Do behaviours in cultural markets affect economic resilience? An analysis of the Italian regions

Cellini, Roberto and Cuccia, Tiziana

University of Catania, Department of Economics and Business,
University of Catania, Department of Economics and Business

11 January 2018

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by

Roberto Cellini and Tiziana Cuccia

(University of Catania, Italy - Department of Economics and Business)
Address: Corso Italia 55 – 95129 Catania - Italy
Tel. +39 095 7537728, +39 095 7537741; Fax +39 0957537710
E-mail: cellini@unict.it ; cucciati@unict.it

Abstract – The purpose of this paper is to investigate the relation between the economic resilience and cultural behaviour, resorting to the evidence provided by the 20 Italian regions at the time of the Great recession. We consider specific cultural behaviours, which provide a specific meaning of culture; its relation with the resilience ability of regions is analysed. We document that higher level of supplied and demanded quantity of cultural goods in a region associate with higher regional economic resilience as measured by the ability of limiting employment drop; the relation with the considered cultural behaviours is weaker in the case of economic resilience as measured by the ability of limiting income drop. We propose possible explanations for this asymmetry.

Keywords: Regions, Economic resilience, Great Recession, Cultural goods, Italy

JEL Classification: R39, Z10.

Bullet points:
- We study the relation between economic resilience and cultural variables
- The 20 Italian regions at the time of the Great recession are considered
- Higher levels of supply and demand of cultural goods entail higher resilience
- The link is more evident for employment resilience than for income resilience

Do behaviours in cultural markets affect economic resilience?
An analysis of the Italian regions

1. Introduction

This study inscribes into the strand of the economic literature which analyses the determinants of regional economic resilience. More specifically we aim to evaluate whether behaviours in cultural sectors have a role in explaining the different resilience of regions. To this aim, we resort to the cross-section of the 20 Italian regions at the time of the Great recession.

Resilience is a wide concept, which concerns the way in which different systems react to- and recover from- adverse shock. It is an established topic in disciplines like physics and ecology, while the interest of economics and social studies is more recent. The interest in economic resilience has been strengthened by the recent "Great recession", i.e. the deep negative shock affecting the Western economies starting in 2008. Even within a single country, regions have reacted in different way to the adverse macroeconomic shock. Understanding the reasons why regions show different degrees of resilience to adverse shock is important not only from a theoretical point of view, but also for the policy implications that can derive.

The fact that "cultural factors", along with economic, social and institutional factors stand behind the different degree of economic resilience across regions is out of doubt; this point is widely discussed by available literature –see Huggins and Thomson (2015), for an update review. Usually, the considered cultural factors have an anthropological meaning, as they concern the social cohesion, the importance attributed to education and the respect of social norms within a community.

However, in this paper we restrict our attention to the role that the behaviour of both consumers and suppliers of cultural products can have on the resilience capacity of a local economy. Thus, the concept of culture we are dealing with is narrower than the anthropological one mentioned above even if we cannot disregard that there are obviously linkages between the two concepts: consumers' cultural behaviours can be consistently

influenced by the attitude of a community toward education, and the cultural products supplied are inevitably characterised by the local identity and "social atmosphere".

Over the last years, the increasing interest in the economic role of the cultural sector within the economic systems has spurred several researches on the definition of "culture and creative industries", with statistics that often are not easily comparable as the definitions do not perfectly overlap (see, KEA, 2009, and ESSnet-Culture, 2012 for the methodology adopted in the UE, and Santagata, 2009, and Symbola, 2011, for studies on the Italian case). However, apart from the methodology adopted, all the statistics agree on the fact that the cultural economy is playing an increasing role and, in the years of the Great Recession, it was pretty resilient to the financial and economic crisis, particularly in terms of employment.[1]

The economic resilience of the cultural sector has also been investigated from an institutional point of view: as Pratt (2017) writes, «the cultural field is 'born resilient'» (p.136), as it is largely characterised by a non-normative organizational structure, by dispersed network of small and micro enterprises constantly reorganized on serial project arrangements, and hence by a large flexibility of labour supply and demand.[2] However, Pratt himself suggests that it is better not to abuse of this intrinsic organizational structure in the long-run, due to the weaknesses and economic and social cost of constant reinvention.

At the best of our knowledge, this is the first paper that aims at analysing the links between different indicators of resilience and indicators related to behaviours in specific cultural sectors: specifically, we consider a set of variables included in the official cultural statistics provided by ISTAT, the Italian National Institute of Statistics (ISTAT, 2009). The final aim of our present research is to verify whether and what cultural behaviours, concerning the supply and the demand side of cultural markets, are significant explanatory variables of the different degree of economic resilience shown by the 20 Italian regions at the time of the Great recession.

Our analysis shows that clear links exist between some cultural behaviours and economic resilience, especially if resilience is measured as the ability of a region in

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[1] According to EUROSTAT (2016) data, the cultural employment in EU has registered a slight but continuous increase of its share, moving from 2.4% in 2005 to 2.8% in 2011 (and 2.9% in 2015); in Italy, it has moved from 2.1% in 2005 to 2.6% in 2011 (and 2.7% in 2015).
[2] See Phillips and Strachan (2016) for a specific example in the music market.

limiting drop in employment. The link between the cultural variables and resilience is less clear if resilience is evaluated by income dynamics instead of employment. We offer a theoretical interpretation based on the role of individual propensity to cultural and creative activities as a key factor for economic resilience.

The structure of the paper is as follows. Section 2 reviews the different concepts of economic resilience, with specific reference to regional economics. Section 3 presents the data under investigation and provides a first index for regional economic resilience based on descriptive statistics concerning per-capita income and total employment. An analysis on the links between cultural variables and resilience indices is provided in Section 4, which takes a simple correlation and a simple regression analysis perspective. Section 5 mentions the outcome of a multiple regression investigation. Section 6 takes into account indices of resilience derived from a more elaborated modelling: however, these indices provide similar results as the simpler indices based on descriptive statistics. Section 7 concludes, proposing comments and elaborating on the implications for regional and cultural policies.

