Recession, Resilience, Local Labour Markets: Wealthier is better?

ABSTRACT

Economic expansion and recession shaped the long-term evolution of local economic systems, highlighting causes and consequences of territorial disparities at the regional scale and alimenting the debate on socioeconomic resilience. The present study investigates changes (2004-2013) in the spatial structure of two labour market indicators in Italy (participation and unemployment rates) during expansion and recession waves with the aim to identify the socioeconomic and territorial factors impacting the short-term performances of local labour markets. Specialization in advanced industrial sectors (such as precision mechanics) was found as one of the most important factors associated to lower employment losses during recession in Italy. Our results contribute to the debate on regional resilience reconnecting it to the more general issue of spatial disparities, and shed light on the impact of institutional change and external shocks on the evolutionary path of local economic systems.

INTRODUCTION

Long run structural changes in regional economies have attracted a vast literature centred on both the neoclassical equilibrium (or multi-equilibrium) theory and the evolutionary approaches more recently introduced by the New Economic Geography (Patacchini and Rice, 2007; Kemeny and Storper, 2014; Martin and Sunley, 2014). The identification of the main determinants accounting for the spatial distribution of income and wealth, the structure of local labour markets, the differentials in employment and unemployment rates among areas, together with latent changes in the urban hierarchy, have been crucial issues in regional science for a long time and are still challenging in a world dominated by recession and uncertain factors of growth (Soares et al., 2003; Rice et al., 2006; McCann and Ortega-Argiles, 2013; Armstrong et al., 2014). In a perspective of renewed and widened territorial disparities (Taulbut and Robinson, 2014), identifying (and understanding the spatial relationship between) drivers of socioeconomic divides is a key research issue with both theoretical and policy implications (Del Campo et al., 2008; Storper, 2011; Magrini et al., 2015).

Long-run regional economic development has been usually interpreted as a homogeneous trajectory shaped by different types of shocks impacting "on regional linkages and networks, in turn leading to possible changes in trajectories or triggering path-shifting processes that require an ability to mobilize and recombine agents and resources into new development frameworks" (Bailey and de Propris 2014). In the last decade, the rapid succession of expansion and recession waves influenced considerably the medium-term evolution of regional economic systems, strengthening the debate on regional resilience and connecting it with the more traditional issue of spatial disparities in socioeconomic variables (Simmie and Martin, 2010; Fingleton et al. 2012; Martin, 2012). In Europe, recession impact was higher in economically-disadvantaged and weak Mediterranean regions than in northern regions. Thus, the analysis of regional economic dynamics during recession in southern Europe allows a kind of short-term, empirical verification of concepts such as 'resilience', 'resistance', 'recovery', 're-orientation' and 'renewal' applied to the recent evolution of local systems undergoing socioeconomic, political and cultural changes (Pike et al., 2010; Benediktsson and Karlsdóttir 2011; Glaeser et al., 2014; Kemeny and Storper, 2014, among others). So far, the concept of 'resilient region' has been applied mainly to affluent regions, either through empirical testing of economic theory or under exploratory approaches evaluating target variables or sets of indicators (Hassink, 2010; Hudson, 2010; Hincks et al., 2014). By recognizing the ongoing global crisis as a major turning point in regional economic systems, resilience-based approaches have been inspired, in some cases, from definitions and operational frameworks typical of evolutionary economic geography (Bristow and Healy, 2014). Important results in this field were

achieved regarding the effects of the recent financial crisis on regional growth, employment and investment, among others (Bailey and De Propris, 2014).

Assessing the intimate relation between structure and performance in local labour markets is a deserving issue in regional economics and contributes to the study of socioeconomic disparities at both national and supra-national levels. Spatial differentials in employment and unemployment rates have been considered when assessing the economic performance of local districts (Patacchini and Zenou 2007; Bande and Karanassou, 2013; Fratesi and Percoco, 2013; Green and Livanos, 2013; Taulbut and Robinson, 2014). The short-term development of local economic systems has been interpreted as the result of short-term recession dynamics and as a *proxy* of regional resilience (Hassink, 2010; Hudson, 2010; Pike et al., 2010; Hincks et al., 2014; Martin and Sunley, 2015). Temporal variations in the unemployment rate can be interpreted as an implicit indicator of resistance to economic shocks or post-shock recovery.

In a recent work on the impact of the 2008-2009 recession on unemployment in the largest 60 cities of United Kingdom, Lee (2014) identified the main determinants of the resilience of urban economies to unexpected shocks. Cities with the highest proportion of people employed in financial services, manufacturing and construction have experienced the lowest increases in the unemployment rate. The spatial determinants that have traditionally characterized the socioeconomic disparities in the United Kingdom have also played a role in the scattered growth of the unemployment rate during recession, with wealthier regions in Britain and Scotland performing better than other regions. An important feature of urban resilience is human capital and especially the stock of skilled workers: Lee found unemployment rates to be growing less in cities with population with the highest professional skills that can attract businesses, stimulate innovation and create value more quickly. At the same time, the 'resilience gap' caused by short term economic shocks could exacerbate regional disparities in unemployment (e.g. Rice et al., 2006; Patacchini and Rice, 2007; Taulbut and Robinson, 2014), determining spatial effects in socio-demographic processes that deserve further investigation.

