# The local impact of the crisis in a sustainable perspective: the Italian case

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*Abstract*

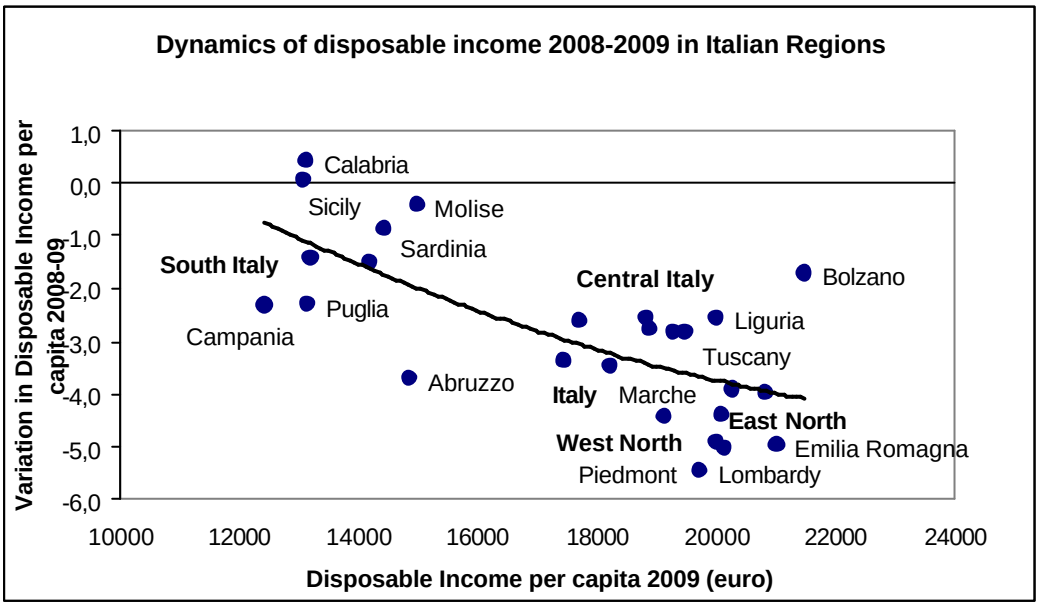
This paper aims to analyze the effects of the international crisis on the Italian regional and local territorial systems. There are two sections in the paper. The first one concerns the cyclical aspects, which will be investigated using the dynamics of added value, enterprises tendencies, exports. These variables are usually monitored in such approaches. There is also a particular focus on the labour market, where the crisis takes its effects in a second wave with some months of lag. The key variables in this case are the following: employment and unemployment public subsidies (Cassa Integrazione Guadagni in the Italian Welfare System).
The second section of the paper focuses on the evidences from a logical framework describing the territorial systems, which is called ESE Model. It includes the sustainability issues (Economy-Society-Environment Model) and is applied to the Italian provinces in order to evaluate the different responses to the crisis of different territorial approaches to local sustainable development.
The empirical evidence reveals that the structural aspects of local development (industrial production and districts in the economy pillar, infrastructure and services in the society pillar) are related with strong negative crisis effects on export, production and unemployment, but the sustainable strategies of local systems describe trajectories being more positive in the medium-long run. These dimensions are measured with a model that describes local systems not only in terms of economic factors (entrepreneurship, cost of life, profitability of enterprises), but also in terms of social issues (levels of education, crime rates, health conditions, leisure time) and environmental elements (natural heritage, air quality, waste, etc.).
At a regional level, the traditional North-South divide in Italy confirms a lower negative impact on Mezzogiorno Regions (with a low level of international openness in terms of trade-balance), but stronger and durable effects in the medium-long run development paths of southern Italy with consequences in terms of labour migration, growing unemployment rates and the closedown of businesses.

The effects of the international crisis in Italy have been strong and pervasive since 2009, since when GDP has decreased by 5%. At the regional level the impact of the crisis has been general but it has had a greater effect on the richer regions of the country.

**1. The regional impact of the international crisis in Italy**

In terms of disposable income the regions of Lombardy, Piedmont, Veneto and Emilia Romagna have experienced a decrease of more than 5%, with north-western Italy (the industrial core of Italy including the so-called "industrial triangle" of Milan-Turin-Genoa) and north-eastern Italy (the regions with industrial districts characterized by very dynamic SMEs) showing negative trends of -4.9% and -4.4%. On the other hand, central Italy (Lazio, Tuscany, Marches and Umbria) has witnessed a less marked decline in disposable income, equal to 2.8%. In an even more pronounced difference, the south of Italy (the "Mezzogiorno", characterised by a structural gap in industrial and economic development) has seen a more modest decline, of 1.4%. In some cases, we observe constant family income, as in Calabria, Sicily and Molise. The interpretation of this regionally-differentiated pattern is clear. The international crisis hits the more export-oriented and industrialized local systems harder, due to decreasing international trade, not to mention the fact that the financial system, particularly hit by the subprime and toxic bond crisis, is concentrated in the north (led by Milan).

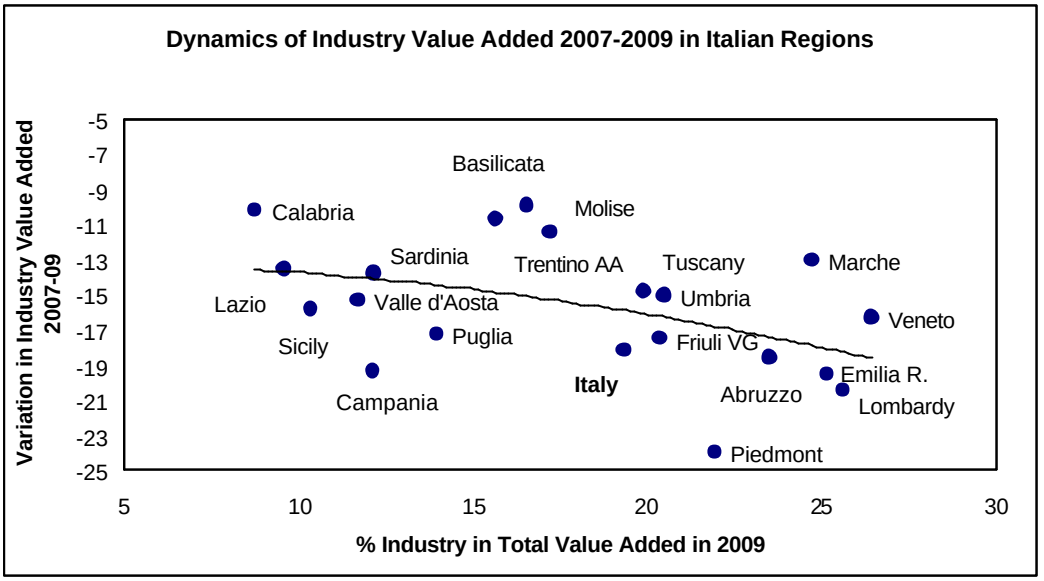
**Fig.1. The effects of crisis on Italian Regions' Family Income**




The same trend emerges when the dynamics of industrial production are analysed: the decline in industrial value added in the two years of the crisis was greater in the richer regions like Piedmont, Lombardy, Emilia Romagna and Veneto, especially in the industrial sectors such as mechanics (Emilia Romagna and Lombardy), automotive (Turin), "made in Italy" sectors (textile-clothing, wood-furniture, footwear, etc. in Veneto, Tuscany and Marches). In some sectors, such as ceramics or machine tools, we have seen decreases of more than 50% in turnover and exports (in particular for the Sassuolo area for ceramics or Reggio Emilia's machinery districts). We can observe a strong correlation between the higher share of industry in total value added and a decrease in industrial production. Indeed, in the southern regions with lower

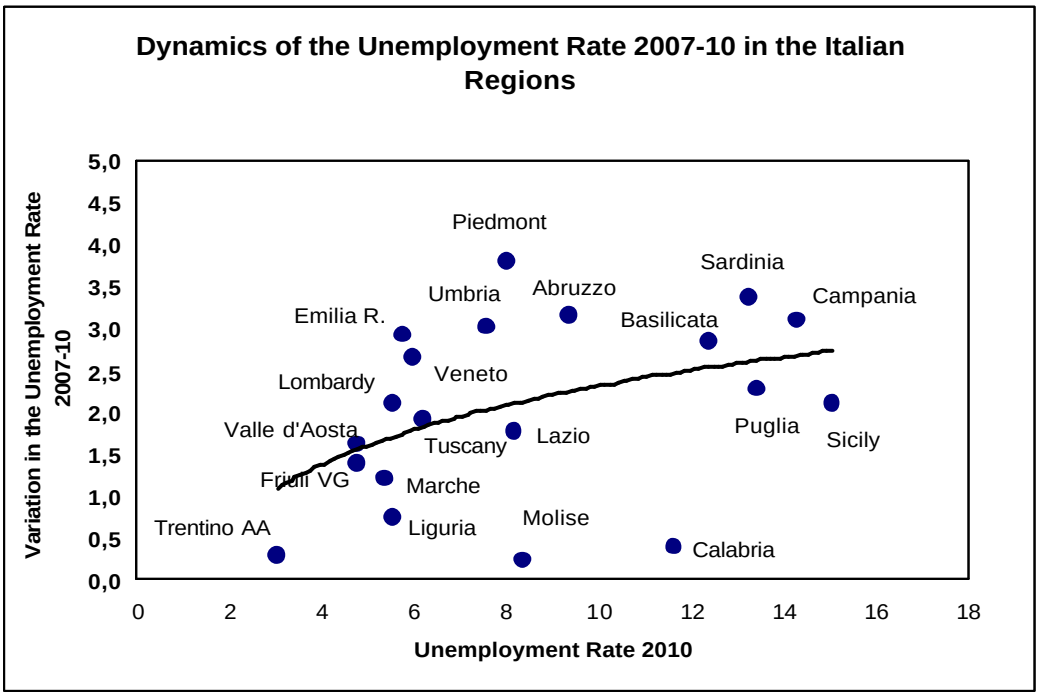
levels of industrialization (Calabria, Sardinia, Sicily, Basilicata, in which the proportion of industry is 10-15% of local GDP), smaller effects of the recession emerge, with the exception being the Campania region (Naples) where some industrial areas are present (aerospace and textiles).

**Fig.2. The effects of crisis on Italian Regions' Industrial Production**




The perspective changes radically when we analyse the impacts of the international downturn in terms of employment and in the medium term. Indeed if the first shock (2008-2009) struck the Northern industrialized regions of Italy in particular, there is evidence that the less developed Southern Italy regions could be strongly hit in the medium to long run.

**Fig.3. The effects of crisis on Italian Regions' Unemployment Rate**



The Unemployment rate in these regions increases in effect from an already very high level, reaching in some cases more than 10%, such as in Sicily, Campania and Puglia (respectively, 15%, 14.3% and 13.4%). The dramatic change in unemployment should however also be noted in Piedmont, as a consequence of the automotive crisis, and in Emilia Romagna because of the recession in the machinery sector with increases in the unemployment rate of 3.8 and 2.9 percentage points, respectively.

This negative dynamic was however moderated by public subsidies (CIG). The Cassa Integrazione Guadagni (CIG) fund is an institution required by Italian law, consisting of a financial benefit (paid by INPS) for workers suspended from undertaking work. The underlying objective is to help companies in temporary difficulty, by paying for the cost of workers that they currently can't employ. In the years 2007-2010, we observe a radical increase in the use of this subsidy-to-firms tool, with a percentage change higher than 500%, especially in some Northern Regions such as Piedmont, Lombardy, Trentino Alto Adige, Friuli Venezia Giulia and Emilia Romagna, but also in some Southern Regions such as Calabria, Sicily and Puglia. It is only thanks to this public intervention that the decline in employment has been able to be kept in check, with a lower social impact on families and workers.