2. Different concepts and measures of economic resilience

Economic resilience is a multifaceted issue;[3] it has to do with the ability of systems (cities, regions, countries, or economics sectors) to resist to the impact of a negative shock, and the ability to recover from the adverse consequences. Resisting means to be able to limit the negative impact effect of the shock. Recovering means to be able to re-gain the pre-crisis level or growth performance, or to find new and better, growth paths.

Different concepts and, correspondingly, different definitions of resilience do exist; furthermore, different operative procedures to measure resilience are available even with reference to a given specific concept. A report of CARPI (2013) identifies at least twenty-five definitions of resilience used in socio-economic literature.

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[3] The present review bases on Cellini and Cuccia (2015) and Cellini *et al.* (2017). A critical review on different meanings of regional economic resilience is offered by Martin and Sunley (2015); Di Caro (2014) includes a review of econometric methods to assess regional resilience.

Conceptually, three main interpretations of regional economic resilience may be found. First, *engineering resilience*, that is, the short-term ability of a given area to return to its pre-shock stable equilibrium state, by following a sort of bounce-back trajectory (Simmie and Martin, 2010; Martin, 2012). This view is based on the idea that shocks are temporary and unable to influence a specific system in a permanent way. Second, e*cological resilience*, which is the ability of a particular economic system to absorb shocks (Holling, 1973; Walker *et al.*, 2006) before to find a new equilibrium. This interpretation admits the possibility of (more or less long-lasting) out-of-equilibrium situation generated by the adverse shock. A third, more general, notion of regional resilience, is *evolutionary* or *adaptive resilience*, which focuses on the relationship between the capacity of a system to recover from shocks and its long-term growth performance (Christopherson *et al.*, 2010; Pike *et al.*, 2010; Simmie and Martin, 2010; Boschma, 2015). The evolutionary approach looks at regions as complex systems characterized by the interdependence of space- and time-specific institutional, historical and economic aspects. Resilience is seen as a dynamic process of robustness and adaptability. Martin and Sunley (2015) observe that evolutionary resilience encompass the first two definitions.

Dozens of specific indices have been proposed in socio-economic literature, to measure resilience – basing on both parametric and not-parametric analysis, also depending on the time period under consideration, the data at hand, and the specific aim of research. Economic variables (like per-capita income or labour productivity), labour market variables (total employment or unemployment ratio) and socio-demographic variables are considered by available analyses. In general, two empirical approaches have been taken to obtain economic resilience measures. On the one side, there are indicators that simply consider the performance of a variable (or a list of variables) in an area, with respect to average data (for instance, Lagravinese, 2014, 2015; Evans and Karecha, 2014; BRR Institute, 2015, Giannakis and Bruggeman, 2017). Different ratios (pertaining to different variables) can be rescaled and aggregated into a single index (see, e.g., Dabson *et al.*, 2012, Pendall *et al.*, 2010, Rose and Krausmann, 2013). On the other side, resilience indicators are derived from data regression analysis, which can employ time series for different subjects (possibly within a simultaneous system estimation approach) or panel data. The idea is to obtain a specific coefficient associated to the crisis event (to capture the impact effect) and/or a coefficient associated to the post-crisis years (to capture the

recovery effect), within a model that takes into account the determinants of the level (or growth) of the variable under consideration; in these analyses, spatial interactions among neighbouring areas are introduced in more sophisticated studies (Groot *et al.*, 2011; Fingleton *et al.*, 2012 and 2014; Fingleton and Palombi, 2013; Di Caro, 2017; Doran and Fingleton, 2014).

Broadly speaking, the constituting steps of a typical analysis on regional resilience are: (i) the identification of adverse shock(s): the shock can be one, or more than one; its (their) date(s) can be taken as exogenous or set in an endogenous way on the basis of data themselves;[4] (ii) the measurement of the region-specific responses to the shock(s) –as mentioned, by resorting to simple statistic indicators or to coefficients from regression analysis); (iii) the comparison of resilience indicators across regions; (iv) the explanation of differences in regional resilience indicators.

Our present analysis specifically contributes to the fourth step of the above-outlined procedure: we do not proceed here to estimate resilience indicators for the Italian regions, but we take a set of indices already presented in available studies, and we aim to investigate whether these indices are linked to variables related to cultural behaviour. Thus, we aim to assess whether a part of explanation of the different degree of economic resilience across Italian regions can be driven by differences in specific cultural behaviour.

Several factors are analysed in available studies as responsible for the different degree of resilience across regions, the most popular being: the sectoral structure and sectoral specialization (e.g., Giannakis and Brunneman, 2017); the level of GDP, employment, or wealth (e.g., Petrakos and Psicharis, 2016); human capital; investment (especially in innovation; see, e.g., Crescenzi and Rodriguez-Pose, 2011); trade openness; urbanization (Dijstra *et al*., 2015). Of course, "culture" is a keyword in several studies of this literature line.

Culture is generally interpreted in a wide sense and several meanings of culture can play a role in enhancing local economic resilience: culture as 'local social values' fosters entrepreneurial resilience (Huggins and Thompson, 2015); culture as 'visual arts' (i.e., street art and/or art collections) fosters the revitalization of de-industrialized areas if inserted in local urban planning projects (Lazzaretti and Cooke, 2017); culture as

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[4] See Sensier et al. (2016) for a critical assessment of resilience operationalization and specifically on the choice of shock timing.

'intangible and tangible heritage' fuels local industrial specialization and is able to support the transition of mature industrial districts into new opportunities offered by the creative economy (Bellandi and Santini, 2017).

In the present paper we deal with specific cultural behaviours, recorded by ISTAT, that concern both the demand and the supply side of cultural markets, and we investigate these cultural behaviours as potential drivers of evolutionary resilience: local-based cultural participation and cultural production can be considered two faces of the same coin, able to enhance place-specific responses to exogenous macro-economic shocks in terms of innovations and new job opportunities. Thus, the distinction between the faces of demand- and supply- side of cultural markets has a convenience reason rather than a substantial meaning.