Like the United Kingdom, Italy is a developed economy in Europe with strong socioeconomic disparities (Proietti, 2005; Dunford and Greco, 2007; Dunford, 2008; Dow et al., 2012; D'Agostino and Scarlato, 2013). Local unemployment rates diverged by more than twenty points between the richest areas of northern Italy and the poorest southern regions. In the last decade, the slow economic growth and the subsequent stagnation stimulated moderate changes in the industrial structure at both the national and regional scales. On the contrary, local labour markets have evolved rapidly, in part due to political reforms that, since 1997, have opened highly-regulated local markets to competition, flexibility and temporary jobs. Flexibility was invoked as a response to

youth unemployment and inherent disparities in the job market between northern and southern regions, contributing to the uneven internal migration of skilled workers towards northern Italy (Faini et al., 1997; Fratesi and Percoco, 2013; Iammarino and Marinelli, 2014).

The reform of the labour market came into force in 1997 (the so called 'Treu' law) and it was revised and improved by a subsequent law (the so called 'Biagi' law) in 2003. These reforms positively impacted the Italian labour market - considered one of the most rigid in Europe - by increasing the flexibility of contracts, reducing constraints to recruitment and introducing new institutions responsible for the matching between labour supply and demand. On the whole, job reforms, combined with slightly positive economic dynamics, pushed the unemployment rate to the historic low in 2007 (6.1%), with significant decreases in female and youth unemployment rates (Battaglia and Iraldo, 2011). However, in an economic structure dominated by small-size firms such as Italy, reforms also contributed to a progressive de-regulation of local markets promoting more temporary jobs than expected. Unemployment rates returned to rise in the subsequent years as a result of recession, reaching 8.9% in 2010 and 12.2% in 2013, the peak value observed in the time series since 1977.

Due to the short-term relationship between the evolution of local labour markets (increased regional disparities in the rate of activity and employment consolidating the north-south divide in youth unemployment) and structural reforms at the national scale, the recent Italian development path provides a unique opportunity to test hypotheses on the socioeconomic resilience of the local districts. Empirical analyses may benefit from the new time-series of labour market indicators disseminated annually, since 2004, by the National Institute of Statistics at a fine spatial scale. This data set includes participation and unemployment rates at the level of local labour markets in Italy (686 districts as defined in 2001) and allows accurate spatial analysis of pre- and post-recession economic dynamics, e.g. in terms of reduction (or expansion) of regional disparities in unemployment rate. The effects of institutional changes (in this case, labour reforms) on local labour markets performances can be also investigated (Storper, 2011; Rodriguez-Pose, 2013; McCann and Ortega-Argilés, 2013; Boschma, 2014; Martin and Sunley, 2014).

Based on these premises, the present study assesses changes in the spatial structure of the two aforementioned indicators during employment growth in Italy (2004-2007), in the subsequent job shortage following recession (2007-2010) and in the most recent crisis period (2010-2013) dominated by a stable participation rate and the progressive increase in unemployment rates. By compiling a database with more than 70 socioeconomic and territorial indicators, the analysis identifies which factors impact more on the dynamics of participation and unemployment rates on a district scale. While the rationale here proposed is eminently exploratory, it attempts to overcome

the supposed limits of the descriptive approach typical of the 'regional resilience' paradigm (Christopherson et al., 2010). In this approach, the socioeconomic environment on the whole is seen as a powerful factor influencing the resilience potential of local districts. Our results contribute to the debate on socioeconomic resilience reconnecting it to the more general issue of regional disparities, and shed light on the impact of institutional change and external shocks on the evolutionary path of local economic systems (Boschma, 2014).

The paper is organized as follows. The next section covers data collection and describes the methodological framework. The subsequent section illustrates evidence related to changes in the spatial distribution of participation and unemployment rates across the Italian local labour markets, testing for intrinsic differences based on place-specific factors. The final section interprets this evidence through the lens of regional resilience and offers some concluding remarks.

METHODOLOGY

Study area

Italy is a southern European country covering 302,070 km^2 with 23% lowlands, 42% uplands and 35% mountainous areas. The partition into two geographical divisions (Northern-Central Italy and Southern Italy including the two main islands, Sicily and Sardinia) reflects the long-established disparities still observed in the country. Extending well beyond the industry-service dichotomy, the territorial divide in Italy reveals its wide-range impacts on urban structures and involves socioeconomic processes working on different spatial scales, from national to local (Bonavero et al., 1999). Northern Italy encompasses the Italian tract of the "blue banana" area and includes some of most developed regions in Europe, such as Lombardy, Veneto and Emilia-Romagna. Separated from northern Italy by the Apennines mountain, Central Italy is a polarized region with a marked urban-rural divide and a mixed economic structure centred on small-scale manufacturing, tourism and high-quality agriculture. Southern Italy is a disadvantaged region with younger population structure, more restricted accessibility from Europe and a production structure centred on low-income agriculture and traditional services (constructions, commerce and the public sector) concentrating in compact urban areas.

Labour market indicators

Two labour market indicators (participation and unemployment rates) were made available on a year basis for the time interval 2004-2013 at the local scale in Italy. Participation rate (labelled with 'p') was calculated as the ratio of total workforce (employed and unemployed) to the resident population > 14 years and < 74 years at each year of the time interval. Unemployment rate (labelled with 'u') was calculated as the ratio of population actively seeking for a job to the total workforce as described above. The percent rate of change over three consecutive intervals of equal length (2004-2007, 2007-2010, 2010-2013) was also calculated for both indicators. Empirical analysis was carried out using the 686 travel-to-work areas (the so called 'Sistemi Locali del Lavoro' or Local Labour Market Areas, LLMAs) as the elementary spatial unit. LLMAs have been identified by the Italian National Institute of Statistics (Istat, 2006) based on commuting data collected in the 2001 National Census of Population (Istat, 1997). LLMAs reflect districts of socioeconomic interest and were widely used to analyze e.g. the regional development of Italy (Pellegrini, 2002), the local specialization in agriculture (Giusti and Grassini, 2007), and the impact of land quality on economic growth (Salvati et al., 2011).

