in descending order among 100 EU regions

Some Italian regions occupy very high position in the ranking of tourists overnight stays, both in absolute values and in the ratio of this variable with regional population.

Six Italian regions belong to the Top 20 regions on the ranking position of overnight stays: Trentino-Alto Adige, Emilia Romagna, Veneto, Toscana, Lombardia and Lazio.

In the values of Ons the highest positions correspond to Trentino-Alto Adige with more than 30 millions of overnight stays at hotels, with a ranking number of 5 among 100 European regions, followed by Emilia-Romagna with almost 29 millions and ranking 6, Veneto with more than 25 millions and ranking 7.

In the values of Onsh 7 Italian regions belong to the group of Top 20 EU regions: Valle d'Aosta, Liguria, Trentino-Alto Adige, Veneto, Emilia-Romagna, Toscana and Umbria.

Table 3. Tourist indicators for Italian regions in 1995
(thousands of overnight stays in hotels and related variables)

ITALY	ons	onsh	onshn	onshx	onskm	rons	ronsh
Piemonte	5067	1179	792	387	199	52	78
Valle d'Aosta	2630	22192	17841	4351	806	73	5
Liguria	12226	7349	5402	1947	2257	26	8
Lombardia	18416	2067	1199	868	772	17	50
Trentino-Alto Adige	30077	33099	15540	17560	2208	5	3
Veneto	25574	5783	2353	3430	1393	7	10
Friuli-Ven. Giulia	3883	3260	1767	1493	495	61	28
Emilia-Romagna	28959	7382	5636	1747	1309	6	7
Toscana	18689	5300	2852	2448	813	16	11
Umbria	3103	3773	2804	970	367	69	18
Marche	5304	3681	2794	887	547	50	21
Lazio	17137	3300	1387	1913	996	19	27
Campania	12136	2112	1162	950	893	27	49
Abruzzo	3333	2629	2278	352	309	66	34
Molise	304	916	833	84	69	100	88
Puglia	4391	1077	963	114	227	55	82
Basilicata	511	836	759	77	51	98	95
Calabria	3066	1477	1378	99	203	70	68
Sicilia	8136	1601	943	657	316	37	65
Sardegna	5090	3067	2454	613	211	51	30

Note: "onsh" is the ratio between overnight stays and population, in units per one thousand inhabitants, while onshn and onshx are similar ratios for ons from national and foreign origin. "onskm" is the number of overnights per Km^2 in the year 1995. "rons" is the ranking position in overnight stays and "ronsh" the position in onsh, in descending order, among 100 regions of former CEE12.

Among regions southern to Lazio, the highest values of Ons correspond to Campania with more than 12 millions and Sicilia with 8 millions.

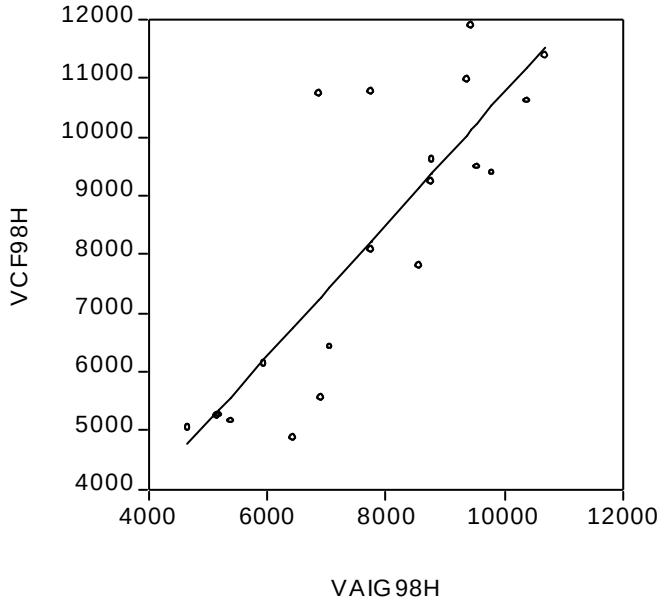
4. Regional distribution of Value-Added by sector.

The regional distribution of Value-Added in Industry and Government Services has a highly positive impact on regional market services and building, as it is shown in the econometric models that we present on the next section.

Here we present some graphs that show the differences among regions.

First of all Graph 10 shows the high positive correlation of market services value-added (Vcf98h) with the sum of Agriculture, Industry and Government Services (Vg98h).