3. Data and basic facts: data

3.1 Indicators for regional economic resilience

The present analysis looks at the twenty Italian regions, and their reaction to the shock represented by the so-called Great recession, that is, the shock that hit the Western economies in 2008 and 2009, as a consequence of the US financial (2007) and economic (2008) crisis. Hence, we focus here on *one* shock.

Specifically, we resort to the resilience indicators computed for the Italian regions by Cellini and Torrisi (2014) with reference to income, and by Di Caro (2015) with reference to employment. In Cellini, Torrisi and Di Caro (2017) a comparison between these different indicators, with a discussion on their respective pros and cons, is provided. Here we simply mention the salient elements.

As an indicator for the economic resilience of region *i*, based on simple descriptive statistics, the following is considered:

(1) $$r_i = \frac{g_i}{|g_N|}$$

where g_i is the growth rate (of real per capita income or, alternatively of employment) in region i over a given period of time, and g_N is the corresponding growth rate at the national level. Notice that since we are typically dealing with negative values of growth rate in period of crisis, the lower in algebraic value is r_i, the less resilient is the region, while the higher in algebraic value is r_i, the more resilient is the region. Similarly, if we dealing with recovery periods, with positive growth rates, the higher the value of r_i, the better the resilience of the region in terms of recovery ability. In all cases, higher values of the indicator stay for stronger economic resilience.

As an indicator for economic resilience based on regression analysis, the simple and standard procedure and modelling suggested by Fingleton *et al.* (2012) is followed: one takes into account the time series g_i (t), with $t \in [1, T]$, for any region $i \in [1, N]$ and then considers the regression equation

$$(2) \qquad g_i(t) = \alpha_i + \sum_{h=1}^{H} \beta_{i,(h)} D_h(t) + \sum_{k=1}^{K} \gamma_{i,(k)} S_k(t) + \varepsilon_i(t)$$

where D_h, with $h \in [1, H]$, denotes the dummy variable associated to shock occurred in time h, whose coefficient captures the impact effect of the shock, and S_k, with $k \in [1, K]$ denotes the dummy variable associated to recovery period following the shock occurred at time k, whose coefficient captures the recovery ability. In applied estimations, recovery periods after shock may have a fixed and equal length, or they can be modelled as lasting until the subsequent adverse shock. The indicator of resilience is represented by the beta or gamma coefficient, according to the cases. If one is interested in evaluating the resilience to a specific crisis, one looks at a specific beta or gamma, depending, respectively, on whether one is interested in the impact effect or the recovery performance; if one believes that the distinction between impact and recovery is useless, a combination of the beta and gamma coefficient referred to a shock can be considered. If one is interested in obtaining an indicator of regional resilience referred to the whole period T (and hence referred to the general ability of a region to react to shocks and not only to a specific shock), an average value (or a combination) of all beta or/and gamma coefficients can be considered.

As already stated, we are here interested in one shock, namely the Great recession shock. As to the date of the considered shock, following Cellini *et al*. (2017), we choose to evaluate the reaction of income in 2009, and the reaction of employment in years 2009 to 2011. It is not strange or unusual that the considered dates of the same shock are different, if applied to different variables. In the case at hand, the Great recession had a minor impact on GDP in 2008 and the big adverse impact in 2009, followed by a slight and temporary recovery in 2010, while employment even increased in 2008, and started to decrease only in 2009, with severe contraction in 2010 and (in several regions) in 2011.[5] The lagged reaction of employment, as compared to GDP, is likely due to the rigidities of Italian labour market. Table 1 provides basic statistics based to the drop of GDP and employment in the years under consideration, in the 20 Italian regions and at the national level, and the corresponding indicator of resilience, here computed according to eq. (1), which are our basic reference indicators in the present analysis. All data are from ISTAT and are borrowed from Cellini *et al*. (2017, p. 313, last Columns of Table 14.1).

< Table 1 - The impact of the Great recession on income and employment >

As already noted in Cellini *et al*. (2017) income and employment seem to tell different stories about the resilience of Italian regions (the simple correlation between the series r_i^{GDP} and r_i^{EMP} is -0.078, that is not significant at all and even negative). According to GDP (the real GDP per capita is considered), the most resilient regions to the Great recession crisis have been Trentino-AA, Calabria and Lazio while the less resilient ones are Umbria, Piemonte and Emilia-R; according to employment (total employment is considered) the strongest resilience pertains to Trentino-AA, Lazio and Emilia-R while the weakest resilience is shown by to Campania, Molise and Puglia. Thus, Trentino-AA is the most resilient region, according to both GDP and employment. However, most regions

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[5] In Italy the real per-capita income remained substantially stable in 2008 w.r.t. 2007 (the variation rate was -0.1%), while it dropped both at the national level (by 6.4%) and in each of the 20 regions. In 2010 the national real per capita grew by 0.9%. All these data drive us to set the date of the negative shock in 2009, with little hesitation. As far as employment is concerned, it has been increasing in 2008 w.r.t. 2007, while it has been decreasing in 2009, 2010 (in each of the 20 regions) and 2011 (in several regions); for this reason, and also for comparison reasons, we consider the average annual variation of employment occurred between 2009 (w.r.t. 2008) and 2011 (w.r.t. 2010).

change widely their ranking position, according to whether GDP or employment is taken as the reference variable (see, e.g., Valdaosta, Liguria, Molise, Calabria).