Contextual variables

Based on the analysis of multiple drivers of change, our approach is aimed at illustrating the complexity of local labour market dynamics in expansion and recession waves. The economic, social and demographic indicators tested for possible impact on local labour market performances in Italy were organized in the following domains: (i) territorial aspects including topography (7 indicators), (ii) land-use distribution (5), (iii) settlement characteristics (7), (iv) district specialization (6), (v) economic performances (11), (vi) productive structure (27), (vii) education level (3) and (viii) demographic attributes, including population structure and dynamics (8).

Contextual indicators were derived from statistical data sources (mainly Italian National Institute of Statistics and Corine Land Cover maps of Italy) at the local district scale and refer to the beginning of the study period (2004-2007) with some variables recorded in 2001 because of restricted data availability (e.g. population and building census data). A total of 74 indicators have been calculated for each LLMA (Table 1). Research domains and indicators have been chosen according to previous works in the field of exploratory regional analysis (see, among others, Soares et al., 2003; del Campo et al., 2008; Dallara and Rizzi, 2012; Salvati et al., 2014) and to suggestions provided by studies on unemployment differentials in Italy (Faini et al., 1997; Cracolici et al., 2007). Although the indicators chosen in the present study should be considered as giving a partial outlook of the

vastly different Italian socioeconomic contexts, they provide a broad qualification of the economic structure and socio-demographic traits observed in each local labour market.

Data analysis

The analysis framework developed in this study was based on multivariate statistics and spatial techniques. Such an approach was preferred to formalized econometric techniques since the aim of this study was eminently exploratory. By working on a wide set of indicators, exploratory approaches are broadly conceived and rather frequent in resilience science (e.g. Del Campo et al., 2008). They allow considering the impact of variables supposed to be indirectly correlated with labour market dynamics in a comprehensive way and to underline latent resilience dimensions that might be demised from a traditional econometric analysis.

Descriptive and correlation statistics

Descriptive statistics and maps of the two labour market indicators (participation and unemployment rates) by time interval have been calculated with the aim to assess changes in the labour market performances between northern and southern Italy during 2004-2013. Spearman non-parametric rank tests were run to assess significant pair-wise correlations between each labour market indicator and each contextual indicator. Significance was set up at $p < 0.05$ after Bonferroni's correction for multiple comparisons.

Multivariate analysis

A Principal Component Analysis (PCA) was undertaken on the data matrix composed of the labour market indicators by LLMA to evaluate latent relations among rates of unemployment and participation over time and space. We run a second PCA on the matrix composed of a selection of the 74 contextual indicators described above, where some were removed to avoid multi-collinearity problems (see Table 1); labour market indicators were considered as supplementary variables. The analysis is aimed at identifying the latent factors shaping changes in the labour market indicators at the beginning of the study interval and during the three phases described above (expansion, early decline, recession) possibly identifying place-specific variables and relevant research domains. As the PCA was based on the correlation matrix, the number of significant axes (m) was chosen by retaining the components with eigenvalue > 3. The Kaiser-Meyer-Olkin (KMO) measure of

sampling adequacy, which tests whether the partial correlations among variables are small, and Bartlett's test of sphericity, which tests whether the correlation matrix is an identity matrix, have been used to assess the quality of the PCA outputs. These tests evaluate the appropriateness of the factor model when analyzing the original data.

Regression analysis

The Geographically Weighted Regression (GWR) framework proposed by Fotheringham et al. (2002) was finally used to identify (and rank the impact of) the most relevant indicators in the spatial distribution of participation and unemployment rates. Model specification was based on the results of the PCA to avoid misspecification due to indicators' collinearity. The scores of the components with eigenvalue > 3 (see above) were regarded as predictors with the objective to consider relevant, independent dimensions possibly affecting local labour markets. Predictors were tested for correlation separately with each labour market indicator (the 2004 'benchmark' values: p04 and u04, and the rates of change over the subsequent time intervals: p07 and u07, p10 and u10, p13 and u13) taken as dependent variables.

The methodological framework underlying GWR uses a kernel function to calculate weights for the estimation of local weighted regression models. Contrary to the standard regression model, where the regression coefficients are location-invariant, the specification of a basic GWR model for each location s = 1, …, n, is:

$$y(s) = X(s)b(s) + e(s)$$

where $y(s)$ is the dependent variable at location s, $X(s)$ is the row vector of explanatory variables at location s, $b(s)$ is the column vector of regression coefficients at location s, and $e(s)$ is the random error at location s. Hence, regression parameters, estimated at each location by weighted least squares, vary in space, implying that each coefficient in the model is a function of s, a point within the geographical space of the study area. As a result, GWR gives rise to a distribution of local estimated parameters, modelling socioeconomic processes that are non-stationary in space (Ali et al., 2007; Manca et al., 2014). The weighting scheme is expressed as a kernel function that places more weight on the observations closer to the location s. In this study, we adopted one of the most commonly used specifications of the kernel function, which is the bi-square nearest neighbour function. All variables were standardized prior to analysis.