Graph 10

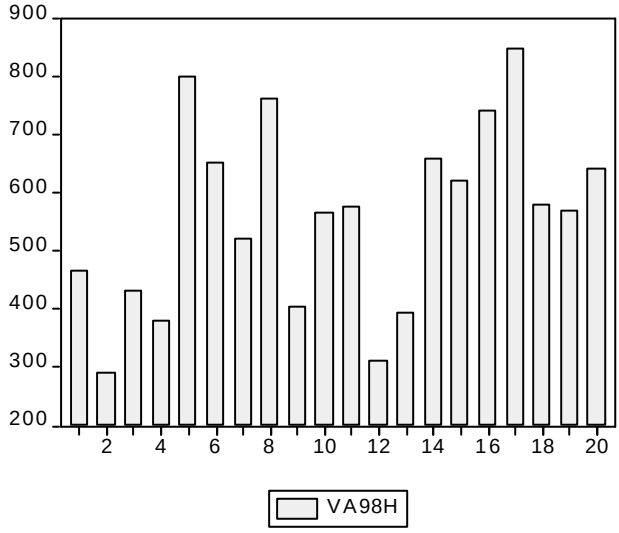


The correlation coefficient between the variables of graph 10 is equal to 0.84. The regions with highest levels of market services

Value-Added per inhabitant (Vcf98h) in comparison with expected according to the value of Vaig98h, where Liguria and Emilia-Romagna. This discrepancy could be related with the effect of tourism.

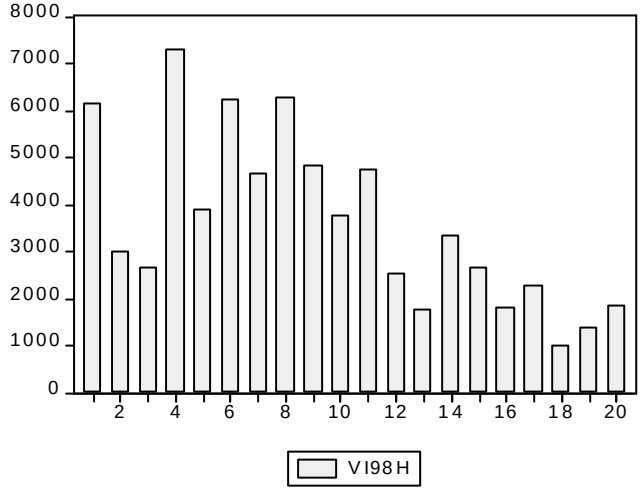
Besides that graphs 11 to 15 present the regional distribution of Value-Added by sector. The order of regions is the same of table 1.

Graph 11. Value-Added of Italian regions in 1998: Agriculture
(Ecus per inhabitant at 1998 prices)

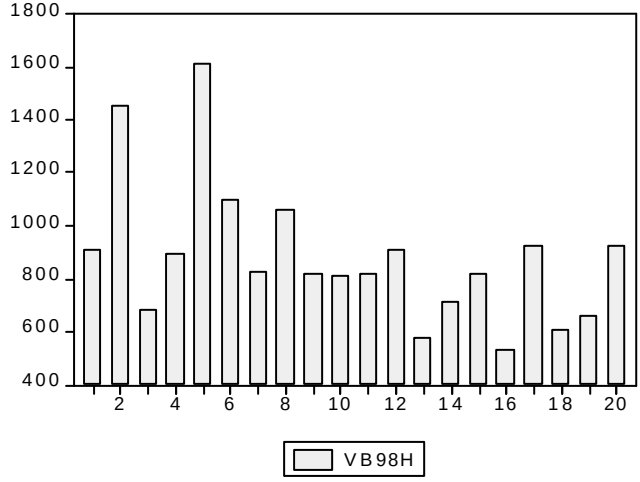


We can observe that the most outstanding regions in Value-Added per inhabitant of Agriculture are Basilicata, Trentino-Alt Adige, Emilia Romagna, Puglia, Abruzzo, Veneto, Sicilia and Molise, while the lower values correspond to Valle d´Aosta and Lazio.