**Table.1: The effects of crisis on Italian Regions**

| | Disposable Income per capita, euro 2009 | % Change in Disposable Income 2008-2009 | % Change Industry Value Added 2007-2009 | % Industry in Total VAdded 2009 | % Change CIG Fund 2007-2010 | Unempl. Rate % 2010 | Absolute Change in Unemploy-ment Rate 2007-2010 | % Change Employees 2007-2009 |
|---|---|---|---|---|---|---|---|---|
| **Piedmont** | 19,717 | -5.47 | -24.03 | 21.92 | 549.00 | 8.02 | 3.79 | -0.77 |
| **Valle d'Aosta** | 20,814 | -3.99 | -15.34 | 11.70 | 13.70 | 4.80 | 1.62 | -1.16 |
| **Lombardy** | 20,122 | -5.05 | -20.43 | 25.63 | 792.53 | 5.53 | 2.10 | -0.93 |
| **Trantino A.Adige** | 20,375 | -2.27 | -10.73 | 15.65 | 215.89 | 3.03 | 0.30 | 1.60 |
| **Veneto** | 19,123 | -4.44 | -16.36 | 26.42 | 998.20 | 5.99 | 2.65 | -1.16 |
| **Friuli-Ven.Giulia** | 20,254 | -3.93 | -17.56 | 20.35 | 822.27 | 4.80 | 1.38 | -2.22 |
| **Liguria** | 19,999 | -2.56 | -13.82 | 12.13 | 224.65 | 5.55 | 0.73 | -1.15 |
| **Emilia-Romagna** | 21,014 | -4.98 | -19.50 | 25.15 | 1,802.60 | 5.78 | 2.92 | -0.17 |
| **Tuscany** | 19,472 | -2.82 | -14.86 | 19.91 | 586.90 | 6.21 | 1.91 | 0.28 |
| **Umbria** | 17,716 | -2.61 | -15.12 | 20.49 | 1,079.80 | 7.58 | 3.02 | -2.81 |
| **Marches** | 18,215 | -3.46 | -13.08 | 24.74 | 991.32 | 5.37 | 1.20 | -1.06 |
| **Lazio** | 18,833 | -2.57 | -13.59 | 9.57 | 399.03 | 8.16 | 1.78 | -0.66 |
| **Abruzzo** | 14,861 | -3.70 | -18.61 | 23.51 | 346.75 | 9.36 | 3.14 | -2.83 |
| **Molise** | 14,987 | -0.41 | -11.49 | 17.22 | 396.00 | 8.34 | 0.24 | -1.47 |
| **Campania** | 12,432 | -2.33 | -19.35 | 12.12 | 187.64 | 14.33 | 3.10 | -5.33 |
| **Puglia** | 13,159 | -2.29 | -17.26 | 13.95 | 439.60 | 13.44 | 2.27 | -3.38 |
| **Basilicata** | 14,187 | -1.49 | -9.98 | 16.54 | 249.47 | 12.39 | 2.85 | -2.34 |
| **Calabria** | 13,130 | 0.42 | -10.19 | 8.73 | 144.69 | 11.63 | 0.39 | -2.57 |
| **Sicily** | 13,063 | 0.05 | -15.84 | 10.35 | 152.02 | 15.05 | 2.10 | -1.13 |
| **Sardinia** | 14,421 | -0.87 | -13.84 | 12.19 | 186.99 | 13.25 | 3.37 | -2.81 |
| **Italy** | 17,433 | -3.38 | -18.18 | 19.34 | 555.18 | 8.30 | 2.20 | -2.81 |

Source: Istat, Inps

## 2. The Italian local Systems from a sustainability perspective

Using a sustainable local development model, the evidence of the effects of the crisis shows new interpretation perspectives. The ESE model used for the description of the socio-economic areas (Rizzi-Dallara 2011), is able to define the components of competitiveness and sustainable development of territorial systems. It is based on indicators that measure the economic, social and environmental performance of local systems. To make the analysis of competitiveness and sustainability, it is therefore necessary to use synthetic indicators, which are statistically robust. Hence the need to use statistical methods (principal component analysis) which aggregate elementary variables into macro-variables, which are more manageable and useful in interpreting the dynamics of development in local contexts (Dallara-Rizzi 2008, 2009).

In particular in the dimension of Economy, through the principal components analysis, there were obtained synthetic province-wide macro-variables on the economic structure, economic performance and economic strategies (Table 2).

**Table 2: The variables in the Economy Pillar**

| *Macro-variables* | *Indicators* | *Elementary Variables* |
|---|---|---|
| **Economic Structure** | Enterprises and employees | Average size of enterprises |
| | | Local district units |
| | | Enterprises life period |
| | | % of high-tech enterprises |
| | | Production specialization |
| | | Debt/equity of firms |
| | Labour market | Unemployment rate |
| | | Female activity rate |
| | | Firms' labour cost/value added |
| | Credit system | Interest rate |
| | Economic infrastructures | Infrastructures Index |
| **Economic Performance** | Entrepreneurial birth rate | Average growth rate |
| | Enterprise financial statements | Return on Equity |
| | | Gross operating margin/Finance charges. |
| | Internationalization | Export Propensity |
| | | FDI inflow |
| **Economic Strategies** | Innovation | Number of patents (by European Patent Organisation) |
| | Networking | % Team operators/total territory operators |
| | Internationalization | FDI outflow |

In the Society dimension, social structure comprises the variables of demography and human capital, social performance refers to the conditions of the population's health, and the social strategies are derived from variables related to personal and relational strategies (Table 3).

The third dimension that characterizes local systems is the Environment, which consists of "state", "pressure", "response", according to the setting established at the international level. The structural dimension defines the "state" of the environment of the territorial system (emissions and natural heritage), the dimension of performance refers to "pressure" generated by the activities of individuals and the community, the strategic dimension is then configured as a "response" and includes the strategies adopted locally by public administrators, businesses and individuals to contain the activities of pressure on the environment and to safeguard and protect natural resources and environmental (Table 4).

**Table 3: The variables in the Society Pillar**

| *Macro-variables* | *Indicators* | *Elementary Variables* |
|---|---|---|
| **Social Structure** | Demography and human resource | Concentration Residents index |
| | | Demographic dependency index |
| | | Graduates from other provinces or abroad |
| | | Graduates' Employment rate |
| | Culture | Education facilities index |
| | | Culture and entertainment facilities index |
| | | Number of cultural plays |
| | | Cultural Events Tickets sold |
| | | Cultural expenditure pro capita |
| | Leisure time | Number of sporting associations |
| | | Number of operators in sporting associations |
| | | Number of sportsmen in sporting associations |
| | Health | Hospital stay per physician |
| | | Average hospital stay |
| | | Rate of Hospital beds used |
| | | Health facilities index |
| **Social Performance** | Health performance | Death rate for cancer |
| | | Rate of HIV/AIDS affected |
| | | Death rate for cardiovascular disease |
| | Demography | Natural growth rate of residents |
| | | Life expectancy |
| | | Net migration rate |
| **Social Strategies** | Relations strategies | Crime rate |
| | | Number of abortions |
| | | Number of volunteers |
| | Individual strategies | Number of suicides / population |
| | | Number of divorces / population |

**Table 4: The variables in the Environment Pillar**

| *Macro-variables* | *Indicators* | *Elementary Variables* |
|---|---|---|
| **Environment Structure (State)** | Natural heritage | Urban green areas |
| | Emissions | PM 10 concentrations |
| | | Nitrogen dioxide concentrations |
| **Environment Performance (Pressure)** | Pressure | Circulating vehicles |
| | | Urban waste |
| | | Unauthorized building |
| | | Home power consumption |
| | | Fuel consumption |
| **Environment Strategies (Response)** | Public Response | Air monitoring system |
| | | Separate waste collection |
| | | Cycle paths |
| | | Restricted access areas |
| | | Pedestrian areas |
| | | Waste water treatment |
| | Private Strategies | ISO 14000 certified industries |

In this way we obtain nine macro-variables with principal component analysis, three from each dimension. Based on the value taken by each macro-variable it is possible to measure the relative position of each geographical area and assess their competitiveness in terms of not only economic but also social and environmental factors. With these nine macro-variables, it is also possible to apply a criterion of geographical clustering (non-hierarchical k-means method), which integrates the analysis of local systems with indicators of economic, social, and environmental development. We can now calculate the ESE index of sustainable competitiveness

(always with principal components) for each of the 11 clusters into which the Italian provinces are divided (Table 5).
This index reaches the highest value in cluster 10, "Frontiers of sustainability", as the cluster that combines more factors of competitiveness (4th in GDP pc) and sustainability, able to excel simultaneously in both economic and social aspects without neglecting the role of the ecological system. This cluster contains the provinces in the Alps but also maritime cities such as Ancona and Trieste.

In second place, the cluster "Intermediate areas" characterized by the middle position in all ESE macro-variables: these are areas that can combine the processes of production structure (6th in GDP pc) with a significant development in terms of social cohesion and ecological balance. There are areas characterized by profound processes of de-industrialization (Terni, Livorno, Savona, La Spezia) and some outliers like Syracuse and Chieti with high rankings in the social rank.

Above the national average are also positioned the "Strong open systems" (that represent the backbone of Italian industrial districts with the presence of advanced manufacturing and export-oriented Lombardy and Veneto, where, however, in the face of strong economic performance indicators imbalances emerge from a social and ecological perspective), and "Diversified systems" (able to develop a mix of economic sectors in the areas of Piedmont and Lombardy, but characterized by lower performance because of high social and environmental costs), and the "Smaller areas of the centre" (areas of Lazio and Marches, but also some outliers in Tuscany) with economic and social performance just above the southern average, but with excellent results in the ecological field.

In the sixth place are the large metropolitan areas of "International Gates", with the major Italian cities (Rome, Milan, Turin, Florence, Bologna, Genoa), which represent the access doors to the global economy and are characterized by strong competitive advantages in economic terms but negative impacts on the ecological system in terms of diseconomies of agglomeration, combined with bad social behaviour penalized in terms of high crime and congestion costs for the high density of population and business. In terms of overall sustainability, this cluster loses its ranking of first in the purely economic rank (GDP per capita).

Just below the average there is the "Dynamic North", including the provinces of the Po Valley and Tuscany with positive economic performance (3rd in GDP ranking), strong business presence and social services but the worst position in terms of environmental pressure. Further down are the territorial systems of Southern Italy, where the economic backwardness is not sufficiently compensated by the good quality of the environment and the satisfactory conditions of quality of life. It should be emphasized that the Southern areas' GDP per capita highlights a persistent structural gap (up to 40 percentage points below the national average). In contrast, the index of sustainable competitiveness emphasizes the more positive factors in a social and environmental context, with the exception of "Deep South" which includes the poorest areas of the country, particularly in Calabria and Basilicata.

**Tab.5 The Italian Provinces and the Sustainable Competitiveness Clusters**

| Clusters | Provinces | Rank GDP per capita | Rank ESA Index |
|---|---|---|---|
| **1. Diversified Systems** | Alessandria, Asti, Cremona, Cuneo, Lodi, Massa Carrara, Novara, Pavia, Pesaro-Urbino, Piacenza, Rovigo, Trento, Vercelli | 5th | 4th |
| **2. Dynamic North** | Brescia, Ferrara, Forlì, Lucca, Mantova, Modena, Parma, Perugia, Pisa, Prato, Ravenna, Reggio Emilia, Rimini, Siena | 3rd | 7th |
| **3. Strong open systems** | Ascoli Piceno, Bergamo, Bolzano, Como, Lecco, Padova, Treviso, Udine, Varese, Venice, Verona, Vicenza | 2nd | 3rd |
| **4. Intermediate Areas** | Biella, Chieti, Gorizia, Grosseto, La Spezia, Livorno, Pescara, Savona, Syracuse, Terni | 6th | 2nd |
| **5. Smaller areas of the center** | Arezzo, Imperia, L'Aquila, Latina, Macerata, Pistoia, Rieti, Teramo, Viterbo | 7th | 5th |
| **6. Sud in mid-stream** | Avellino, Bari, Benevento, Brindisi, Caltanissetta, Enna, Foggia, Isernia, Lecce, Taranto | 10th | 9th |
| **7. South Capitals** | Catania, Naples, Palermo, Caserta, Cosenza, Salerno | 9th | 11th |
| **8. Islands Cities** | Agrigento, Cagliari, Frosinone, Nuoro, Oristano, Ragusa, Sassari, Trapani | 8th | 10th |
| **9. International Gates** | Milan, Rome, Turin, Bologna, Florence, Genoa | 1st | 6th |
| **10. Frontiers of sustainability** | Ancona, Aosta, Belluno, Pordenone, Sondrio, Trieste, Verbano Cusio Ossola | 4th | 1st |
| **11. Deep South** | Campobasso, Catanzaro, Crotone, Reggio Calabria, Matera, Messina, Potenza, Vibo Valentia | 11th | 8th |

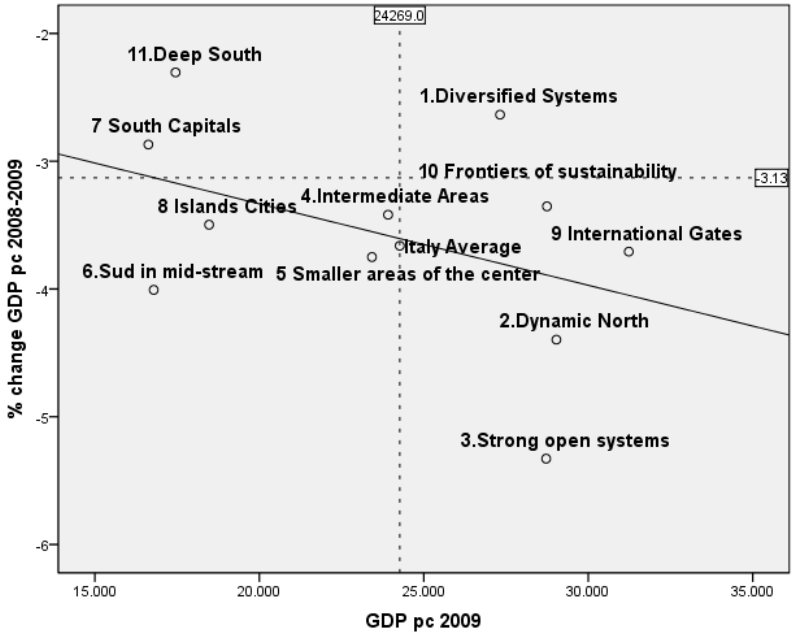
## 3. The evidence of crisis in the Italian local systems

The crisis of the Italian local systems can be analysed by some important variables enable to capture the more recent tendencies: the dynamics of GDP (negative anywhere in Italy, except some provinces, both in the Deep South (Reggio Calabria and Catanzaro), and in the extreme North (Sondrio) and in the Centre (Rieti, Lucca and Massa-Carrara); the dynamics of unemployment (anywhere positive), the trends of export (anywhere negative), the trends of Cassa Integrazione Guadagni (CIG, see above, in a previous chapter) (anywhere very very high).