RESULTS

Descriptive statistics of job market indicators

Trends in participation and unemployment rates in Italy between 1977 and 2013 were illustrated in Figure 1. Unemployment rate increased from an average rate encompassing 6.5%-7% at the end of the 1970s stabilizing around 9%-10% in the 1980s and decreasing up to 8% at the end of the decade. Unemployment rate increased up to 11% in the 1990s showing a slight but continuous decline between late 1990s and 2007 and a rapid increase afterwards. The minimum value in the whole time-series analyzed (6.1%) was recorded in 2007. This year represented a structural break between a long time interval characterized by unemployment decline (due to the joint effect of moderate economic growth and job reforms) and the 2008-2009 recession. Unemployment rate reached the highest observed value after six years (12.2% in 2013) doubling the rate recorded in 2007. Following a period of slight increase between the end of the 1970s and mid-1990s, participation rate increased rapidly since the end of the 1990s approaching 64% in 2012 and 2013.

The spatial distribution of the two indicators in the Italian local labour markets was illustrated in Figure 2 as crude rate for 2004 and as percent rate of change for three subsequent time intervals (2004-2007, 2007-2010 and 2010-2013). The traditional north-south divide in the performance of local labour markets was evident in 2004 maps. Participation rate exceeded 50% in the majority of northern Italy districts and in a number of central Italy districts with the exception of poorly-accessible rural and mountain areas. In southern Italy, the only districts with participation rate above 50% were found in Sardinia (the metropolitan areas of Cagliari and Sassari and the tourism district of Gallura). Unemployment rate was found below 5% in flat and accessible districts of the Po plain, and below 10% in central Italy districts and in mountain, less-accessible northern Italy districts. Southern districts showed a rate systematically above 10% with sparse districts over passing 15% (the metropolitan area of Naples, southern Sardinia including Cagliari, the majority of Sicily districts including Palermo, some rural districts in Calabria, Basilicata and Apulia). Unemployment rate increased with participation rate (Spearman correlation coefficient, $r_s = 0.90$, n = 686, $p < 0.001$).

During 2004-2007, unemployment rate decreased more rapidly in southern districts than in northern districts. This process was accompanied with a decline in participation rate in southern Italy and a slight increase in northern Italy. The resulting change in the participation rate showed a fragmented and spatially-heterogeneous distribution with higher gains observed in rural areas of northern and central Italy than in urban, coastal and internal flat districts.

Trends in the job market indicators observed in the subsequent time interval (2007-2010) illustrate the effect of the 2008-2009 recession on the job market, determining a spatially-diffused increase of

the unemployment rate in all geographical divisions of Italy. The largest increases were concentrated in high-density, industrial areas of northern and central Italy and medium-density rural areas of southern Italy. Participation rate decreased in southern Italy (except for some tourism and coastal districts in Sardinia, Sicily and Basilicata with rates increasing more than 2%) contrasting with the moderate increase observed in central and northern districts. Changes in participation rate at the local scale were not correlated with changes in unemployment rate. The last phase (2010-2013) was accompanied with a widespread and sharp increase in the unemployment rate. Participation rate increased in both northern and southern Italy and correlated positively with unemployment rate ($r_s = 0.25$, n = 686, $p < 0.05$).

A Principal Component Analysis was finally developed to summarize the spatial correlation in the job market indicators during the four time intervals analyzed (2004, 2004-2007, 2007-2010 and 2010-2013). The PCA extracted two significant components explaining 61.4% of the total variance. Component 1 (38.7% of the total variance) outlines the north-south divide in the Italian job market. Participation rate in 2004 (higher in northern Italy) showed positive loadings while unemployment rate (higher in southern Italy) clustered along the negative side of the axis. While percent changes in the unemployment rate between 2004 and 2007 were positively associated with component 1, changes in the unemployment rate in the subsequent time interval (2010-2013) followed the reverse pattern. Component 2 (22.7% of the total variance) outlines a different spatial pattern for the percent changes in participation rate over 2007-2010 (higher gains observed in northern Italy) and 2010-2013 (widespread increases across the whole country).

Local labour markets and contextual indicators

Spearman non-parametric correlations assessed the relationship between job market indicators and contextual indicators at the LLMA scale (Table 2). Participation rate at the beginning of the study period (2004) showed a marked north-south divide (SOU), being significantly higher in industrial districts (IN%) specialized in mechanics (DK) and with above-average per-capita income (VAP), propensity to export (WEP and EXP), labour productivity in industry (PIN) and services (PSE) and size of local units (SIZ). In these districts above-average values were also observed for the following indicators: population growth rate (GRO), density of foreign citizens (MIG), incidence of upper secondary education (DEG), percentage of civil weddings (WED) and incidence of rented houses (REN). Participation rates decreased significantly in de-specialized districts (DES) with above-average share of agriculture in the total district value added (AG%), density of workers in

constructions (F), commerce (G), health and other public services (N), and incidence of non-occupied dwellings (EMP). Unemployment rate (2004) showed the reverse correlation profile.