A live debate is present in the literature on economic resilience, regarding pros and cons of considering GDP *vs.* employment data. On the one hand, employment data do not need to be deflated, thus avoiding difficulties associated to different price indices (Cecchetti *et al.*, 2002). Fingleton *et al.* (2012) argue that a large part of the impact of a recession is generated by the labour market; transient and permanent adjustments in the labour market have direct and differentiated implications on the aggregate demand, on local employers' decisions, on migration of people, activities and ideas and so on. Labour market performance is a major concern in political debate and policy agenda. On the other hand, the consideration of GDP is inclusive of elements that are important in resilience behaviour, and do not affect the employment statistics necessarily: let us think of structural change in economies, changes in production processes, movements of productivity, and so on. Furthermore, the reactions of labour markets are deemed to be less variable than income across regions within a country, due to institutional rigidities. However, this could not be the case in culture-based sectors, where the degree of flexibility of labour market is particularly high (Pratt, 2017).

3.2 Cultural variables

In the present paper, we consider the cross-section sample made by the 20 Italian regions, as observed at the time of Great recession, to investigate the relation between economic resilience indicators and variables related to cultural behaviours. Also all variables concerning cultural behaviours are provided by the Italian National Institute of Statics; specifically, they are from ISTAT (2009) which focuses on cultural statistics and refers to the year 2007.[6] The list of the considered variables and their description is provided in Table 2.a, while descriptive statistics are in Table 2.b. Some variables concern the supply side and/or the cultural endowment of regions, while others concern the demand side and describe consumers' behaviour. All variables are scaled by the size of regions, as

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[6] We consider also further data, concerning demographic and institutional (population and regional surface): all these data are also from ISTAT and are readily available from any publication of (e.g., ISTAT, 2014)

measured by population or territorial size, according to the fact that the variable is population-serving or space-serving.

< Table 2.a – List of cultural variables and their description >
< Table 2.b – Cultural variables: Descriptive statistics >

It is far from being surprising that a great deal of heterogeneity across regions does exist. For instance, the propensity to attend museums, as captured by the percentage of resident population (aged over 6) declaring to have visited at least one museum over the previous year, ranges between 14.7 (in Calabria) to 43.0 (in Trentino-AA); the propensity to attend theatre performances, as captured by the number of tickets sold for 100 residents, ranges between 1.40 (in Molise) and 17.14 (in Lazio). On the supply side, the number of given theatre performances (scaled by resident population in 100,000 residents) ranges from 148 (in Calabria) to 662 (in Valdaosta). It is necessary to underline that these data have to be read and interpreted with caution, in particular in correspondence to variables with minimum value equal to zero. Two cases must be mentioned: (i) there are regions with zero State museums (Valdaosta, Trentino-AA, and Sicily), because public museums are run by the respective Regional administration; (ii) there are regions where State libraries registered zero books borrowed to private (of course in these regions other public libraries are available for the service); in these two cases, we carry out analysis also omitting the regions with the zero minimum values (the label "No_0" is attached in these circumstances). By the way, the zero minimum value in UNESCO variable is genuine, in the sense that there are regions in which no UNESCO sites are present, and there is no reason to omit these observations from the sample.

4. Simple correlation analysis

In this Section we present an analysis of simple correlation between the indicator of resilience and the cultural variable under consideration. Remember that the correlation we are dealing with is the simple correlation between cross-section series made by 20

observation. Thus, the critical value of significance is 0.378, 0.444 or 0.561, according to the two tail test at the 10%, 5% or 1% level of significance, respectively.

Table 3.a reports the simple correlation between any considered cultural variable and the indicators of resilience based on simple statistics referred to either real per capita income or employment. Thus, the reported correlation coincides with the correlation between any single cultural variable, on the one side, and the growth of per capita GDP in 2008-9 (second Column) or the growth of employment in 2008-11 (third Column) on the other side. At the end of the Table, we also report the simple correlation of size measures (namely, regional population and territorial surface) with the resilience indicators, just to make clear that it does not exist any significant correlation between the dimension of a region and its performance in terms of real per-capita income or employment dynamics. An identical substantial evidence is obtained if one performs a single regression equation of the considered resilience indices upon a constant term and each of the cultural variable under investigation, considered as a single regressor; in this case, a regression equation of type $r_i = C + B \cdot x_i + \eta_i$ is considered, where x denotes the cultural variable; the outcome is in Table 3.b. Of course, we are interested in evaluating the statistical significance of coefficient B, which has to be (and it is indeed) in accordance with the significance of the simple correlation.

< Table 3.a - Simple correlation: cultural variables and resilience indicator r^{GDP}, r^{EMP} >

< Table 3.b - Simple regression analysis: the effect of any cultural variable on resilience indicator r^{GDP}, r^{EMP} >

Some comments are in order. First, significant correlation with cultural variables is much more frequent in the case of the indicator of resilience referred to employment rather than the indicator of resilience referred to income: in other words, the cultural behaviours have been more significant in limiting the negative employment effect of the crisis, rather than the negative income effect. Put in a further different way again, larger demand and supply of cultural activities have helped limiting job losses, more than they have helped limiting income drop.

Second, the correlation is particularly strong in the case of cultural variables with a high degree of cross-section variability –see, e.g., the supply of theatre performances, and the propensity to attend museums or theatre.

Third, active cultural behaviours of residents are more important than "endowment" for limiting the negative effect on income; by contrast, endowment may have a role in limiting the income drop. This consideration specifically stems from observing the correlation coefficients of the resilience indicators with the variables related to museums: in our dataset there are three variables related to museums: MUSEUMS (which simply considers the number of State museums, scaled by regional surface –hence, a measurement of "endowment"); MUSATTRACT (which considers the number of visitors –residents and non-residents, charged and free– registered by the museums located in the region, scaled by the regional surface; hence, it is a measure of attractiveness, which has to do, once again, with the cultural endowment of regions); MUSATTED (which reports the percentage of resident population which declares to have attended at least one museum, irrespective of its location, over the past year –hence, a variable related with the demand side of cultural behaviour). Now, there is a positive and significant correlation between MUSEUMS and the regional resilience referred to income (the correlation with the resilience referred to employment is not significant), while there is a positive and significant correlation between the propensity of regional residents to visit museums (as measured by MUSATTEND) and resilience as referred to employment. MUSATTRACT has insignificant correlation with resilience indicators, but the sign of this correlation is positive for the income-based resilience and negative for the employment-based resilience. In sum, how many residents are interested in visiting museums has a positive effect on employment resilience; how many museums are present and how much attractive they are has a positive effect on income resilience, likely due to the tourism attractiveness of region.