### *GDP and its dynamics*

The GDP per capita (pc) aggregated in territorial clusters shows clear trends: in local systems where the higher is GDP pc the higher is the rate of reduction, on average. The same variable at provincial level shows trends not so evident and clear: in the last year provincial GDP is not linked with its dynamic. Between 2008 and 2009 in all the local systems aggregated in clusters GDP declines heavily. The worst values are registered in clusters of North Italy (cluster n.2, 3): they are clusters open to international business and dynamic clusters, with social components of territorial systems very strong in structural terms and with very good performances, but with some problems in environmental protection.

**Fig.4. The effects of crisis on Italian Local Systems' GDP pc**



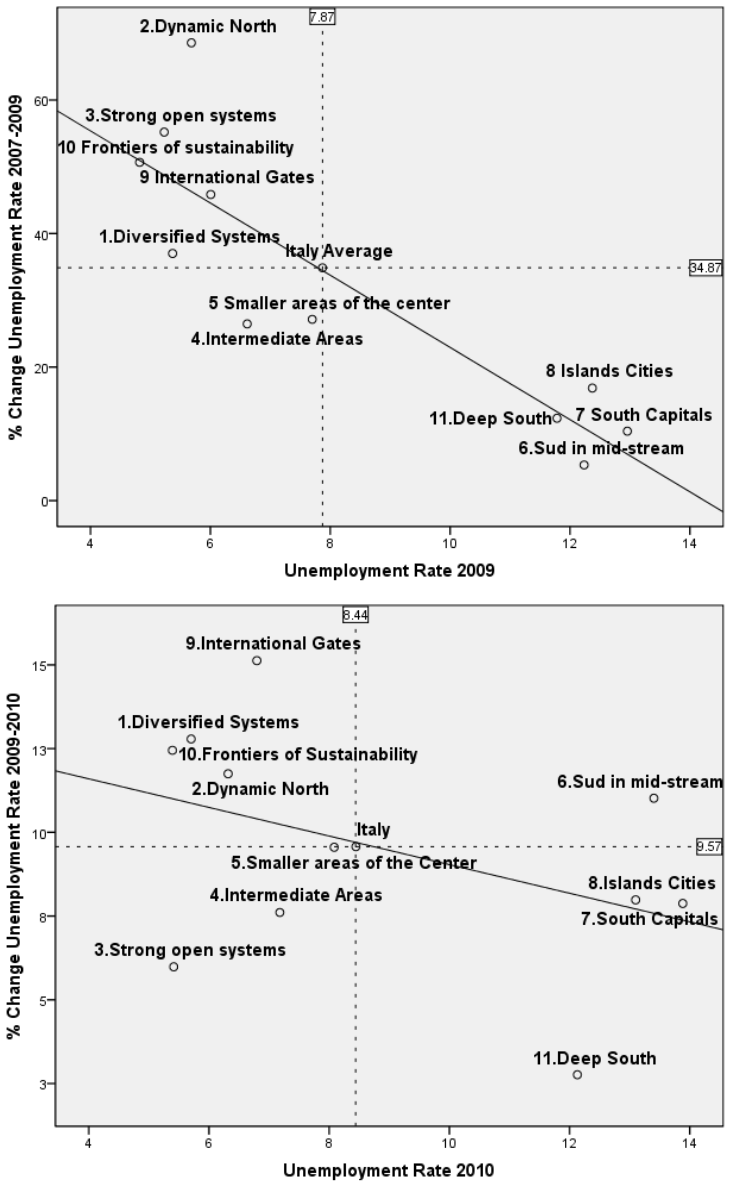

If during the crisis GDP and its dynamics are linked, but just in moderate way, the relations between the same variables (GDP and its dynamics), observed in years preceding the recent economic crisis, in 2007 and 2008, are quite non-existent.

### *Unemployment and its dynamics*

In local systems with high level of unemployment rates, during the years characterized by the recent economic crisis, the dynamics of unemployment has been minor than territories with lower levels of unemployment. Like in the relation between GDP and dynamics of GDP, also in the relation between unemployment rate and its dynamics in the years of crisis show three large groups formed by the clusters already presented: the South Italy areas (clusters n. 6, 7, 8, 11), the Centre Italy areas

(clusters n.4 and 5) and the North-Centre areas (clusters n.1, 2, 3, 9, 10). In this case the differences within each group are very small, not so for GDP.

**Fig.5. The effects of crisis on Italian Local Systems' Unemployment Rate**



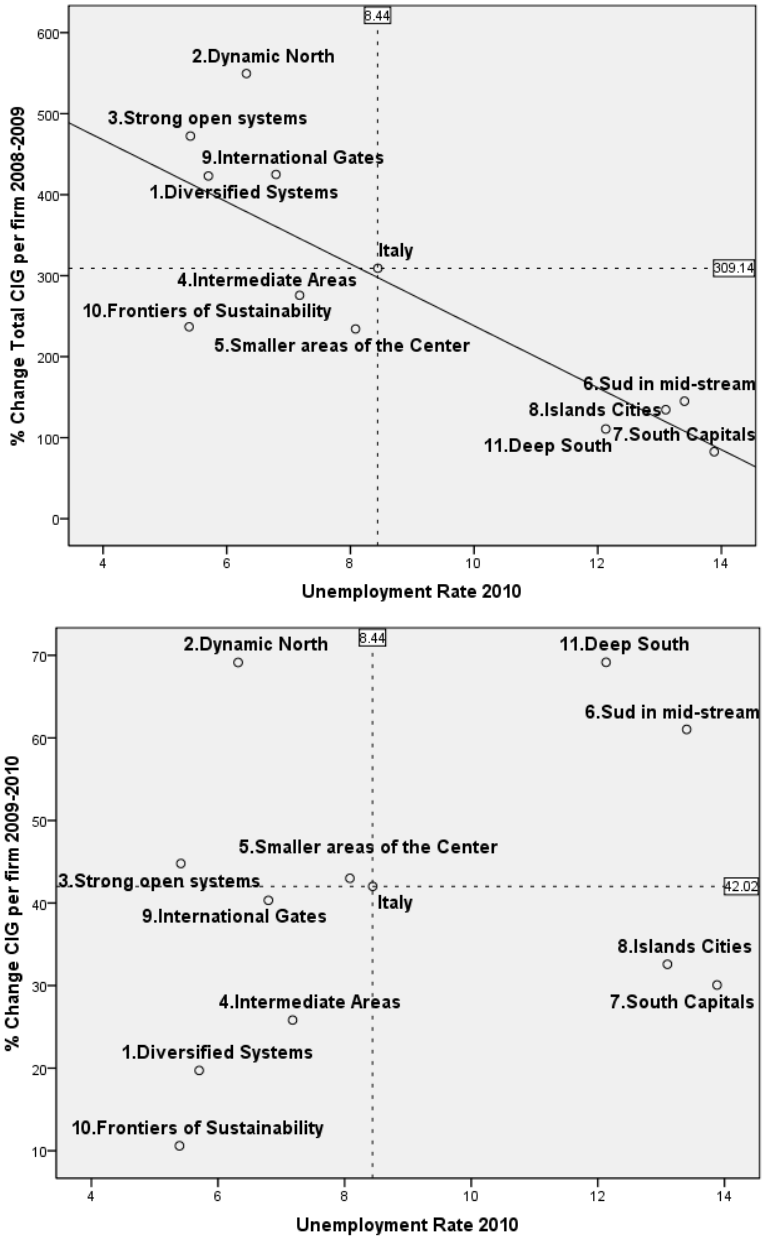

But the evidence changes in the second period (2010) when the dynamics of the Unemployment Rate in Southern clusters are greater. On the other hand the same dynamics are greater in North clusters in 2008-2009. We can say that the effects of medium period are stronger in weak areas.

***CIG and its dynamics***

The Cassa Integrazione Guadagni (CIG) fund is an institution required by Italian law, consisting of a financial benefit for workers suspended from undertaking work. The negative dynamic of the production and the employment was moderated by this kind of public subsidies. It is only thanks to this public intervention that the social impact on families and workers was limited.

In the first period (2008-2009) the dynamics of CIG were stronger in rich areas (like the decline of GDP and the increase of Unemployment Rate). But in the second period (2010) the diffusion of crisis effect is more dispersed with several South areas that utilized the public subsidies in the labor market.

**Fig.6. The effects of crisis on Italian Local Systems' CIG Change Rate**




In particular in the cluster "Frontiers of Sustainability" and "Intermediate Areas" (the more sustainability-oriented in ESA model) the dynamics of the CIG and the level of

Unemployment Rate in the period 2009-2010 results the less among the 11 clusters of Italian provinces.

***Subjective Perspective***

We can now analyse the effects of the economic downturn from the point of view of entrepreneurs in subjective perspective. The data refer to Small and Medium-Sized Italian companies (SMEs) from the annual sample survey Unioncamere-Tagliacarne (2010). For SMEs the most significant reductions in 2009 turnover are found in the "Strong Open Systems", more related to exports and hence to the sudden decrease of the international trade, the "Dynamic Areas of the North" (provinces with high per capita income of Lombardy, Emilia Romagna and Tuscany) and "Diversified Systems", despite the presence of multiple specializations. The southern regional systems (Deep South, Islands Cities, South Capitals) show a lower incidence of SMEs with turnover drops, sometimes by 20% points lower than the Northern Territory (where this percentage reaches about 70%).

The reduction of the workforce was not so dramatic: about 27% of Italian SMEs registered a decline in employees in 2009. In this case, there were no significant differences between the different clusters, or indeed there was a greater relative decrease in the dynamic metropolis and in the North.

The estimates of Italian SME changes in turnover and employees in 2010 are still negative, with 24.2% of SMEs that record further declines in sales and 21.1% decreases in employees. However, these data are less severe than the dynamics of 2009, so that the balance between companies with growth and decline in turnover is finally positive, confirming the trends of economic recovery at international levels. However, it should be noted that the employment balance is still negative (-14.1%). In 2010 the spatial cluster analysis overturns the 2009 evidence: while in richer areas of the country, characterized by the presence of an absolute majority of SMEs, about a fifth of firms show another year with a decline in orders and sales, the share is higher in weaker systems of the South (South in Mid-Stream, Island Cities, Southern Capitals).

**Tab. 6 Dynamic of turnover and employees in Italian SMEs by territorial cluster**
(SMEs % with decrease in turnover and employees 2009-2010)

| Cluster | SMEs % with Turnover decline 2009 | SMEs % with Employees decline 2009 | SMEs % with Turnover decline 2010 | SMEs % with Employees decline 2010 |
|---|---|---|---|---|
| 1.Diversified Systems | 68.8 | 29.0 | 31.4 | 22.5 |
| 2.Dynamic North | 68.8 | 30.4 | 22.1 | 23.5 |
| 3. Strong Open Systems | 68.8 | 26.4 | 22.1 | 19.6 |
| 4. Intermediate Areas | 57.6 | 25.7 | 28.0 | 24.8 |
| 5. Smaller Areas of the Centre | 59.3 | 25.3 | 20.5 | 20.2 |
| 6.South in mid-stream | 57.5 | 28.9 | 30.7 | 27.3 |
| 7.Southern Capitals | 48.7 | 28.4 | 29.7 | 24.2 |
| 8.Island Cities | 48.5 | 30.3 | 30.2 | 25.7 |
| 9.International Gates | 68.2 | 23.8 | 22.7 | 17.1 |
| 10. Frontiers of sustainability | 62.2 | 31.0 | 15.6 | 16.5 |
| 11.Deep South | 46.4 | 23.8 | 28.0 | 22.7 |
| Italy | 64.9 | 27.4 | 24.2 | 21.1 |

*Source: Unioncamere-Istituto Tagliacarne-Local Economy Laboratory*

Among the more dynamic areas emerge the cluster of Frontiers of sustainability and the International Gates, which seem more prepared to respond to the crisis in terms of both turnover and employees, but also the Strong Open Systems due to the high level of international economic recovery, especially in Eastern markets. All the more industrialized systems show positive balances between growth- and decline-companies, while all the Southern territorial systems still show negative balances. With regard to the employment forecasts, the overall balance is negative for the Italian SMEs in 2010, particularly for areas of the South in mid-stream and the Island cities However, the peculiar evidence is the real significant recovery capacity of local systems with high sustainable competitiveness. That is a good indication that local development models which are sustainability-oriented (positive balance among economic, social and environmental dimensions), are able to address the crisis in a more balanced way, trying to balance business competitiveness with social needs and ecological sustainability.

To support these findings, we have calculated the differences in the dynamics of unemployment and the CIG between clusters in the North and South Central Italy, showing how in the two crisis periods (2008-2009 and 2009-2010) the effects are reversed.
The local systems in North Italy had the dynamics of Unemployment Rate and Total CIG worse than the provinces of South and Center in the year 2008-2009, the first period of the recent crisis. On the other hand the situation changes radically in the next period 2009-2010: the same variables show the worst dynamics in South and Center Italy. In the same period the provinces of North had negative dynamics both in Unemployment and in CIG but minor than the ones in South-Center Italy. The results are also statistically significant.