Changes in participation and unemployment rates between 2004 and 2007 showed a marked north-south divide. Both indicators decreased in the local districts with an economic structure dominated by commerce, increasing in districts with high per-capita income, above-average labour productivity in industry and propensity to export, larger firms and high attractiveness for foreign people. These results pinpoint at the process of north-south convergence in unemployment rates in Italy, when unemployment decreases were observed mainly in economically-disadvantaged districts, although with a decreasing participation to the job market. Economically-leading districts attracted workers and the increasing participation rate was reflected in a higher unemployment rate. Participation rate between 2007 and 2010 declined in southern Italy and increased slightly in northern Italy. The declining participation to the job market in southern Italy did not impact unemployment rates.

While changes in participation rate during recession (2010-2013) were found uncorrelated with any contextual indicator, unemployment rate increased in southern Italy, mainly in de-specialized districts with an economic structure dominated by commerce. By contrast, unemployment rates increased less rapidly or even decreased in wealthier districts characterized by above-average per-capita income, share of industry in the total product, labour productivity in industry, propensity to export, firm size and percentages of foreign people and civil weddings.

Results of the PCA run on the 74 contextual indicators provided a more comprehensive outlook of the multiple relationships between labour market indicators and the local socioeconomic context. The PCA extracted four components (48% of the total variance): labour market indicators were considered as supplementary variables in the PCA and analyzed for correlation with each component extracted (Table 3). Component 1 extracted 21% of the total variance with more than 10 indicators showing significant (positive or negative) loadings. Component 1 represents a gradient of economic performances (per-capita income, labour productivity in both industry and services, firm size) and industrial specialization (precision mechanics with high propensity to export) discriminating northern districts from southern districts. Performing and wealthier districts - mainly located in northern and central Italy - attracted workers from less-performing or disadvantaged districts and from abroad. Participation and unemployment rates in 2004 and changes in participation and unemployment rates between 2004 and 2007 were correlated with component 1.

Component 2 (12% of the total variance) illustrates the urban-rural gradient in Italy. Compact urban districts with an economic structure based on specialized services (research and development, real estate, finance and banking) and high density of skilled workers contrasted with suburban and rural

districts with the highest share of industrial product in the total product. Unemployment rate in 2004 and changes in unemployment rate (2004-2007) were associated with component 2. Unemployment rate in 2004 was higher in service-oriented local labour markets. Unemployment rate during 2004-2007 increased in industrial districts and decreased in service-oriented local labour markets.

Component 3 (9% of the total variance) identifies a land-use/accessibility gradient in turn associated to specific attributes of the demographic structure and human settlements at the local scale (average number of components per family, non-occupied houses, dwelling size). Participation rate increased during 2004-2007 in less accessible districts. Component 4 (6% of the total variance) illustrates a 'tourism attractiveness' gradient discriminating tourism-specialized districts with younger population, above-average percentage of mono-nuclear families and rapid urban expansion from economically-disadvantaged, de-specialized districts characterized by population aging. Participation rate in 2004 was found moderately associated to component 4.

Exploring district performances through Geographically Weighted Regression

The relationship between local labour market indicators and the four principal components described above was investigated through Geographically Weighted Regression (GWR) producing models with different goodness-of-fit (Table 4). As a general rule, the models running on the dependent variables measured at the beginning of the study period (p04, u04) performed better than the models running on the rates of change over time. Unemployment rate performed better than participation rate as dependent variable irrespective of the time interval analyzed.

Spatial disparities in 2004 participation rate were satisfactorily explained (global adj-R^2 = 0.91) by a GWR model using component scores as predictors (Figure 4). Local R^2 coefficients were particularly high in northern Italy and in some areas of central and southern Italy (Marche, Sardinia, part of Apulia and Basilicata regions). Component 1 ('economic performances and industrial specialization') influenced positively the participation rate in some rural areas of northern and central Italy and in southern Sicily and a similar pattern was observed for component 2 ('rural-urban divide'). Component 3 ('district accessibility and land-use') had the major impact on northern Italy districts and restricted areas of central Italy located between Tuscany and Marche. Component 4 ('tourism and natural amenities') put on evidence the negative correlation between population aging and participation rate in northern and central Italy, with participation rate in southern Italy being positively affected by tourism specialization.

1   The four component scores explained spatial changes in participation rate between 2004 and 2007
2   with a global adjusted R^2 by 0.40. Local R^2 coefficients were the highest in some districts of central
3   and southern Italy. Both the economic performance gradient and the urban-rural divide influenced
4   positively the participation rate in central and southern Italy. A negative association was found with
5   the accessibility/land-use gradient in north-eastern Italy, Apulia and southern Sardinia. Component
6   4 showed negative coefficients in north-western regions and in districts placed at the boundary
7   between central and southern Italy.

8   GWR produced less powerful models for the two dependent variables in the time intervals 2007-
9   2010 and 2010-2013 with adjusted R^2 generally lower than 0.4 and high local R^2 scattered across
10 Italy. The performance gradient and the urban-rural divide influenced the change in participation
11 rates (2007-2010) more in southern districts than elsewhere in Italy. While the accessibility/land-
12 use gradient was negatively associated with changes in participation rate over 2007-2010 in
13 northern Italian districts, the reverse pattern was observed in the following time interval. Our results
14 indicate that, with economic growth, the positive impact of agglomeration economies (e.g.
15 industrial specialization, economic performances and urban concentration) on the participation rate
16 was more evident in central and southern Italy. accessibility/land-use and tourism specialization
17 became the most relevant factors during recession with distinct impacts on participation rates in
18 northern and southern districts.