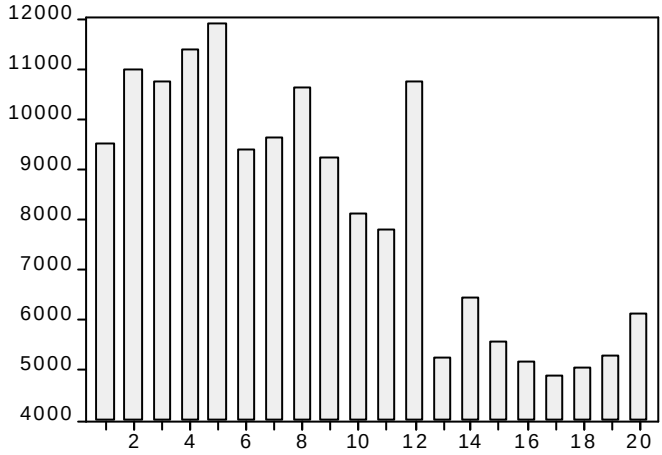
Graph 12. Value-Added of Italian regions in 1998: Industry
(Ecus per inhabitant at 1998 prices)



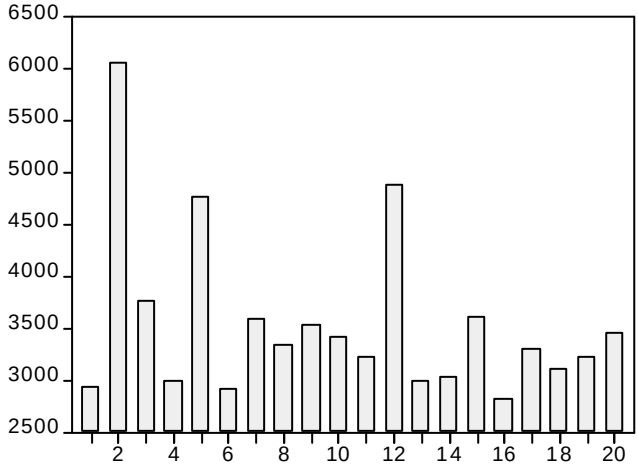
Graph 13. Value-Added of Italian regions in 1998: Building
(Ecus per inhabitant at 1998 prices)



Graph 14. Value-Added of Italian regions in 1998: Commercial and Financial Services ((Ecus per inhabitant at 1998 prices)



Graph 15. Value-Added of Italian regions in 1998: Government and Social Services ((Ecus per inhabitant at 1998 prices)



The differences in Industry are very big, with several Northern regions with more than 4000 dollars of industrial Value-Added per inhabitant while all Southern regions are below that value.

The most outstanding regions in the value of Vi98h are Lombardia, Piemonte, Veneto, and Emilia Romagna, followed by Friuli-Venetia Giulia, Toscana and Marche.

Tourism intensity, in relation with population, shows an important positive influence on Building and so the most outstanding regions in Value-Added of Building per inhabitant where in 1998 Trentino-Alt Adige and Valle d'Aosta.

5. Econometric models of regional development

Equations 1.1 and 1.2 present a linear relation between the rate of non-agrarian employment per one thousand inhabitants, and non-agrarian Value-Added per inhabitant of Italian regions. Equation 1.1 does not allow for differences in parameters across regions while equation 1.2 includes some dummies for allowing differences in intercept.

Equation 1.1. Model for LNA98H without dummies.

Dependent Variable: LNA98H Method: Least Squares Included observations: 20				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
VNA98H	16.05086	0.933094	17.20177	0.0000
C	100.1816	15.67216	6.392330	0.0000
R-squared	0.942657	Mean dependent var		360.7199
Adjusted R-squared	0.939471	S.D. dependent var		73.19667
S.E. of regression	18.00826	Akaike info criterion		8.714178
Sum squared resid	5837.356	Schwarz criterion		8.813751
Log likelihood	-85.14178	F-statistic		295.9009
Durbin-Watson stat	1.335611	Prob(F-statistic)		0.000000

Equation 1.2. Model for LNS98H with dummies

Dependent Variable: LNA98H
Method: Least Squares
Included observations: 20

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DVNAH	9.016947	2.723721	3.310525	0.0052
LNA85H	0.896940	0.043702	20.52395	0.0000
D2	-45.78234	11.51682	-3.975260	0.0014
D5	-61.15155	14.88275	-4.108888	0.0011
D6	19.57279	12.12680	1.614011	0.1288
D20	22.58004	11.09397	2.035344	0.0612

R-squared	0.983758	Mean dependent var	360.7199
Adjusted R-squared	0.977957	S.D. dependent var	73.19667
S.E. of regression	10.86745	Akaike info criterion	7.852746
Sum squared resid	1653.420	Schwarz criterion	8.151466
Log likelihood	-72.52746	Durbin-Watson stat	2.065122

V_iH= Value-Added per inhabitant of each sector, in the years 1998 and 1985, measured in dollars at 1990 prices and exchange rates, using the income approach, as to say using Consumption Price Index for deflating.

i=A, B, C, F, G, I, corresponds to Agriculture, Building, Commercial and Financial services, Government and social services and Industry. NA means non agrarian and NG non government.