**Tab.7 The differences of crisis effects on Italian Provinces**
(Mean Differences with t-test)

| **Variables** | North Italy | Center-South Italy | Means Differences | t Value |
|---|---|---|---|---|
| | n.obs. 46 | n.obs. 57 | | |
| % Change Unemployment Rate 2008-2009 | **32.25** | 9.82 | 22.43 | -4.80 |
| % Change Unemployment Rate 2009-2010 | 5.98 | **14.02** | -8.05 | -2.32 |
| % Change CIG pc 2008-2009 | **452.3** | 193.6 | 258.7 | -5.44 |
| % Change CIG pc 2009-2010 | 31.39 | **50.59** | -19.20 | 2.08 |

Then a picture emerges confirming that the medium-term effects are more negative on poor areas of the country, unable to intercept the international recovery and less skilled at the structural level in terms of economic dimensions and in the sustainability perspective in general.

## 4. Global and Local Spatial Autocorrelation: the Moran Index and LISA

The spatial autocorrelation of the variables used in the analysis is generally high. The Moran's I Index is in the last years always positive and sensitive to the recent socio-economic crisis. This sensitive is evident comparing the values of Moran Index of Unemployment Rate, Total CIG per firm and their variations in the periods 2008-2009 and 2009-2010. Evidences are also given by the same index applied to GDP per capita, even if in this case data of the year 2010 are not available and we have just the dynamics of the first part of the crisis. Moran's statistics are shown in table 8 for the elementary variables analysed. These statistics have been obtained using rook

contiguity matrix. But we used also the queen contiguity matrix (its results are not shown), in order to test the influence of different weights on the results.

**Tab. 8 The Moran's I Index, statistics and inferences**

| Variables | Moran's I* | E(I)** | Reference Distribution (999 permutation) | | |
|---|---|---|---|---|---|
| | | | Mean | Std Dev. | p-value |
| Unemployment Rate 2010 | 0.7520 | -0.0098 | -0.0083 | 0.0693 | 0.001 |
| Unemployment Rate 2009 | 0.6896 | -0.0098 | -0.0098 | 0.0679 | 0.001 |
| Unemployment Rate 2007 | 0.8678 | -0.0098 | -0.0062 | 0.0685 | 0.001 |
| % Change Unemployment Rate 2009-2010 | 0.0687 | -0.0098 | -0.0104 | 0.0677 | 0.123 |
| % Change Unemployment Rate 2008-2009 | 0.3078 | -0.0098 | -0.0094 | 0.0680 | 0.001 |
| Total CIG per firm 2010 | 0.3214 | -0.0098 | -0.0088 | 0.0675 | 0.001 |
| Total CIG per firm 2009 | 0.3750 | -0.0098 | -0.0071 | 0.0697 | 0.001 |
| Total CIG per firm 2007 | 0.2961 | -0.0098 | -0.0091 | 0.0687 | 0.001 |
| % Change Total CIG per firm 2009-2010 | 0.2789 | -0.0098 | -0.0095 | 0.0668 | 0.001 |
| % Change Total CIG per firm 2008-2009 | 0.3681 | -0.0098 | -0.0087 | 0.0659 | 0.001 |
| GDP pc 2009 | 0.8186 | -0.0098 | -0.0067 | 0.0711 | 0.001 |
| GDP pc 2008 | 0.8285 | -0.0098 | -0.0087 | 0.0676 | 0.001 |
| GDP pc 2007 | 0.7925 | -0.0098 | -0.0087 | 0.0684 | 0.001 |
| % Change GDP pc 2009-2008 | 0.1006 | -0.0098 | -0.0087 | 0.0704 | 0.067 |

* Type of spatial weight matrix: root continuity matrix

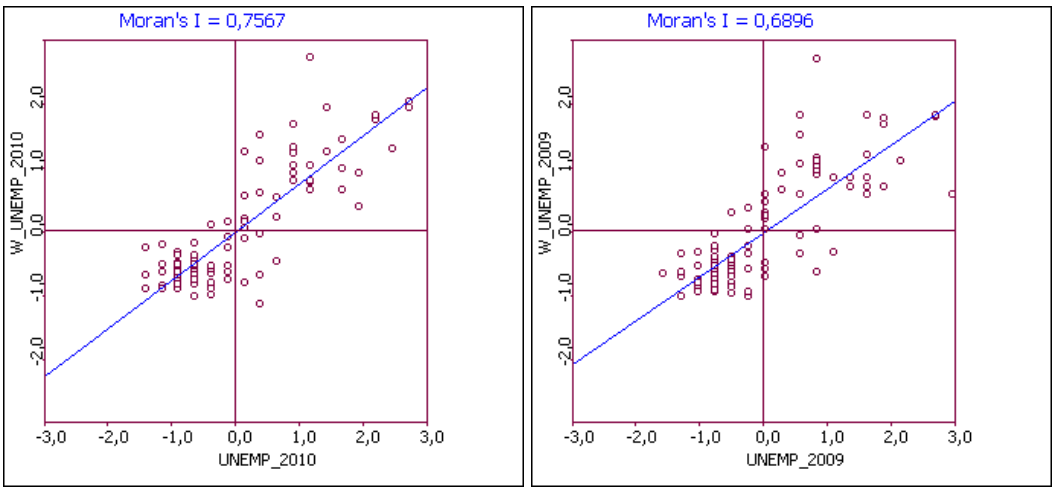
** The expected value of I is (-1/(103-1)), where 103 is the number of Italian provinces

The values of Moran Index justify the aggregation of Italian provinces in territorial clusters, as proposed in paragraph 2. The clusters are clearly distinct in North and South, in none you can find a province of Southern Italy together to a province of North. And then each cluster joins local systems with common socio-economic and environmental elements.

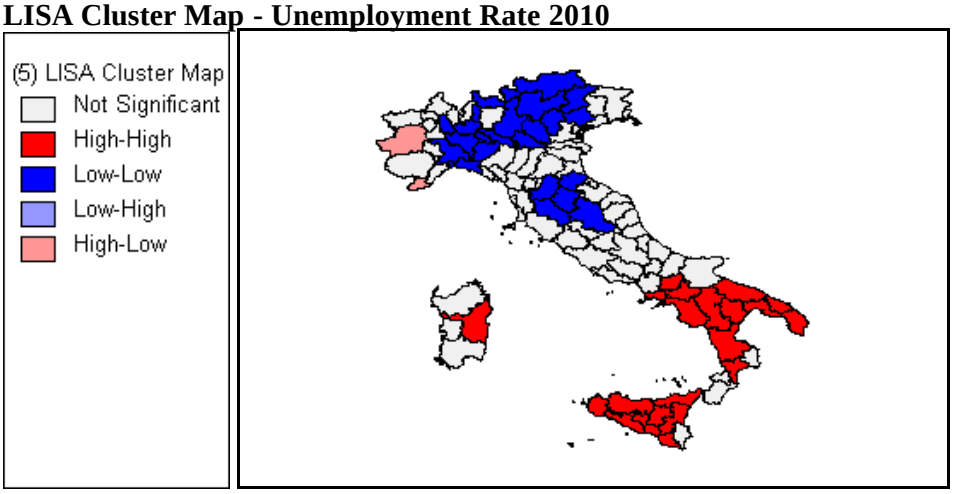
*Unemployment Rate and its Change Rate during and before crisis*

In 2010 the Moran Index of Unemployment Rate is 0.75. It is an high positive value and shows an high positive autocorrelation. It means two different situations at once: 1. the territorial systems with high values of unemployment rate have similar neighbours, that also have high unemployment rates (usually called "hot spots"); 2. the territorial systems with low values of unemployment rate have similar neighbours, that also have low ones (usually called "cold spots"). In 2010 the high unemployment rates are in near provinces, and low rates are in provinces with the same borders. The same trend is in preceding years. It is again an evidence of the Italian territorial dualism: rich provinces in the North areas and poor or less rich provinces in the South. But you can note an important event: the value of Moran Index decreases in the first part of the crisis (2008 and 2009), then in 2010 back to the pre-crisis values (See Table 8). In 2007 Moran Index of unemployment rate is 0.87. Then with the crisis the value decreased to 0.83 in 2008 and to 0.70 in 2009. In the years of the crisis the differences between North and South are again present, but not so pronounced. Since 2010 the North-South differences begin again to increase. In support of this, the Moran Index of the rate of change of unemployment rate: the I value in the periods 2008-2009 is 0.31, higher than the value of the successive period 2009-2010 (0.07). The Moran Index brings out the spatial dependence, while the LISA Indicators (Local Indicator Spatial Association) measure the Local Spatial Autocorrelation. The LISA Indicators show that territorial systems with high value of Unemployment Rate are concentrated in Southern Italian provinces, both in 2010 and in 2007. On the other hand the local systems with low unemployment rate are in the North and, in 2010, in some provinces of Tuscany and Umbria Regions. Before the crisis in 2007 the low value of unemployment were in North-Eastern provinces. In the first part of the crisis

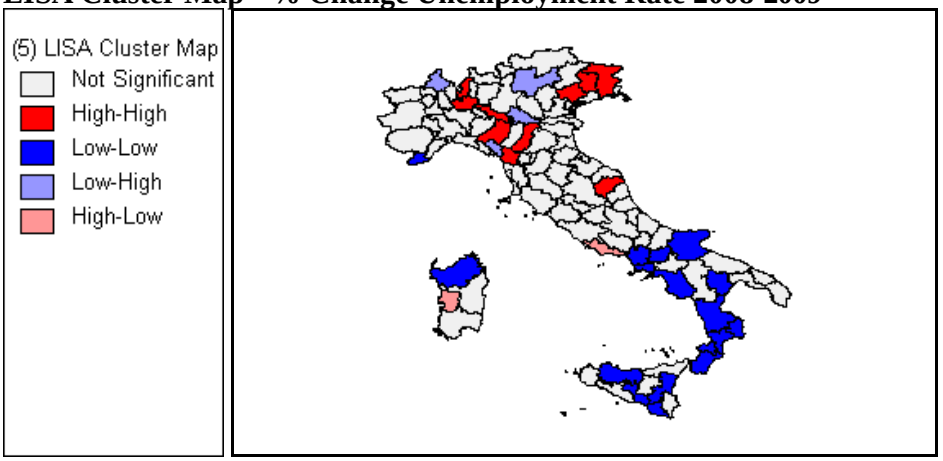
(2008-2009) the minor values of the variation of unemployment rate are in the Southern provinces. It is a new proof that the effects of the crisis are smaller in the South. In the period 2009-2010 the minor variations are concentrated in Tuscany and Umbria, and it is the cause of low unemployment rates in that territory in 2010.




**LISA Cluster Map - Unemployment Rate 2010**



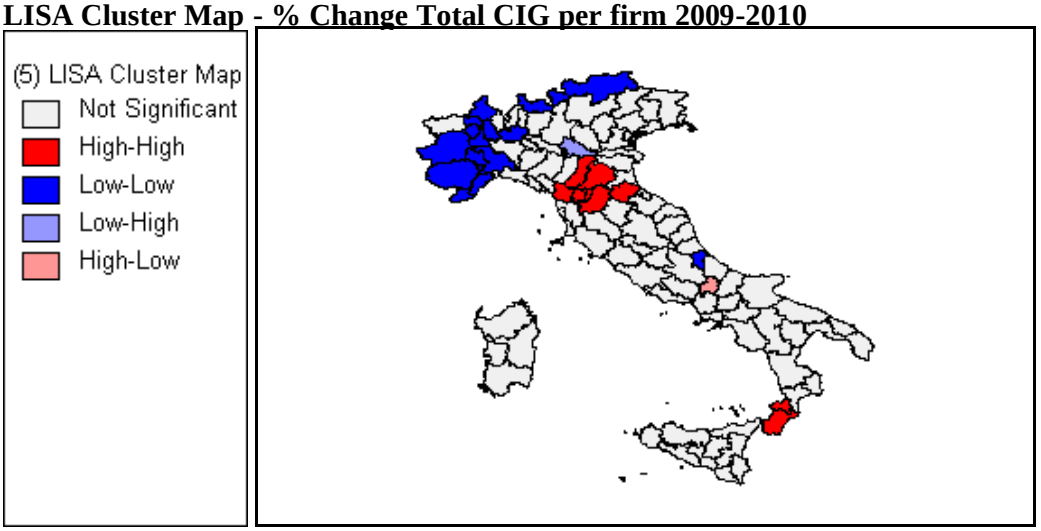

**LISA Cluster Map - % Change Unemployment Rate 2008-2009**



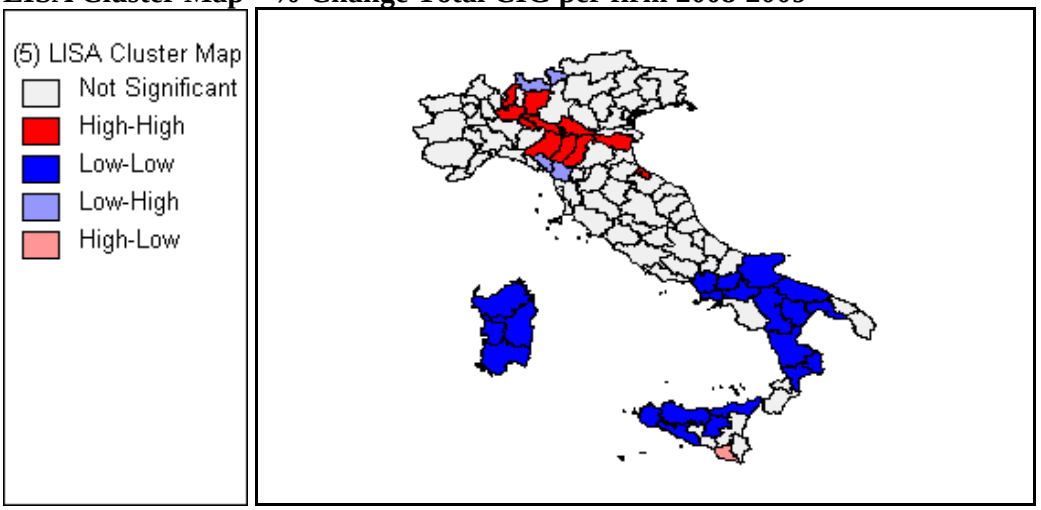
*Total CIG per firm and its Change Rate during and before crisis*

The Moran Index of Total Cig per firm decreases in the last years, from 0.375 in 2009 to 0,3214 in 2010. The Moran's I of this variable has the same dynamics shown by Moran's I of Unemployment Rate and GDP pc. The Moran's I of Change Rate of CIG in 2009-2010 (I=0.2789) is minor than the Moran's I of the same variable in 2008-2009 (I=0.3681) (See Table 8). In the period 2008-2009 in South Italy are concentrated the low change rates of CIG, and the high change rates are concentrated in some rich provinces of Emilia Romagna and Lombardy Regions. In the second period of crisis, 2009-2010, the lower change rates of CIG are especially in Piedmont's provinces, in Milan, and in some local systems of the Alps. Some of these provinces are in the cluster "Frontiers of Sustainability".