Fourth, a few variables have a significant and positive correlation with resilience referred to employment, while are negatively related with resilience referred to income. Namely, these variables are: the propensity to visit museums, the book-readers, the number of active editors, the supply of cinema shows, and both the demand and the supply variables related to theatre performances. All these variables are related to how much active citizens are in cultural life: such a propensity clearly has helped the regional

resilience in terms of employment, while it has had no positive effect on the resilience in terms of income.

These differences on the relevance of cultural behaviours on the resilience indicators in terms of employment and income could be also interpreted taking in account some features of cultural activities and cultural labour markets. Two considerations, in particular, are worth developing.

First, one could wonder whether cultural behaviours like the propensity to visit museums, to read books and to attend theatre performances can be proxied by one single variable, namely the human capital level as measured, for instance, by the share of population with a given level of education. To this end, we have considered the percentage of residents (aged over 15) who are graduated (also this variable, as dated in 2007, is taken from ISTAT)[7]. In the cross-section correlation of this variable with the cultural variables under scrutiny here, a positive and significant (at different level of significance) correlation does exist with all the variables except for the variable concerning both side of radio (RADIOLISTENER, RADIOST); however, this educational variable has no significant (cross-section) correlation with r_i^{EMP} and r_i^{INC}.[8] Thus, generally speaking and as expected, a correlation exist between educational level and specific behaviours in cultural markets; however, the only consideration of education level is insufficient to understand the different degree of resilience across regions, and it is even not helpful to describe the links between resilience and specific cultural behaviours. Furthermore, most of the cultural variables under consideration (more precisely, all variables but the ones related to the radio and TV services demand and supply, along with cinema attendance) are also significantly and positively related with the income level, as measured by per capita income in 2007: also this aspect is far from being surprising –even if a large body of literature suggests that cultural behaviours are more strictly related to educational rather than income attainment (see, Gray, 2003; see also O'Hagan, 1996, and the review in Ateca-Amestoy, 2008, on the determinants of cultural participation). However, and once again, income level alone is insufficient to explain the reason of different degrees of resilience.

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[7] Just for curiosity, the region with the highest percentage of graduated residents is Lazio (14.2%), followed by Liguria (11.3%), while the regions with the lowest percentage are Puglia and Sicily (8.3 and 8.4%, respectively).

Second, the propensity to visit museums, to read books and to attend theatre performances can be interpreted as a sign of intellectual liveliness, curiosity and open-mindedness, that can contribute to the vitality and vibrancy of the regional cultural life. These individual behaviours can also express some hidden artistic and creative interests in the attendance. The concept of "active consumption" could help to interpret the empirical results: cultural consumers are more addicted to cultural consumptions more they are practitioners of creative activities; more they are practitioners of creative activities, more easily they can pass from consumers to producers of creative goods (Caserta and Cuccia, 2001). A macro-economic adverse shock negatively affects local economies but, where these "hidden" artistic and creative interests are cultivated, new energies can be resealed and new ideas can arise able to increase the degree of resilience at least in employment. In fact, the opportunity-cost of the time devoted to creative activities decreases in times of economic crises, due to higher unemployment rate and possibly lower wage rates.

This interpretation is supported by the fact that the cultural and creative sectors are typically characterized by a higher and increasing percentage of self-employers on the total employment[9] and a smaller average size of cultural enterprises (three persons employed, on average, as against five in the services sector as a whole, according to EUROSTAT, 2017).

The smaller average size of cultural enterprises can also explain the lower share of cultural enterprises in the total value of market sales of the services sector (except trade, financial and insurance activities), equal to 5.2%, as compared to the share of 6.3% of number of cultural enterprises in the number of all enterprises in total services (still, except trade, financial and insurance activities). This datum can also have a role in explaining the different relevance of cultural sector in shaping *employment* vs. *income* resilience of regions: the weight of cultural activities is larger in employment as compared to income.

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[8] There is positive and significant cross-section correlation with other resilience indicators, for instance with β^{INC} - see below Section 7; all data not reported in text are available from Authors on request.

[9] Data from EUROSTAT (2016) on "writers and creative artists" show that in 2009 the share of self-employers in UE was equal to 42.2% compared to the share of 16.5 of self-employers as referred to the whole economy; while the share of self-employers in the total employment has not substantially changed in 2011, the share of self-employers among "writers and creative artists" has increased to 47%. In Italy the share of self-employers among "writers and creative artists" was 56.7% in 2009 compared to the share of 25.0 of self-employers as referred to the whole economy; this share has further increased in 2011 to 63% (22% is the correspondent share of self-employers in the total employment in 2011).

We also point out that an active role of individuals in cultural markets may contribute to what Pratt (2015) calls "local capacity building", which is, in his view, the key factor for enhancing resilience. Local capacity building requires competencies, creative expertise, based on intrinsic skills but also developed by formal and informal training, open-mindedness and propensity to innovation. These abilities are partly related with the cultural variables under our present analysis.

5. Suggestions from a multiple regression analysis

Of course, it is hard to obtaining sound evidence from a multiple regression analysis on a cross-section of only 20 observations. Indeed, if we insert more than one regressor, chosen among the cultural variables under scrutiny, as explanatory variable for regional resilience performance, generally any single slope-coefficient appears to be statistically insignificant, though the regression is globally significant, according to the appropriate F-test. Nevertheless, some insights can be derived from the multiple regression analysis.