19 The spatial distribution of the 2004 unemployment rate in Italy was satisfactorily explained (global
20 adjusted $R^2 = 0.88$) by a GWR model with the four principal components as predictors (Figure 5).
21 Local R^2 were found particularly high in districts situated in Emilia-Romagna, Tuscany, Abruzzo
22 and Apulia. Unemployment rate was lower in urban and peri-urban districts with high economic
23 performances. The negative impact of component 4 on the unemployment rate was relatively
24 widespread in central and southern Italy.

25 Changes in the local unemployment rate during expansion were satisfactorily explained by the four
26 component scores (global adjusted $R^2 = 0.58$). Local R^2 coefficients were found higher in northern
27 Italy and in some areas of central and southern Italy than elsewhere in Italy. Factors associated to
28 district economic performances and the urban-rural gradient had a positive influence on the
29 unemployment rate in central-southern Italy. While component 3 had the highest (negative) impact
30 on Sicily and southern Sardinia districts, component 4 showed negative coefficients in north-eastern
31 Italy and in districts placed at the boundary between central and southern Italy.

32 The GWR produced a relatively poor model for the subsequent phase (2007-2010), with adjusted R^2
33 lower than 0.27 and relatively high local R^2 observed only in a restricted part of north-eastern Italy.
34 Spatial trends were comparable with what was observed between 2004 and 2007. The GWR model

1   for 2010-2013 performed better (adjusted R^2 = 0.55). North-east and central-southern districts

2   showed local R^2 coefficients higher than those observed for the rest of Italy. The spatial impact of

3   the four principal components changed slightly compared to the precedent time intervals with

4   higher and positive impact of all components in northern and central districts compared with

5   southern districts. In conclusion, GWR models showed a substantial stability in the spatial

6   coefficient of the four component scores with a moderate north-south divide. These results suggest

7   that recession did not alter the spatial relation between unemployment rate and the indicators

8   associated to the four selected components.

9

10   **DISCUSSION**

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12   Given the inherent spatial complexity of the Italian Local Labour Markets (Patacchini, 2008),

13   exploratory frameworks based on multivariate statistics and spatial techniques provide a

14   comprehensive analysis of the main determinants and contextual factors shaping job market

15   characteristics and performances over time (Rice et al., 2006). The present study has analyzed

16   spatio-temporal trends of selected labour market indicators in Italy with the aim to identify the

17   socioeconomic profile of local districts experiencing (positive or negative) changes in participation

18   and unemployment rates over expansion and recession waves. Our study moves in a regional

19   resilience perspective when exploring the spatio-temporal pattern of the unemployment rate,

20   considered a highly sensitive variable to economic shocks and a proxy for resilience capability

21   (Lee, 2014). The spatial dynamics of the unemployment rate during expansion and recession has

22   been interpreted as a possible measure of local labour market resilience, and the socioeconomic

23   characteristics of the districts that have experienced the best performances in the two phases were

24   investigated (Davies, 2011).

25   With economic expansion (2004-2007), employment grew especially in economically-weak

26   districts, fuelling a process of slow convergence in labour market indicators between northern and

27   southern Italy. Employment gains, however, have partly benefited of a progressive reduction in the

28   participation rate in southern Italy (Dunford, 2008). In northern Italy, an higher unemployment rate

29   was associated with a significant increase in participation rate at the local scale possibly reflecting

30   the higher job attractiveness compared to the rest of Italy (Patacchini, 2008).

31   According to previous studies on socioeconomic resilience in European regions (see for instance

32   Davies, 2011), the analysis of local labour markets' dynamics at the onset of the economic crisis led

33   to mixed results. The correlation profile of the unemployment rate in 2010-2013 is specular to what

34   was observed in 2004-2007 suggesting that the employment gains achieved by lagging districts

during economic expansion were subsequently lost with recession. Economically-leading industrial districts in northern Italy are those experiencing the lowest recession impact on labour market performances. In other words, recession influenced negatively the north-south convergence process stimulated by the 1997 and 2003 job market reforms, showing a more intense impact on the weakest local labour markets in southern Italy. District specialization in advanced industrial sectors (such as precision mechanics) was found as one of the most relevant factors associated to lower employment losses during recession. Interestingly, the socioeconomic profile of districts with the highest gain (and loss) in unemployment rates during expansion (and recession) was quite specular. These results candidate 2007 as the turning point from the process of north-south convergence observed during 2004-2007 to a more heterogeneous regime with wealthier districts better resisting to recession.

Urban areas and districts with an economic structure centred on advanced services occupied an intermediate position between industrial areas of northern Italy, and disadvantaged areas of central and southern Italy with low-skilled workers and a more traditional economic structure based on construction, commerce and the public sector (Dunford and Greco, 2007). These results appear in partial disagreement with what was presented by Lee (2014) for the dynamics of the unemployment rate in the United Kingdom during the 2008-2009 recession. Lee points out that the largest urban areas with an economic structure centred on advanced services and skilled workforce (high percentage of university graduates) tend to be less exposed to economic shocks, showing slower unemployment increases than areas with a more traditional, mixed industrial-service economic structure and less skilled workers. The major differences between Italy and the United Kingdom can be attributed to the economic structure (Patacchini and Rice, 2007) centred on small firms with high propensity to export (such as those specialized in precision mechanics) in Italy. Moreover, regional disparities in participation and unemployment rates are particularly complex in Italy.