**LISA Cluster Map - % Change Total CIG per firm 2009-2010**




**LISA Cluster Map - % Change Total CIG per firm 2008-2009**



## 5. Synthetic considerations and Conclusions

In the second period of the Crisis (2009-2010) the richer local territorial systems of North Italy try to react to the crisis and they find in their endowments and agglomeration economies the ways to re-start. If this consideration is true, then in 2009-2010 the variables more sensitive to cyclical events begin to turn back to the pre-crisis values.

The Unemployment Rate has the greater changes in North provinces in 2008-2009, while in 2009-2010 the greater changes are fragmented in all the national territory. The mean of the Change Rate of Unemployment Rate 2008-2009 in the provinces of North Italy is 32.2 and greater than the Southern provinces, where the value is 9.8. In the next period 2009-2010 the mean in North provinces decreases to 5.98 and in Southern provinces increases to 14.02 (Table 7). The Moran Index of the Unemployment Rate decreases in 2009, but in 2010 increases again to reach the pre-crisis values. In support of this point the decline of the Moran Index of the Change Rate of Unemployment Rate between the period 2008-2009 (Moran's I=0.31) and the period 2009-2010 (I=0.07) (Table 8).

The Total CIG per firm in 2007, before the recent crisis, were so distributed in the three great national areas: North 51%, Center 15%, South 34%. In 2009 the same distribution was: North 69%, Center 13%, South 18%. In 2010 it is: North 66%, Center 15%, South 19%. The Total CIG per firm have had the greater changes in the North in the period 2008-2009 (+452%), while in the same period in the South the change rate was +133% and in the Center +260%. In the previous period 2007-2008, before the crisis began, the change rates of Total CIG per firm were: North +32%, Center +27%, South +11%. In the second period of the crisis (2009-2010) the change rates try to turn back to the values of 2007-2008: North +27%, Center +47%, South +39%. The mean of the Change Rate of the Total CIG per firm in the period 2008-2009 in North Italy is +452% and greater than in South provinces (+199%). In the next period 2009-2010 the mean of North Italy is +31%, while in South increases to +50.6%. The Moran Index of Total CIG in 2009 increases, but in 2010 decreases again to reach the pre-crisis values. The same dynamics you can observe in the Moran Index of the Change Rate of Total CIG per firm in the 2 periods 2008-2009 and 2009-2010, where Moran's I decreases from 0.37 to 0.28 (Table 8).

Also Export per capita and GDP per capita show equal dynamics to that shown by the Unemployment Rate and the Total CIG per firm.

The crisis at first hit the rich territorial systems and later was extended to the more weak ones. In 2010 some dynamics try to turn back to the pre-crisis situation. The CIG has proved a good tool for socio-economic protection, in particular in the clusters indicated as the more sustainable in economic-social-environmental terms by the ESE model.

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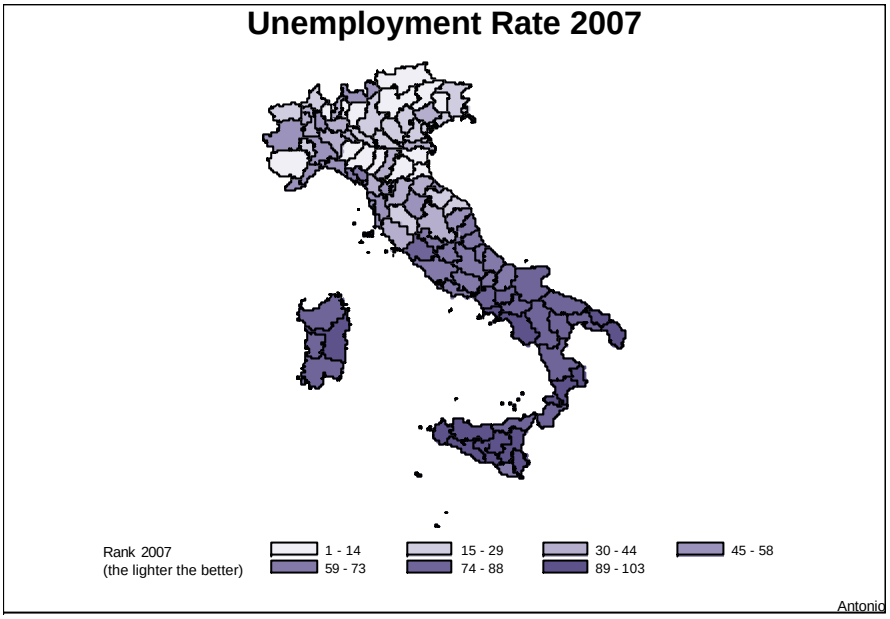
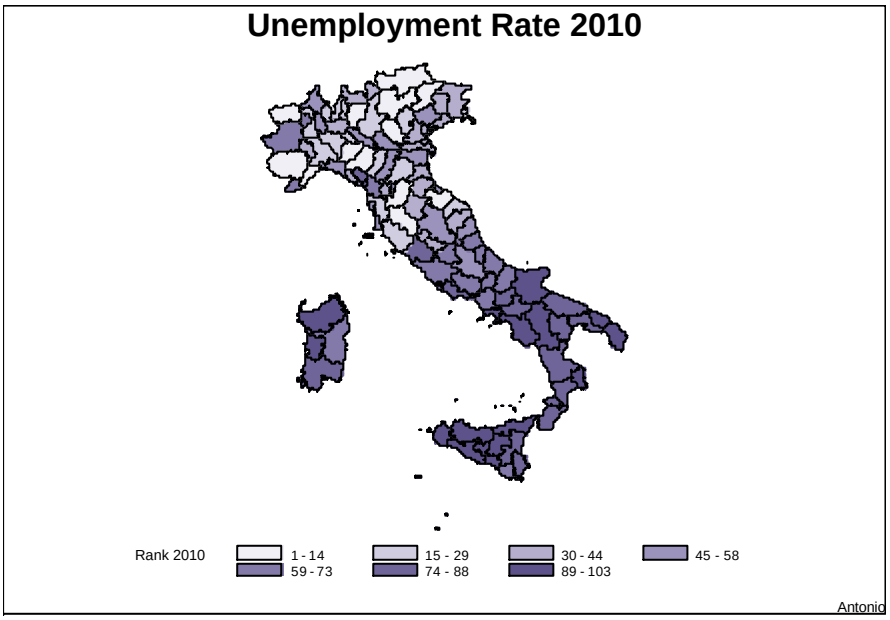
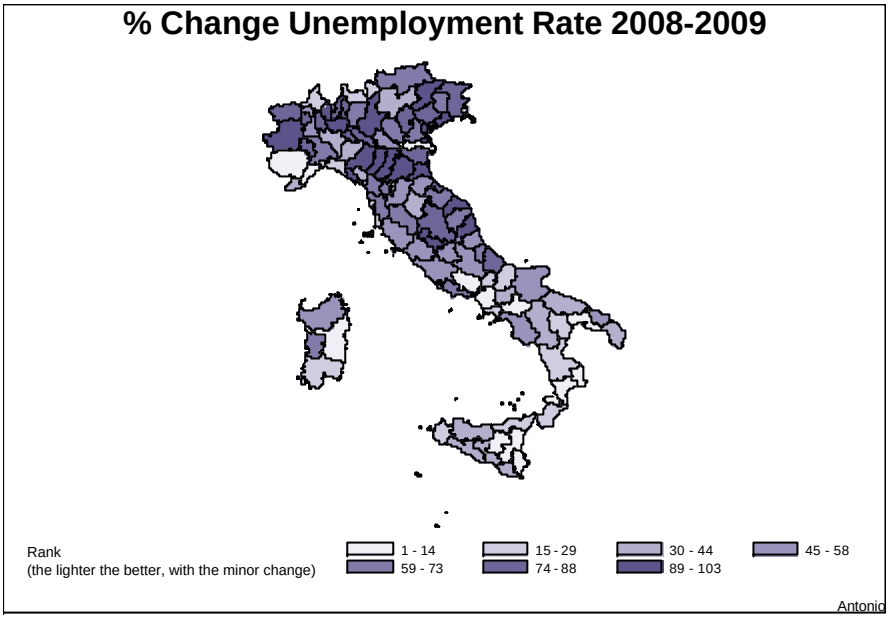
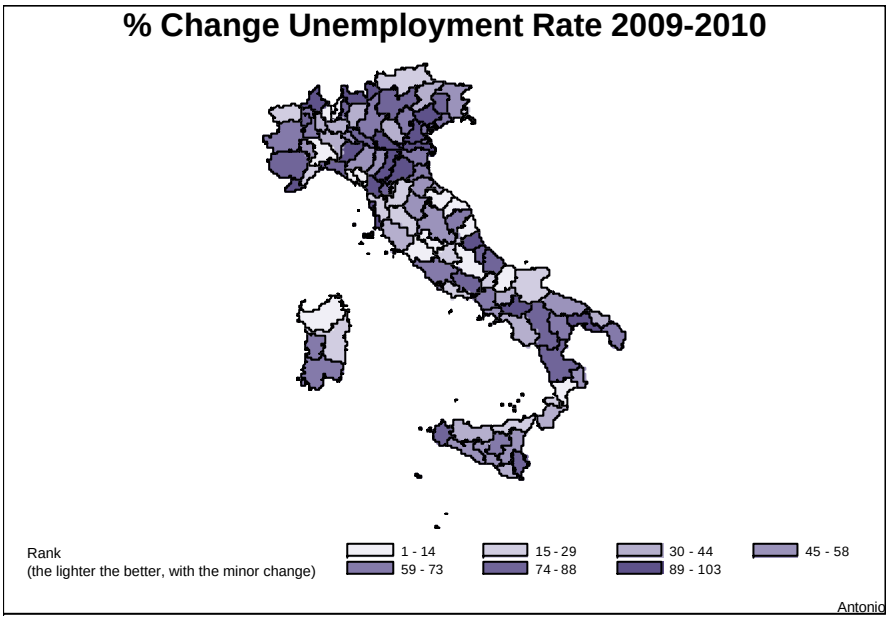
**Appendix 1 - Maps of some variables analysed in the paper**