Maintaining r^{EMP} (i.e., the indicator of resilience based on the relative employment performance of regions), as the dependent variable, we have tried to evaluate how it is affected by the cultural variables related to the demand side and by the variables related to the supply side and endowments. Interestingly, as already mentioned, even if no single explanatory variable is significant as considered by itself, the set of variables is jointly significant in the case of both the supply-side related variables, and in the case of demand-side, the F-test of the regression being $F_{9,10}=4.08$ ($p=0.019$), $F_{7,12}=3.81$ ($p=0.021$), for the supply and demand related variables respectively. The evidence changes slightly if we omit the variables containing the zero minimum values: in such a case, the supply-related variables continue to be jointly significant at the usual confidence level, while the demand-related variable are jointly significant only at the 13% level. The basic statistics concerning the general significance of the multiple regression exercises are reported in Table 4.

< Table 4 – General significance of multiple regression >

Starting from the specification containing all possible regressors for either demand or supply related behaviour, as reported in Table 4, we adopt the so-called "from general to particular" procedure, to find an appropriate specification for the multiple regression. Omitting one-by-one the less significant variable, we arrive at the final specification reported in Table 5.

< Table 5 – A multiple regression specification >

It is worth mentioning that, also in this multiple regression analysis, less clear results emerge, if the dependent variable is the resilience indicator based on GDP instead of employment. In this case, the joint statistical significance of the coefficients related to supply and demand factors is always over 10% (even if always under 25%), and it is impossible to obtain multiple regressor specification where more than one slope coefficient is statistically significant at least at the 5% level.

This drives us to affirm that we find a confirmation of the insight that the cultural behaviours under examination are good factors for explaining the economic resilience of region with reference to labour markets and to total employment specifically, but they are less relevant in enhancing the regional economic resilience as referred to income.

6. Measurements of resilience from time-series model

As mentioned in Section 2, the effect of negative shock upon employment or income can be captured within a context in which the pattern of the investigated variable is modelled, with a more or less complex structural formalization. Thus, the coefficient associated to the shock effect (which provides the resilience degree) is conditional on a set of other explanatory factors which are responsible for the general pattern of the variable under scrutiny. As to the appropriate modelling of income or employment, we have to consider that these variables are typically non stationary, and each of them is integrated of order one; hence, $y_{i,t} = \alpha_i + y_{i,t-1} + e_{i,t}$ is the simplest appropriate statistical representation for the pattern over time of income or employment in region i, so that $\Delta y_{i,t} := y_{i,t} - y_{i,t-1} = \alpha_i + e_{i,t}$. If we want to account for the effect of crisis, we have to

insert specific dummy variables to this end, so obtaining eq. (2).[10] The beta coefficient associated to the years of Great recession, for any region, represents the indicator of the resilience to this crisis. The result of such an exercise is presented in Cellini *et al.* (2017), who consider data over the sample 1960-2013 for employment and income; they obtain, for any region, the beta-coefficient associated to the dummy variable corresponding to the Great recession (2009 in the case of income, and 2009-11 in the case of employment). These cross-section series of these beta coefficients is presented in Cellini *et al.* (2017, p. 320, last Columns of Table 14.4). These beta-coefficient-indicators –that are reported here in Table 1.bis, to ease comparison– can be labelled as indicators of regional resilience *conditional* on the time series modelling of income and employment, as opposed to the *unconditional* indicators of resilience reported in Table 1 (Col. III and VI) which are based on simple descriptive statistics.

< Table 1.bis – Conditional coefficients as indicators for regional resilience >

A comparison between unconditional and conditional indicator shows that $Corr(\beta^{INC}, r^{INC}) = 0.642$ and $Corr(\beta^{EMP}, r^{EMP}) = 0.344$: conditional and unconditional indicators for resilience are correlated, but they show non trivial differences.[11]

Now, the conditional indicators can be analyzed to detect the possible influence of cultural factors, following the same procedure we have already used for the unconditional indicators. Similar substantial outcomes emerge. The simple correlations between the beta coefficients and the variables related with cultural behavior are generally not significant in the case of beta coefficients referred to income (β^{INC}), while they are positive and significant if beta coefficients are referred to employment (β^{EMP}); in particular a positive and significant (5%) correlation emerges from β^{EMP} on the one side, and EDITOR and

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[10] The first difference of variable $y_{i,t}$ coincides with its growth rate if the variable is measured in log.

[11] For instance, with reference to GDP Sardinia is at the 7th place in terms of unconditional performance, but it reaches the 2nd place in the ranking based on the conditional performance: in the light of the "historically weak" performances of Sardinia, it makes very well in the years of the Great recession (in terms of GDP). On the opposite, Veneto is at the 9th place as unconditional performance, but it performed rather badly (at the 15th place) if its historical performance (since 1960s) is take into account. Similar observations apply to the rankings based on employment. However, interestingly enough, in the comparison between the employment-based indicators, Sardinia gets a remarkably worst position when moving from the unconditional to the conditional measure. The explanation rests on the fact that the public sector was unable, over the last crisis, to act as a social protector, as it happened in previous crises.

THEATERATT on the other side; a positive and significant correlation at the 10% level also exists with MUSATT, READBOOK, THEATPERF, CINEMASHOW and CINEMAATT. The same variables are significant in simple regression as well, irrespective of the consideration of observations with minimum zero values or not.

Again, from a multiple regression analysis perspective, the joint significance of explanatory variables is higher for β^{EMP} than β^{INC}.

7. Theoretical interpretations and concluding remarks

The "Great recession" has been an aggregate shock hitting the entire world economy. As to Italy, the drop in the GDP has been particularly severe and long-lasting: real GDP has dropped in Italy by about 8% between 2008 and 2012; most part of the drop concentrating in 2009, when real per capita GDP decreased by 5.0%. Over the same years, employment decreased by about 2.4%. However, the impact of the shock and the economic performance in the twenty Italian regions have not been the same. This point is well known in economic literature: economic resilience, in Italy as well as in any other countries, differs across regions. What makes Italy an interesting case to analyze is the fact that the differences across regions are huge and persistent, both from an historic perspective (see, e.g., Fratianni, 2012; Delmonte and Giannola, 1997, Faini *et al*, 1992, Daniele and Malanima, 2007), and in the specific case of the resilience to the recent shock of the Great recession (Lagravinese, 2014, 2015). Big differences across regions mean large variability of economic factors, and hence good dataset to investigate, to understand which factors are relevant in explaining different economic regional resilience.