Recession has undoubtedly created favourable conditions for a process of divergence between wealthier regions - better protected from economic shocks - and economically-weak local districts (Proietti, 2005; Pike et al., 2010; Cellini and Torrisi, 2014). Moreover, the analysis of Italian LLMAs suggests that "disparities tend to enlarge during slowdowns, that is, during periods in which it is reasonable to expect that fewer resources could be devoted to short-term policies aimed at tackling them" (Magrini et al., 2015). This result is in partial disagreement with the indication coming from empirical studies, that show how regions characterized by a greater firm diversification may be more resilient to economic shocks (Frenken et al., 2007). In our case, the diversification of the local economic structure was the highest in medium-income districts of

northern Italy, suggesting that related variety may reinforce the resistance of industrial districts to economic shocks (Fingleton et al., 2012).

The importance of human capital with high qualification as a resilience factor has also been emphasized in previous studies (Bristow and Healy, 2014). In this perspective, Italy differs somewhat from the stylized facts showing that the percentage of graduates (from secondary school) is higher in industrial districts resulting more resistant to shocks (Faini et al., 1997), contrary to what was observed for the percentage of (university) graduates. These findings - possibly related to the education-job mismatch that characterizes Italy and especially southern Italy (see Iammarino and Marinelli, 2014 and references therein) - underscore the importance of path-dependent processes shaping resilience of the Italian regions (see Sensier and Artis, 2014 and references therein).

Finally, our results suggest how the active policies which introduced more flexibility in the labour market, have also contributed to a regime shift that improved the resistance of weaker local systems to short-term economic shocks. At the same time, the outcome of these policies reflected sometimes controversial situations - such as the decrease in the unemployment rate and the simultaneous decrease in the rate of participation in the labour market observed in the period 2004-2007. These evidence answer to the call "to investigate systemically which institutional structures in regions are responsive to new growth paths, and whether institutional change is required for the development of new growth paths in regions" (Boschma, 2014) and definitely show the relevance of research considering recession, changes in institutional arrangements and local resilience as possible driving forces of regional economic growth.

REFERENCES

Ali K, Partridge MD, Olfert MR (2007) Can geographically weighted regression improve regional analysis and policy making? International Regional Science Review 30(3): 300-329.

Armstrong H, Ballas D, Staines A (2014) A comparative classification of labour market characteristics of British and Greek small islands. European Urban and Regional Studies 21(2): 222-248.

Bailey D, de Propris L (2014) Editorial: Recession, Recovery and Resilience? Regional Studies 48(11): 1757-1760.

Bande R, Karanassou M (2013) The Natural Rate of Unemployment Hypothesis and the Evolution of Regional Disparities in Spanish Unemployment. Urban Studies 50(10): 2044-2062.

Battaglia M, Iraldo F (2011) Spatial effects of labour policies promoted in Italy from 1996 to 2006: an analysis in the EU context. European Planning Studies 19(2): 311-330.

Benediktsson K, Karlsdóttir A (2011) Iceland: crisis and regional development – Thanks for all the fish? European Urban and Regional Studies 18(2): 228-235.

Bonavero P, Dematteis G., Sforzi F (1999) The Italian Urban System. Towards European Integration. Ashgate, Aldershot.

Boschma R (2014) Towards an evolutionary perspective on regional resilience. Regional Studies. doi:10.1080/00343404.2014.959481

Bristow G, Healy A (2014) Regional resilience: an agency perspective. Regional Studies 48: 923–935.

Cellini R, Torrisi G (2014) Regional resilience in Italy: a very long-run analysis, Regional Studies 48(11): 1779-1796.

Christopherson SJ, Michie J, Tyler P (2010) Regional Resilience: theoretical and empirical perspectives. Cambridge Journal of Regions, Economy and Society 3: 3–10.

Cracolici MF, Cuffaro M, Nijkamp P (2007) Geographical distribution of unemployment: an analysis of provincial differences in Italy. Growth and Change 38(4): 649-670.

D'Agostino G, Scarlato M (2013) Innovation, socio-institutional conditions and economic growth in Italian regions. Regional Studies. doi:10.1080/00343404.2013.838000

Dallara A, Rizzi P (2012) Geographic map of sustainability in Italian local systems, Regional Studies 46(3): 321-337.

Davies S (2011) Regional resilience in the 2008-2010 downturn: comparative evidence from European countries. Cambridge Journal of Regions, Economy and Society 4: 369-382.

del Campo C, Monteiro CMF, Oliveira Soares JO (2008) The European regional policy and the socio-economic diversity of European regions: A multivariate analysis. European Journal of Operational Research 187: 600–612.

Dow S, Mantagnoli A, Napolitano O (2012) Interest rates and convergence across Italian regions. Regional Studies 46: 893–905.

Dunford M (2008) After the three Italies the (internally differentiated) North-South divide: analysing regional and industrial trajectories. Annales de Géographie 6(664): 85-114.

Dunford M, Greco L (2007) Geographies of growth, decline and restructuring: the rise and fall (privatization) of the state-owned steel sector and the trajectories of steel localities in the Italian Mezzogiorno. European Urban and Regional Studies 14(1): 27-53.

Faini R, Galli G, Gennari P, Rossi F (1997) An empirical puzzle: Falling migration and growing unemployment differential among Italian regions. European Economic Review 41(3-5): 571–579.

Fingleton B, Garretson H, Martin R (2012) Recessionary shocks and regional employment: evidence on the resilience of UK regions. Journal of Regional Science 51: 109–133.

Fotheringham AS, Brunsdon C, Charlton M (2002) Geographically weighted regression. The analysis of spatially varying relationships. Wiley, Chichester.