% Change Unemployment Rate 2008-2009
Rank
(the lighter the better, with the minor change)
1 - 14
15 - 29
30 - 44
45 - 58
59 - 73
74 - 88
89 - 103
Antonio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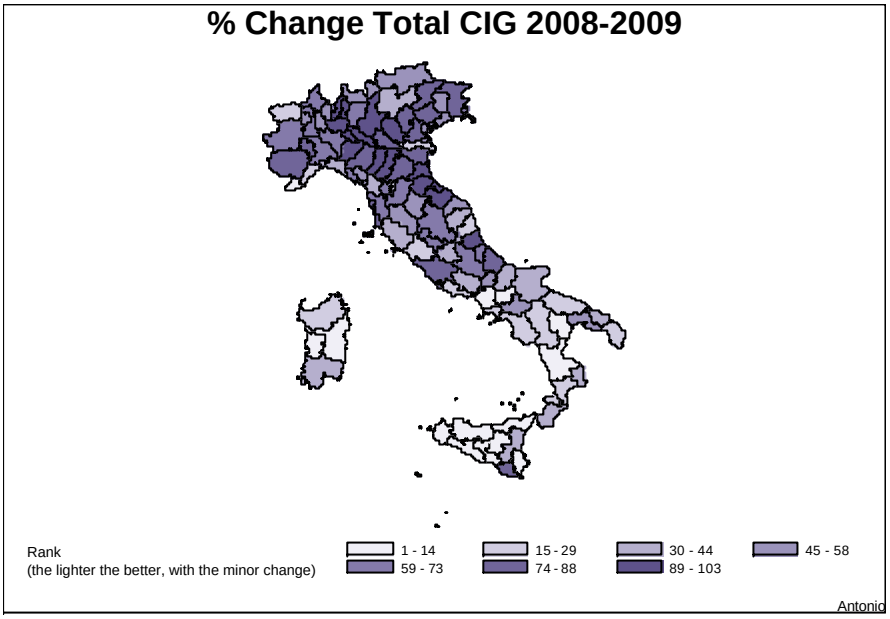
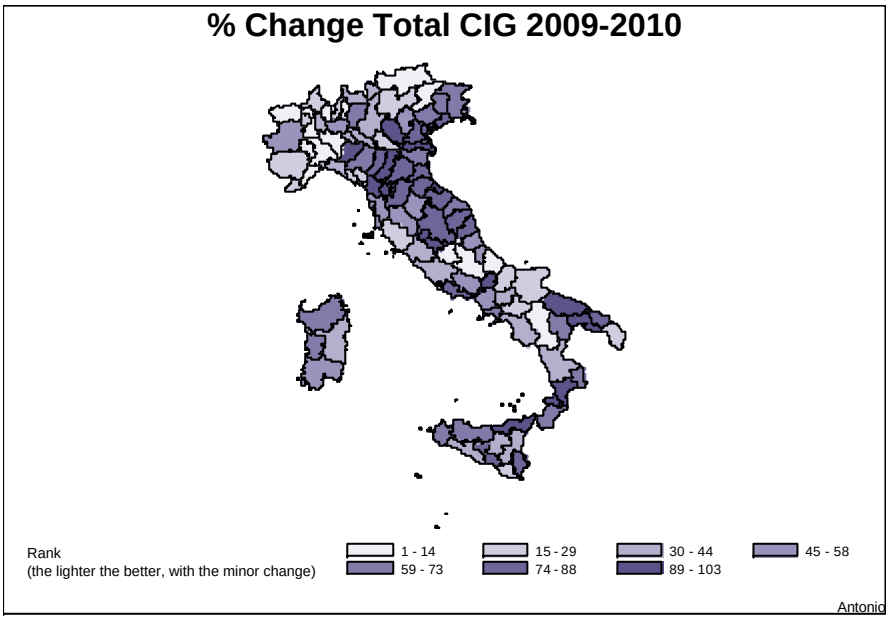
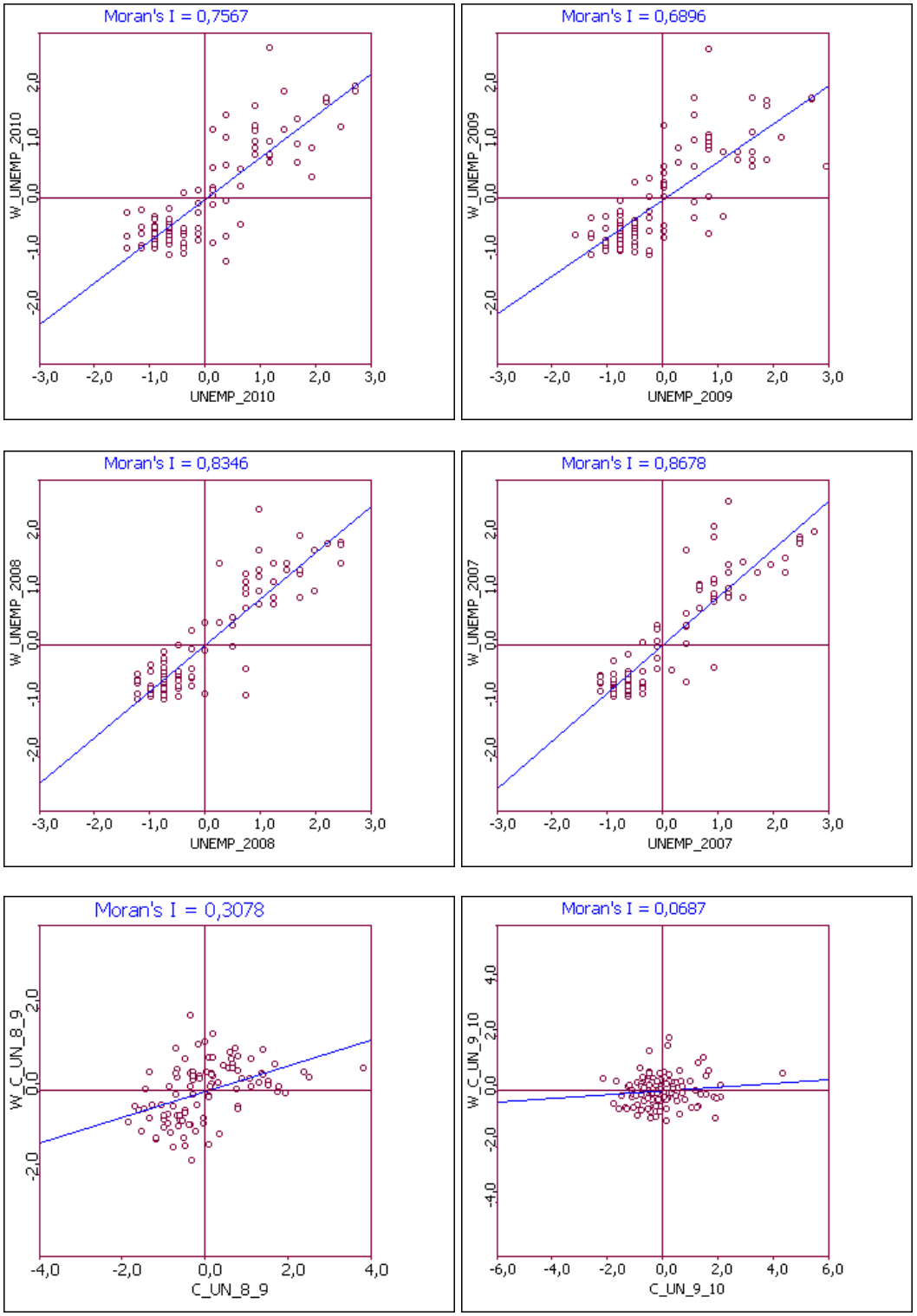
Antonio


% Change Total CIG 2008-2009
Rank
(the lighter the better, with the minor change)
1 - 14
15 - 29
30 - 44
45 - 58
59 - 73
74 - 88
89 - 103
Antonio


% Change Total CIG 2009-2010
Rank
(the lighter the better, with the minor change)
1 - 14
15 - 29
30 - 44
45 - 58
59 - 73
74 - 88
89 - 103
Antonio

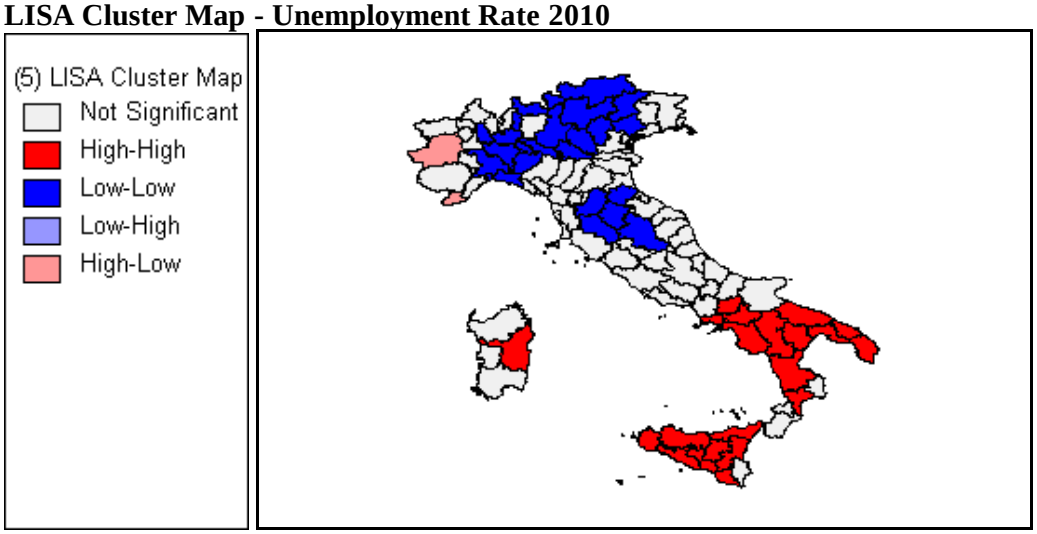
**Appendix 2 - Global and Local Spatial Autocorrelation: the Moran Index and the LISA Indicators**

*The Unemployment Rate and its Change Rate during and before the crisis*

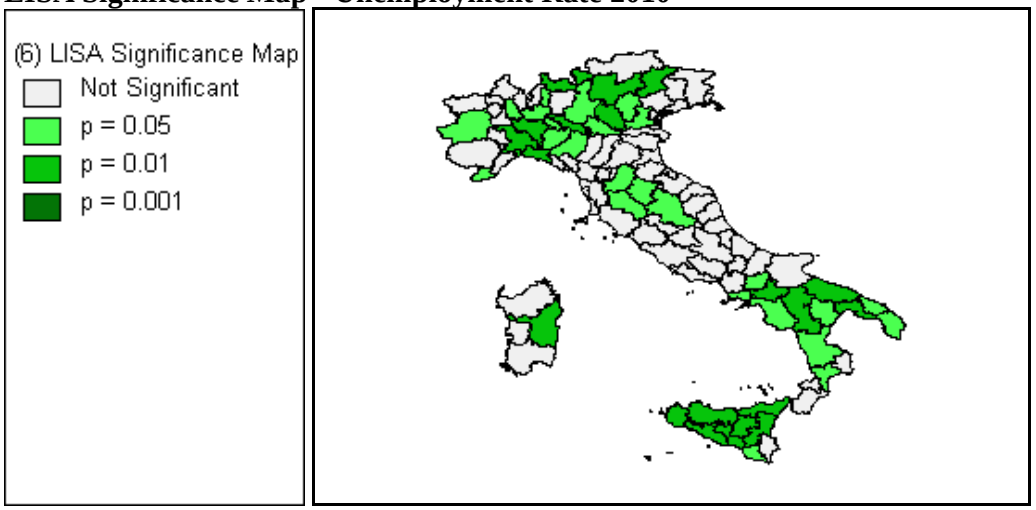


**Local Spatial Autocorrelation: the Local Indicator Spatial Association (LISA)**

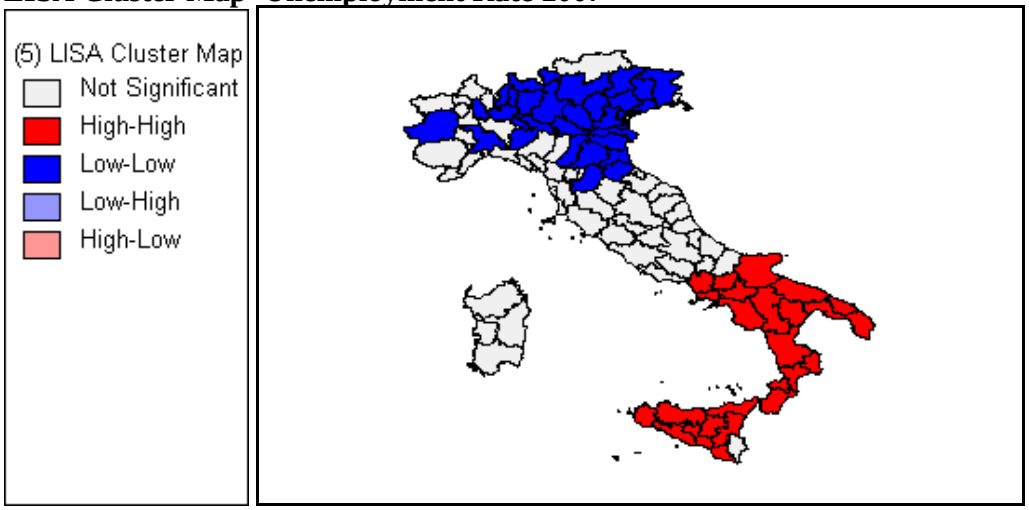
**LISA Cluster Map - Unemployment Rate 2010**