Equations 2, 3 and 4 present, respectively, estimations for explaining the regional levels of Value-Added per inhabitant in Commercial and Financial services (C and F), Building (B), and the Group of Government and Social Services (G).

Equation 2. Model for Value-Added of sectors C and F

Dependent Variable: VCF98H
Method: Least Squares
Included observations: 20

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DVAIH	0.694854	0.099157	7.007631	0.0000
DVGH	0.130253	0.157773	0.825574	0.4252
ONSH/1000	19.57931	14.23482	1.375452	0.1941
VCF85H	1.290423	0.043316	29.79119	0.0000
DVBH	1.701776	0.390118	4.362205	0.0009
D10	1196.315	305.1819	3.920007	0.0020
D18	1121.130	314.8261	3.561110	0.0039
D20	990.3768	308.9646	3.205470	0.0076

R-squared	0.994064	Mean dependent var	10064.75
Adjusted R-squared	0.990602	S.D. dependent var	3069.042
S.E. of regression	297.5297	Akaike info criterion	14.51808
Sum squared resid	1062287.	Schwarz criterion	14.91637
Log likelihood	-137.1808	Durbin-Watson stat	1.818319

Equation 3. Model for Value-Added in Building Sector

Dependent Variable: VB98H
Method: Least Squares
Included observations: 20

Variable	Coefficient	Std. Error	t-Statistic	Prob.
VAIS98H	0.026147	0.005227	5.002184	0.0002
VG98H	0.102228	0.024288	4.209055	0.0009
ONSH/1000	19.68061	3.572974	5.508186	0.0001
D3	-342.3102	111.6961	-3.064658	0.0084
D6	255.5414	117.9294	2.166901	0.0480
D17	340.2713	114.0898	2.982486	0.0099

R-squared	0.921246	Mean dependent var	1084.269
Adjusted R-squared	0.893119	S.D. dependent var	330.6374
S.E. of regression	108.0941	Akaike info criterion	12.44721
Sum squared resid	163580.5	Schwarz criterion	12.74593
Log likelihood	-118.4721	Durbin-Watson stat	1.664390

Equation 4. Model for Value-Added in Government Sector

Dependent Variable: VG98H
Method: Least Squares
Included observations: 20

Variable	Coefficient	Std. Error	t-Statistic	Prob.
VG85H	1.815357	0.047525	38.19824	0.0000
DVNGH	0.110821	0.026937	4.114111	0.0011
D2	3080.478	186.1055	16.55232	0.0000
D5	608.8879	202.6142	3.005159	0.0095
D7	-710.4227	185.8483	-3.822595	0.0019
D19	423.8640	186.9981	2.266675	0.0398

R-squared	0.976491	Mean dependent var	4356.052
Adjusted R-squared	0.968095	S.D. dependent var	989.9593
S.E. of regression	176.8261	Akaike info criterion	13.43154
Sum squared resid	437744.6	Schwarz criterion	13.73026
Log likelihood	-128.3154	Durbin-Watson stat	2.235746

TSLS Equation 3 for Value-Added of sectors C and F

Dependent Variable: VCF98H
Method: Two-Stage Least Squares
Included observations: 20

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DVAIH	0.697928	0.099547	7.011029	0.0000
DVGH	0.085922	0.160307	0.535981	0.6018
ONSH/1000	22.76409	14.40303	1.580507	0.1400
VCF85H	1.301709	0.043940	29.62447	0.0000
DVBH	1.596713	0.396816	4.023816	0.0017
D10	1203.094	306.3534	3.927143	0.0020
D18	1134.374	316.0881	3.588790	0.0037
D20	1001.838	310.1868	3.229789	0.0072

R-squared	0.994019	Mean dependent var	10064.75
Adjusted R-squared	0.990531	S.D. dependent var	3069.042
S.E. of regression	298.6502	Sum squared resid	1070303.
Durbin-Watson stat	1.791725		

TSL Equation 4 for Value-Added of Building

Dependent Variable: VB98H
Method: Two-Stage Least Squares
Included observations: 20