Specifically, in the present analysis we have analyzed the relation between regional economic resilience and a list of variables related to cultural behaviors, documenting that a positive cross-section association exists between employment resilience ability of regions and some cultural behaviors that concern both the demand and the supply side. Particularly, on the demand side, the attendance of museums, theatre performances and cinema shows, have a positive and significant correlation with the indicator of resilience in employment (even if with different level of significance), as well as reading book and listening to radio; on the supply side, the presence of book editors and the supply of theatre

performances and cinema-shows show a positive correlation with the employment resilience ability of the Italian regions. No significance has been found for the correlation between the same cultural variables and the indicator of resilience as referred to income.

We have provided an explanation, by recurring to the peculiar characteristics of the cultural sector, where talented persons could find easier to come in, at least as self-employed, especially in period of economic recession when the opportunity costs of alternative working activities tend to become lower.

At a first glance, it could be weird that the cultural sectors show this capacity to explain the degree of resilience of the Italian regions, if we consider that the cultural sectors are usually subsidized by the Central and the local governments and in the years of crisis we have considered, they have paid a high cost in terms of public funds cut. In Italy, after a maximum share of 2.2 per cent of public expenditure devoted to "culture and leisure activities" in 2004 (before the Great Recession), less than 1 per cent of public expenditure results to be devoted to culture in 2012 (Cuccia and Rizzo, 2016).

However, it is the peculiar structure of the cultural industries, characterized by self-employers, small and micro enterprises, and a high rate of turnover of cultural enterprises, that can justify the resilience capacity of this sector and consequently the larger employment resilience of the regions where the cultural behaviors investigated are more relevant.

The scarce impact on resilience in income of the cultural behaviors investigated should suggest that the peculiar organizational and institutional aspects of the sector can play a positive role in reducing the impact and in the capacity of recovery (especially as far as employment is concerned) in the presence of a negative economic shock but they cannot contribute to long-run growth trajectories of aggregate income (Pratt, 2017).

Thus, the higher flexibility of the cultural industries, and their job markets, should not become a justification to let flexibility become the rule in the whole economy for enhancing global resilience, in the impact and recovery phases of macroeconomic shock, and further for enhancing long-run growth.

New forms of public intervention to enhance economic resilience are generally viewed as necessary (Bristow & Healy, 2015). In the specific case of interventions affecting the cultural sector, the measures to implement have to be less based on financial subsidies and more on institutional support and coordination of cultural enterprises.

Citizens' cultural participation and education have to be cultivated and also supported as instruments able, at the same time, to transmit the culture and the identity of the local communities and to favor the resilience as evolutionary ability to react to exogenous shocks, through new and innovative paths.

REFERENCES

Ateca-Amestoy V. (2008). Determining heterogeneous behavior for theatre attendance. *Journal of Cultural Economics*, 32:127-51.

Bellandi M. & Santini (2017). Resilience and the role of arts and cultural-based activities in mature industrial districts. *European Planning Studies*, 25: 88-106.

Boschma, R. (2015). Towards an evolutionary perspective on regional resilience. *Regional Studies*, 49:733-51.

BRR Institute (2015). *Economic resilience*. Berkeley, Ca, US: Building Resilient Regions Institute of Governmental Studies. http://brr.berkeley.edu/economic-resilience/rci/ (as accessed on July 20th, 2015).

Bristow G. & A. Healy (2015). Crisis response, choice and resilience: Insights from complexity thinking. *Cambridge Journal of Regions, Economy and Society*, 8:241-56.

CARPI (2013). *Definitions of Community Resilience: An Analysis*. Washington, DC: Community and Regional Resilience Institute. http://www.resilientus.org (as accessed on January 8th, 2018).

Caserta M. & T. Cuccia (2001). The supply of arts labour: for a dynamic approach. *Journal of Cultural Economics*, 25:185-201.

Cecchetti, S.G., N.C. Mark & R.J. Sonora (2002). Price index convergence among United States cities. *International Economic Review*, 43:1081-99.

Cellini R. & T. Cuccia (2015). The economic resilience of tourism industry in Italy: What the 'great recession' data show. *Tourism Management Perspectives*, 16:346-56.

Cellini R., P. Di Caro & G. Torrisi (2017). Regional resilience in Italy: do employment and income tell the same story?. In R. Huggins & P. Thompson (Eds), *Handbook of Regions and Competitiveness Contemporary Theories and Perspectives on Economic Development*. Cheltenham: Edward Elgar Publishing, 308-31.

Cellini R. & G. Torrisi, (2014). Regional resilience in Italy: a very long-run analysis. *Regional Studies*, 48:1179-96

Christopherson, S., Michie, J., & Tyler, P. (2010). Regional resilience: Theoretical and empirical perspectives. *Cambridge Journal of Regions, Economy and Society*, 3:3-10.

Crescenzi R. & A. Rodriguez-Pose (2011). *Innovation and regional growth in the European Union: Advances in spatial sciences*. Berlin: Springer-Verlag.

Cuccia T. & I. Rizzo (2016). Less might be better. Sustainable funding strategies for cultural producers. *City, Culture and Society*, 7:109-16.

Dabson B., C.M. Heflin & K.K. Miller (2012). *Regonal resileince: Research and policy brief*. RUPRI – Rural Futures Lab Report. http://www.resilientresearch.ca/wp-content/uploads/2015/08/RegionalResilience.pdf (as accessed on January 8th, 2018)

Daniele, V. & P. Malanima (2007). Il prodotto delle regioni ed il divario Nord-Sud in Italia 1861-2004. *Rivista di politica economica*, 97:267-316.