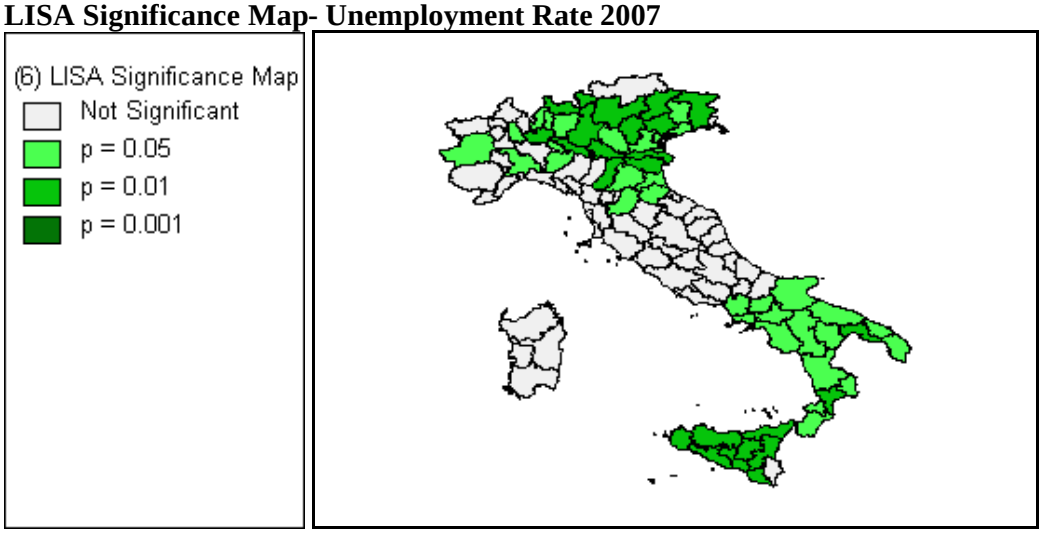

**LISA Significance Map - Unemployment Rate 2010**



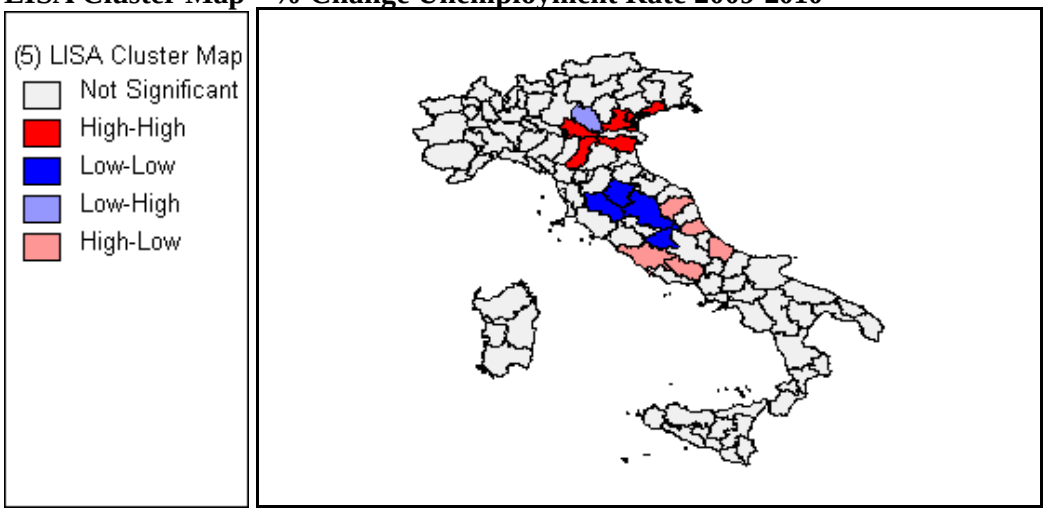
**LISA Cluster Map- Unemployment Rate 2007**



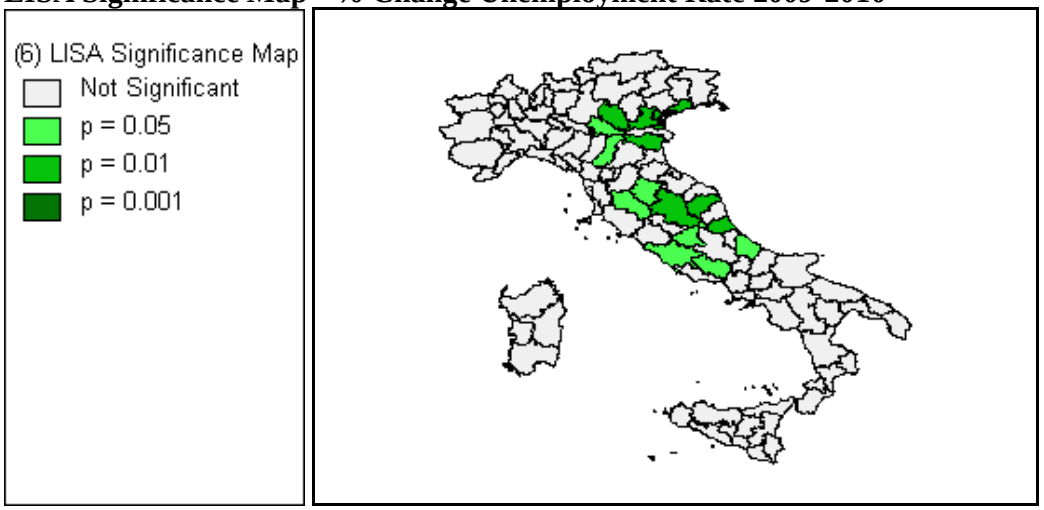

**LISA Significance Map- Unemployment Rate 2007**



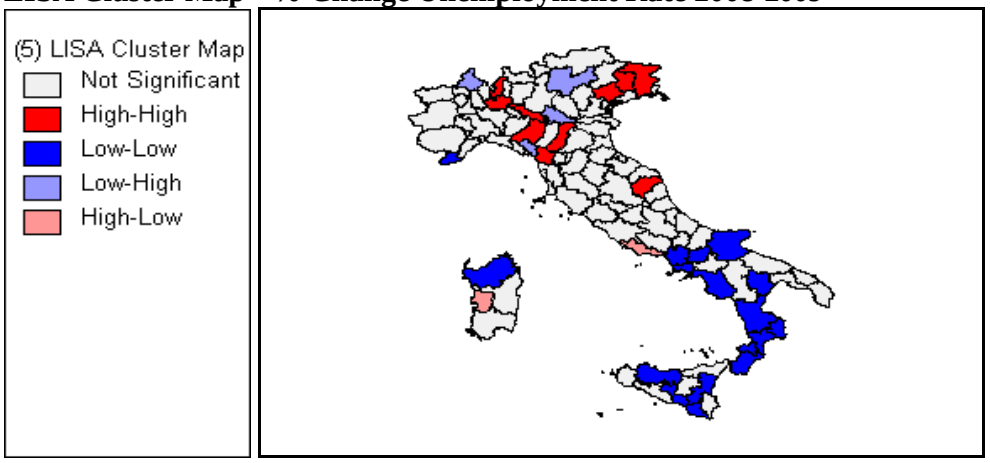
**LISA Cluster Map - % Change Unemployment Rate 2009-2010**



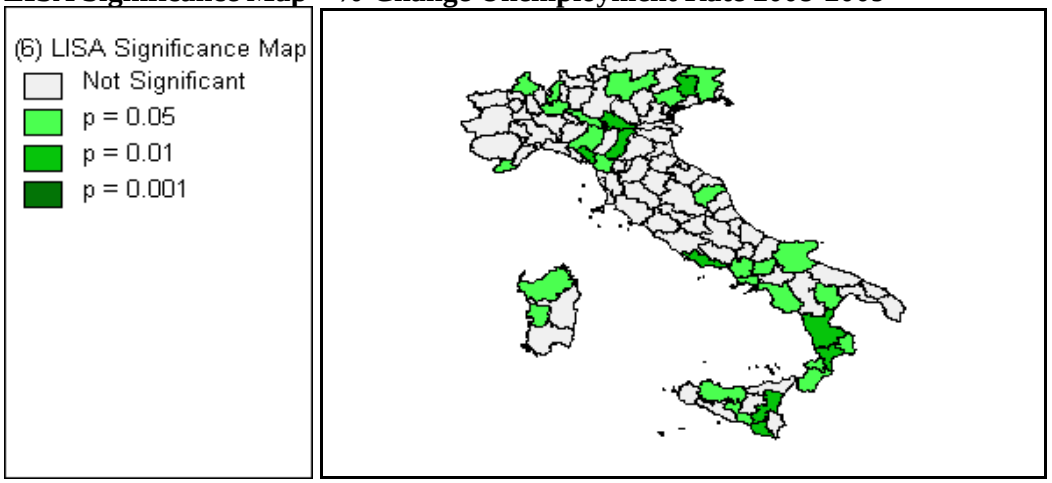

**LISA Significance Map - % Change Unemployment Rate 2009-2010**



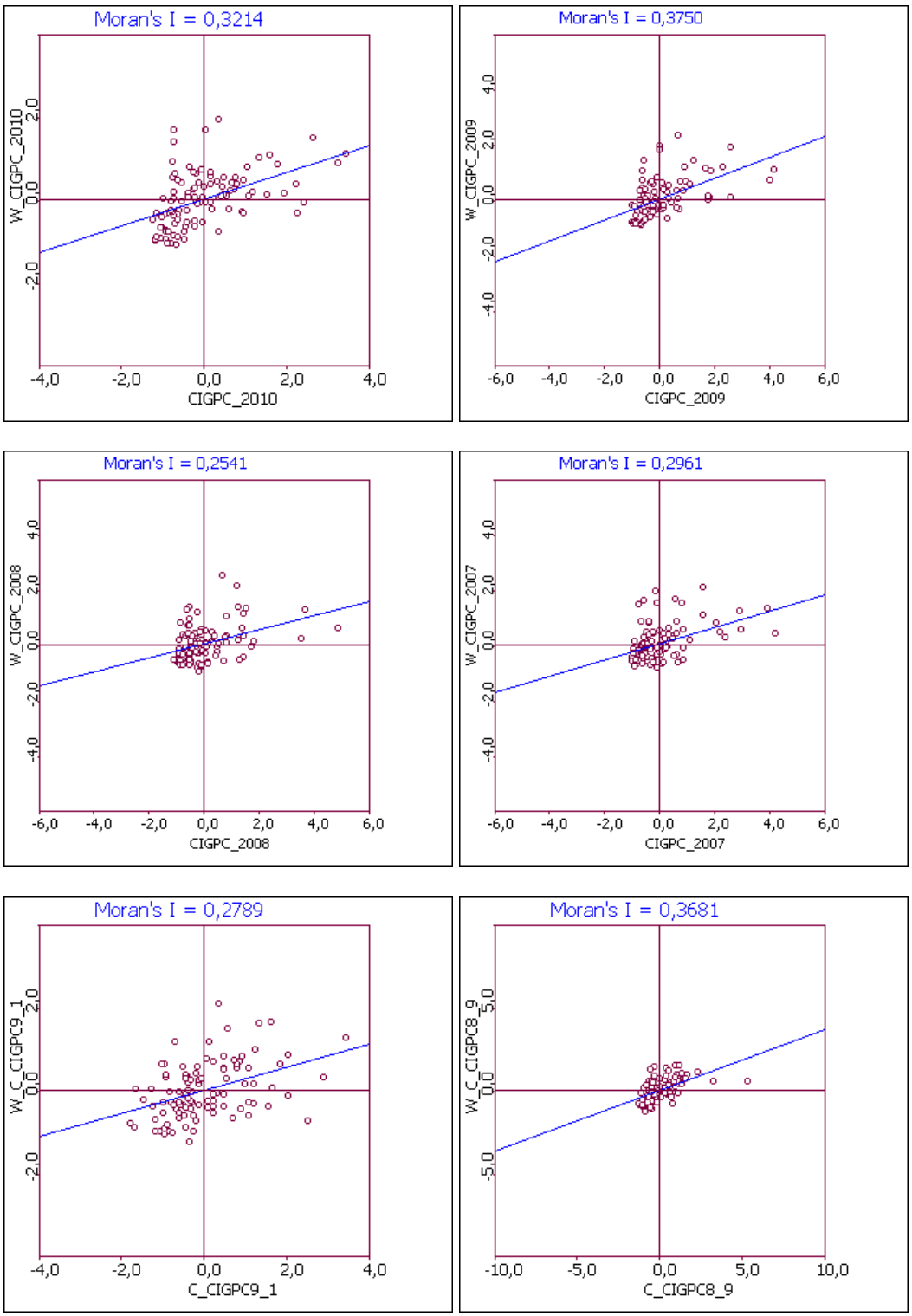
**LISA Cluster Map - % Change Unemployment Rate 2008-2009**