Variable	Coefficient	Std. Error	t-Statistic	Prob.
VAIS98H	0.026133	0.005227	4.999444	0.0002
VG98H	0.102251	0.024288	4.209981	0.0009
ONSH/1000	19.69158	3.573077	5.511098	0.0001
D3	-342.1992	111.6965	-3.063651	0.0084
D6	255.7205	117.9303	2.168403	0.0478
D17	340.3607	114.0901	2.983261	0.0099

R-squared	0.921246	Mean dependent var	1084.269
Adjusted R-squared	0.893119	S.D. dependent var	330.6374
S.E. of regression	108.0942	Sum squared resid	163580.9
Durbin-Watson stat	1.664348		

TSLS Equation 5 for Value-Added of Government Services

Dependent Variable: VG98H
Method: Two-Stage Least Squares
Included observations: 20

Variable	Coefficient	Std. Error	t-Statistic	Prob.
VG85H	1.817305	0.047766	38.04602	0.0000
DVNGH	0.109585	0.027108	4.042618	0.0012
D2	3078.992	186.1548	16.53995	0.0000
D5	612.7364	202.8474	3.020677	0.0092
D7	-709.5772	185.8737	-3.817523	0.0019
D19	421.7606	187.0827	2.254407	0.0407

R-squared	0.976488	Mean dependent var	4356.052
Adjusted R-squared	0.968090	S.D. dependent var	989.9593
S.E. of regression	176.8394	Sum squared resid	437810.4
Durbin-Watson stat	2.230394		

Instrument list: VA85H VI85H VB85H VCF85H VG85H D10 D18 D20 D3 D6 D17 D2 D5 D7 D19 ONSH/1000 VA98H VI98H

Besides V_iH the models include the variable ONSH/1000, as a tourism indicator, and variables D1 to D20 representing regional dummies. DV_iH means the increase of real value-added per inhabitant during 1985-98.

This system of equations has interdependent relations, and because of that we present the two stage least squares, TSLS, estimations besides the Least Squares, LS, estimations. This similarity happens because the main inter-sector relations are unilateral, from Industry, Tourism and Government, to Building and Market Services, although these to sectors have some degree of bilateral dependence.

Some interesting comments from these results are the following:

1) The goodness of fit is very good in all the equations, and the coefficients show generally correct signs and significant coefficients.

2) The estimations by LS and TSLS are very similar, although TSLS coefficients have better statistical properties in case of interdependence.

3) The increase in Value-Added of Agriculture, Industry and Building, shows a significant an positive effect of Value-Added of Commercial and Financial Sector, while the increase and Value-Added of Government and Social Services and the indicator of Tourism Activity, shows a positive effect although non significant.

4) All these explanatory variables show a positive and significant effect on Value-Added of Building Sector.

5) Value-Added of Government and Social Services depends more on past values of this variables and general criteria of distribution than on the increase of Value-Added of non-government sectors, DVNG, in the own region, although this last variable seems

to have an average impact of 11% on the explained variable of equation 4.

According to Guisan, Cancelo, Aguayo and Diaz(2001) the Central regions of European Union, including Northern Italy have a high degree of industrial activity with more than 4 thousand dollars per inhabitant of Value-Added in this sector at 1990 prices, and values generally between 4 and 9 thousand dollars per inhabitant, while European Union Southern periphery, including many Southern regions of Spain, Portugal Italy and Greece, have generally values of Value-Added in Industry between 1 and 3 thousand dollars at 1990 prices.

The low level of industrial production implies generally a low level of development of services, specially in regions with low levels of Tourism and/or Government Services.

6. Conclusions

1) The econometric results explain how the differences in regional distribution of Industry, Government Services and Tourism, affect to the regional differences in market services and building activities.

2) In comparison with other EU countries, the Northern Italian regions show levels of Value-Added per inhabitant in Industry generally higher than EU average, while Southern regions are below that average.

3) Value-Added per inhabitant in Government and Social Services had a moderate value in several regions, around 3 thousand Ecus in 1998, below EU average that was 4 thousand Ecus. We can not consider excessive the level of this variable as even in the highest cases is clearly under EU maximum values that correspond to regions with near 10 thousand Ecus.

4) Although income per capita in Italy is very similar to EU average the average rate of employment is clearly under EU average,

and so it seems convenient to improve employment policies generally in all the country, and mainly in Southern regions, with more industry, more tourism and more Government and Social Services.

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[1]Information about these documents can be found at ideas.repec.org
[2]Information about these documents can be found at www.usc.es/econo met/eaa.htm