Fratesi U, Percoco M (2013) Selective migration, regional growth and convergence: evidence from Italy. Regional Studies 48: 1650–1668.

Frenken K, Van Oort F, Verburg T (2007) Related variety, unrelated variety, and regional economic growth. Regional Studies 41: 685–697.

Giusti A, Grassini L (2007) Local labour systems and agricultural activities: the case of Tuscany. International Advances in Economic Research 13: 475–487.

Glaeser EL, Giacomo AM, Tobio K (2014) Cities, skills and regional change. Regional Studies 48: 7–43.

Green A, Livanos I (2013) Involuntary non-standard employment and the economic crisis: regional insights from the UK. Regional Studies. doi:10.1080/00343404.2013.825712

Hassink M (2010) Regional resilience: a promising concept to explain differences in regional economic adaptability? Cambridge Journal of Regions, Economy and Society 3: 45–58.

Henning M, Stam E, Wenting R (2013) Path dependence research in regional economic development: cacophony or knowledge accumulation? Regional Studies 47: 1348–1362.

Hincks S, Webb B, Wong C (2014) Fragility and recovery: housing, localities and uneven spatial development in the UK. Regional Studies 48(11): 1842-1862.

Hudson R (2010) Resilient regions in an uncertain world: wishful thinking or a practical reality? Cambridge Journal of Regions, Economy and Society 3: 11–25.

Iammarino S, Marinelli E (2014) Education-job (mis)match and interregional migration: italian university graduates' transition to work. Regional Studies. doi: 10.1080/00343404.2014.965135.

Istat (1997) I Sistemi locali del lavoro 1991. Collana Informazioni no. 3. Rome: Istituto Nazionale di Statistica.

Istat (2006) Atlante statistico dei comuni. Rome: Istituto Nazionale di Statistica.

Kemeny T, Storper M (2014) Is specialisation good for regional economic development? Regional Studies. doi:10.1080/00343404.2014.899691

Lee N (2014) Grim down South? The determinants of unemployment increases in British cities in the 2008–2009 recession. Regional Studies 48(11): 1761-1778.

Magrini S, Gerolimetto M, Duran HE (2015) Regional convergence and aggregate business cycle in the United States. Regional Studies 49(2): 251-272.

Manca G, Attaway DF, Waters N (2014) Program assessment and the EU's agrienvironmental Measure 214: An investigation of the spatial dynamics of agrienvironmental policies in Sardinia, Italy. Applied Geography 50: 24-30.

Martin R (2012) Regional economic resilience, hysteresis and recessionary shocks. Journal of Economic Geography 12: 1–32.

Martin R, Sunley P (2014) Towards a developmental turn in evolutionary economic geography? Regional Studies. doi:10.1080/00343404.2014.899431

Martin R, Sunley P (2015) On the notion of regional economic resilience: conceptualization and explanation. Journal of Economic Geography 15(1): 1-42.

Mccann P, Ortega-Argilés R (2013) Smart specialization, regional growth and applications to European union cohesion policy. Regional Studies. doi:10.1080/00343404.2013.799769

Patacchini E, Rice PG (2007) Geography and economic performance: exploratory spatial data analysis for Great Britain. Regional Studies 40: 1–20.

Patacchini E (2008) Local analysis of economic disparities in Italy: a spatial statistics approach. Statistical Methods and Applications 17: 85–112

Patacchini E, Zenou Y (2007) Spatial Dependence in Local Unemployment Rates. Journal of Economic Geography 7: 169-191.

Pellegrini G (2002) Proximity, Polarization and Local Labour Market Performances. Network and Spatial Economics 2: 151–174.

Pike A, Dawley S, Tomaney J (2010) Resilience, adaptation and adaptability. Cambridge Journal of Regions, Economy and Society 3: 59–70.

Rice PG, Venables AJ, Patacchini E (2006) Spatial determinants of productivity: analysis for the regions of Great Britain. Regional Science and Urban Economics 36: 727–752.

Rodríguez-Pose A (2013) Do institutions matter for regional development? Regional Studies 47: 1034–1047.

Proietti T (2005) Convergence in Italian regional per-capita GDP. Applied Economics 37: 497-506.

Salvati L, Mancini A, Bajocco S, Gemmiti R, Carlucci M (2011) Socioeconomic development and vulnerability to land degradation in Italy. Regional Environmental Change 11: 767–777.

Salvati L, Zitti M, Carlucci M (2014) Territorial Systems, Regional Disparities and Sustainability: Economic Structure and Soil Degradation in Italy. Sustainability 6: 3086-3104.

Sensier M, Artis M. (2014) The resilience of employment in Wales: through recession and into recovery. Regional Studies. doi: 10.1080.00343404.2014.920083.

Simmie J, Martin R (2010) The economic resilience of regions: towards an evolutionary approach. Cambridge Journal of Regions, Economy and Society 3: 27–43.

Soares JO, Marques ML, Monteiro CF (2003) A multivariate methodology to uncover regional disparities: A contribution to improve European Union and governmental decisions. European Journal of Operational Research 145: 121–135.

Storper M (2011) Why do regions develop and change? The challenge for geography and economics. Journal of Economic Geography 11: 333-346.

Taulbut M, Robinson M (2014) The chance to work in Britain: matching unemployed people to vacancies in good times and bad. Regional Studies, doi:10.1080/00343404.2014.893058