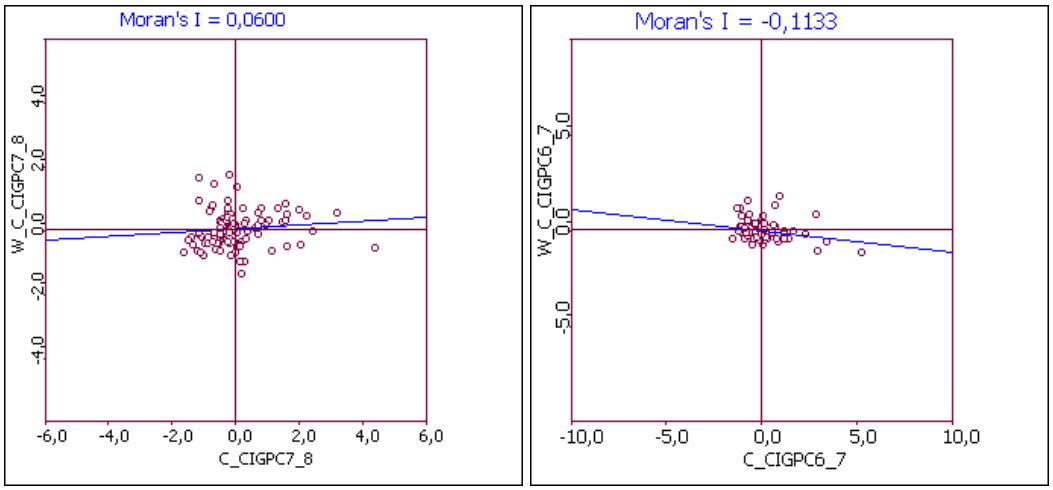



**LISA Significance Map - % Change Unemployment Rate 2008-2009**

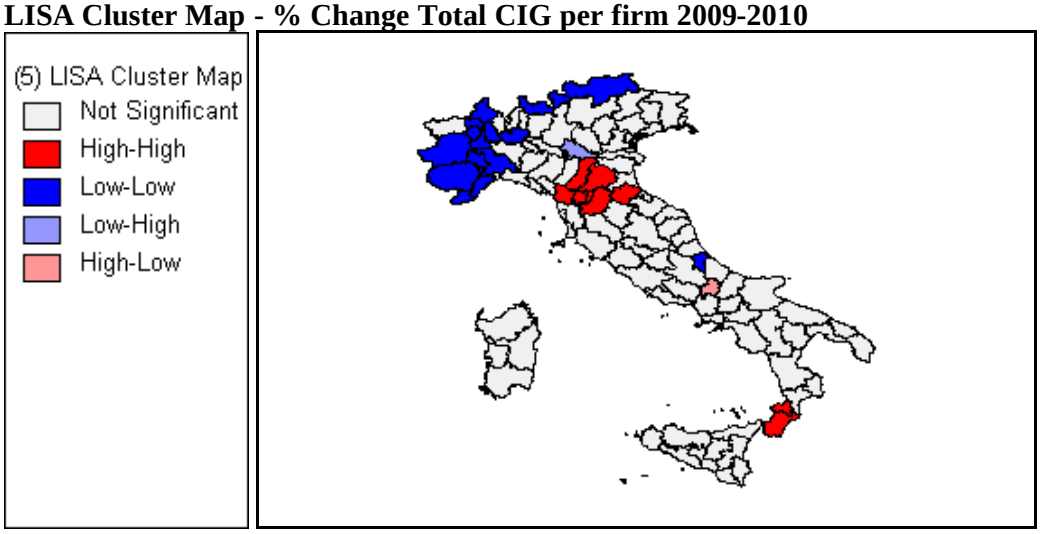


*Total CIG per firm and its Change Rate during and before crisis*






**LISA Cluster Map - % Change Total CIG per firm 2009-2010**

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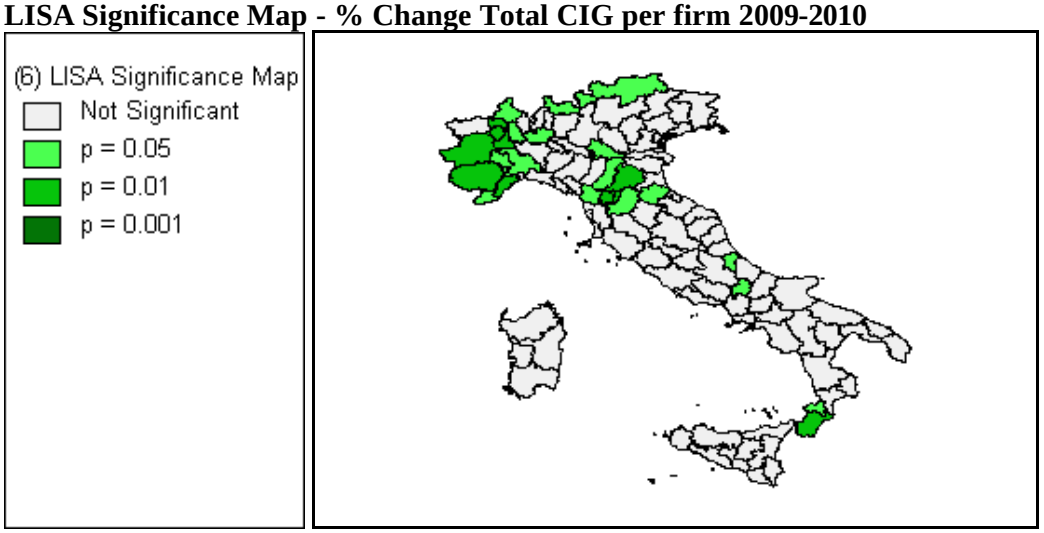

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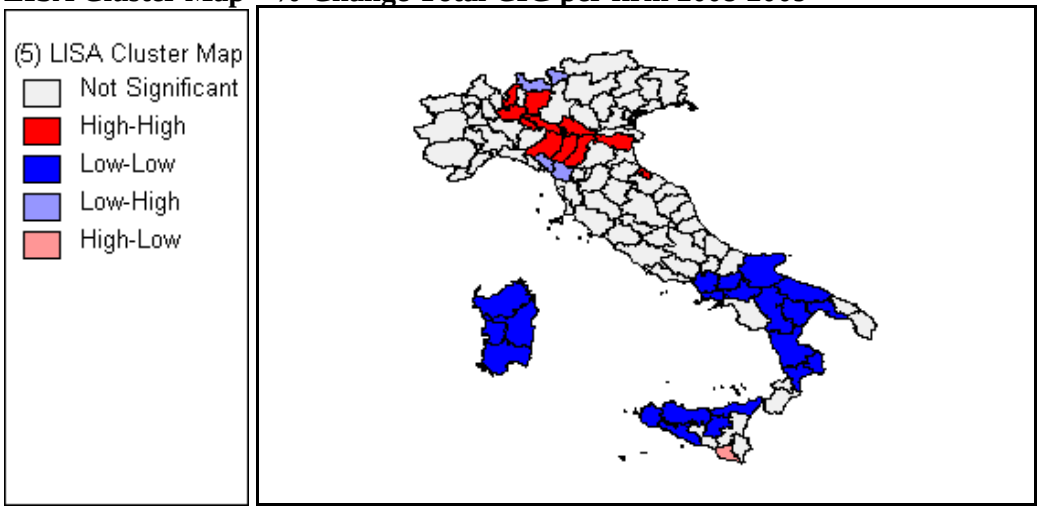


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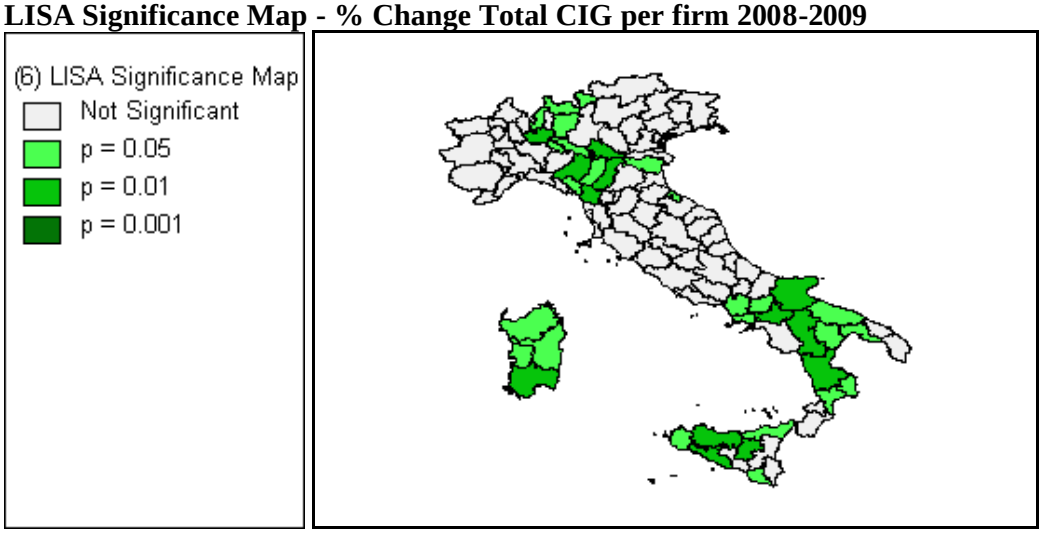
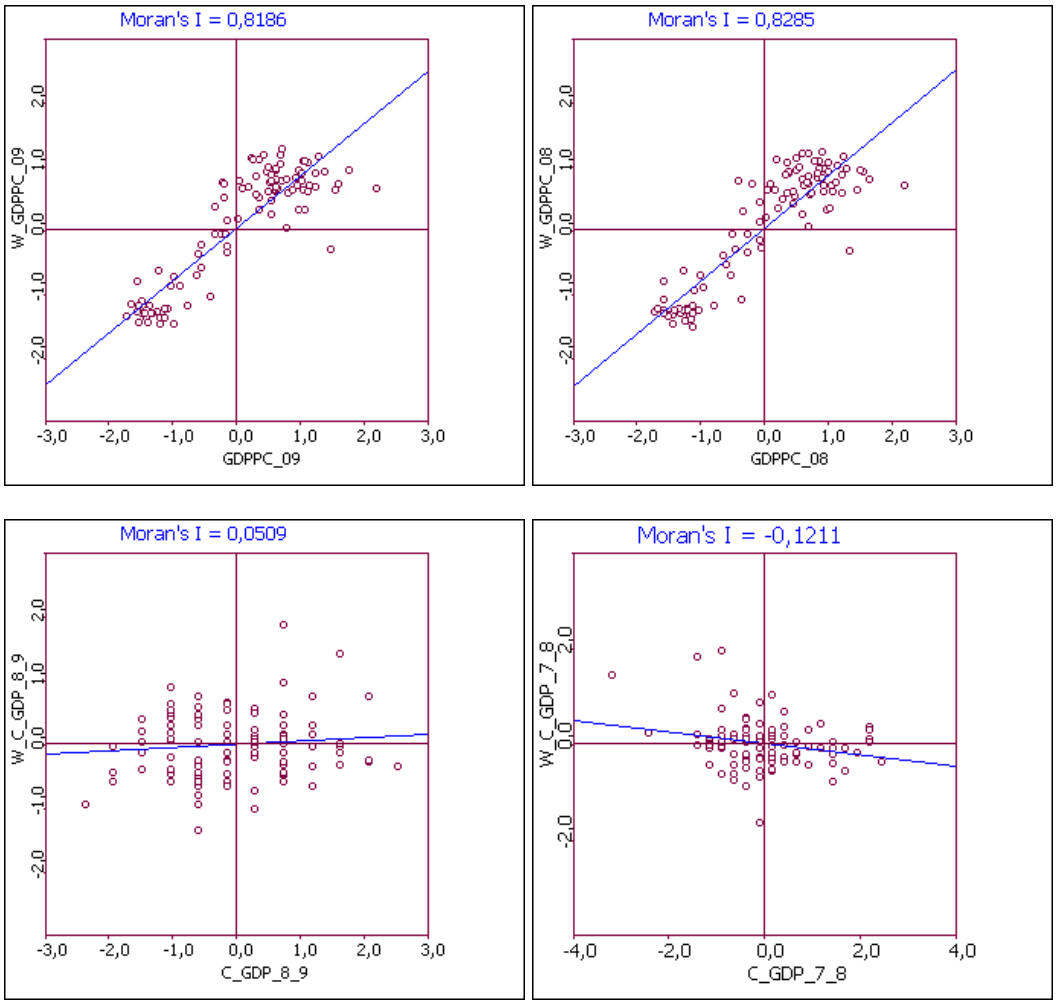
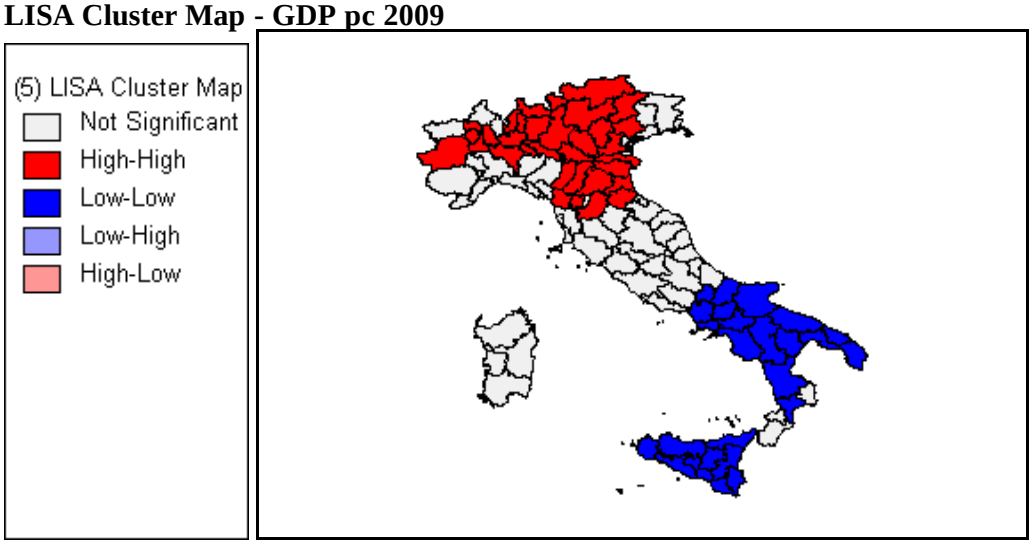


*GDP per capita  and its Change Rate during crisis*



**LISA Cluster Map - GDP pc 2009**




**LISA Significance Map - GDP pc 2009**