Del Monte A. & A. Giannola A. (1997). *Istituzioni economiche e Mezzogiorno.* Rome: La Nuova Italia Scientifica.

Di Caro P. (2014). Regional recessions and recoveries in theory and practice: a resilience-based overview, MPRA working paper 60300.

Di Caro P. (2015). Recessions, Recoveries and Regional resilience: evidence on Italy, *Cambridge Journal of Regions, Economy and Society*, 8:273-91.

Di Caro P. (2017). Testing and explaining economic resilience with an application to Italian regions. *Papers in Regional Sciences*, 96:93-116.

Dijkstra L., E. Garchilazo & P. McCann (2015). The effect of a global financial crisis on European regions and cities. *Journal of Economic Geography*, 15: 935-49.

Doran, J. & B. Fingleton (2014). Economic shocks and growth: spatio-temporal perspectives on Europe's economies in a time of crisis. *Papers in Regional Science*, 93:S137-66.

ESSnet-Culture (2012). *European statistical system network on culture: Final Report.* Luxemburg: EUROSTAT. https://ec.europa.eu/EUROSTAT/cros/system/files/ESSnet (as accessed on January 8th, 2018).

EUROSTAT (2016). *Culture statistics – Cultural employment*. Bruxelles: EUROSTAT. http://ec.europa.eu/EUROSTAT/statistics-explained/index.php/Culture_statistics_-cultural_ employment (as accessed on January 5th, 2018).

Evans, R. & J. Karecha. (2014). Staying on top: Why is Munich so resilient and successful. *European Planning Studies*, 22:1259-79

Faini R., G. Galli G. & C. Giannini C. (1992). Finance and development: the case of Southern Italy. *CEPR Discussion Paper*, n. 674.

Fingleton, B., H. Garretsen, & R. Martin (2012). Recessionary shocks and regional employment: Evidence on the resilience of UK regions. *Journal of Regional Science*, 52:109-133.

Fingleton, B. & S. Palombi (2013). Spatial panel data estimation, counterfactual predictions, and local economic resilience among British towns in the Victorian era. *Regional Science and Urban Economics*, 43:649-660.

Fratianni M.U. (2012). 150 years of Italian political unity and economic dualism. *Rivista Italiana degli Economisti*, 17:335-56.

Giannakis E. & A. Bruggeman (2017). Determinants of regional resilience to economic crisis: a European perspective. *European Planning Studies*, 25:1394-1415.

Gray C.M. (2003). *Participation.* In: R. Towse (Ed), *A Handbook of Cultural Economics*, Cheltenham: Edward Elgar, 355-66.

Groot, S.P.T., J.L. Möhlmann, J.L., J.H. Garretsen, J.H. & H.L.F. De Groot (2011). The crisis sensitivity of European countries and regions: stylized facts and spatial heterogeneity. *Cambridge Journal of Regions, Economy and Society*, 4:437-456.

Holling, C. S. (1973). Resilience and Stability of Ecological Systems. *Annual Review of Ecology and Systematics*, 4:1-23.

Huggins, R. & P. Thomson (2015). Local entrepreneurial resilience and culture: the role of social values in fostering economic recovery. C*ambridge Journal of Regions, Economy and Society*, 8:313-30.

ISTAT (2009). *Statistiche culturali – Anno 2007*. Roma: ISTAT.

ISTAT (2014). *Annuario statistico italiano 2013*. Roma: ISTAT.

KEA (2006). *The economy of culture in Europe*. Bruxelles: European Commission. http://ec.europa.eu/assets/eac/culture/library/studies/cultural-economy_en.pdf (as accessed on January 8th, 2018).

Lagravinese R. (2014). Crisi economica e resilienza regionale. *EyesReg,* 4:48-55.

Lagravinese, R. (2015). Economic crisis and rising gaps North-Douth: evidence form the Italian regions. *Cambridge Journal of Regions, Economy and Society*, 8:331-42.

Lazzaretti L. & P. Cooke (2017). Responding to and resisting resilience. *European Planning Studies*, 25:1-9.

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

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

O'Hagan (1996). Access to and participation in the arts: the case of those with low incomes/educational attainment. *Journal of Cultural Economics*, 20:269-82

Pendall, R, K.A. Foster & M. Cowell (2010). Resilience and Regions: Building Understanding of the Metaphor. *Cambridge Journal of Regions, Economy and Society*. 3:71-84.

Petrakos G. & Y: Psycharis (2016). The spatial aspects of economic crisis in Greece. *Cambridge Journal of Regions, Economy and Society*, 9:137-52.

Phillips R.J. & I.C. Strachan (2016). Breaking up is hard to do: The resilience of the rock group as an organizational form for creating music. *Jurnal of Cultural Economics,* 40:29-74.

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

Prat A. (2015). Resilience, locality and the cultural economy. *City, culture and society*, 6:61-67.

Prat A. (2017). Beyond resilience: learning form the cultural economy. *European Planning Studies*, 25:127-39.

Rose A. & E. Krausmann (2013). An economic framework for the development of a resilience index for business recovery. *International Journal of Disaster Risk Reduction*, 5:73-83

Santagata W. (Ed), (2009). *Libro Bianco sulla Creatività*. Milano: Egea.

Sensier M., G. Bristow & A. Healy (2016). Measuring regional economic resilience across Europe: Operationalizing a complex concept. *Spatial Economic Analysis*, 11:128-51.

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

Symbola (2011). Io sono cultura 2017. WP Quaderni di Symbola. http://www.symbola.net/assets/files/IoSonoCultura_2017_DEF_1498646352.pdf, as accessed on January 8th, 2018)

Walker, B. H., Gunderson, L., Kinzig, A., Folke, C.S.. Carpenter & L. Schultz (2006). A handful of heuristics and some propositions for understanding resilience in social-ecological systems, *Ecology and Society*, 11:art.13.

TABLES

Table 1 - The impact of the Great recession on income and employment

I	II	III	IV	V	VI	VII
REGION	g_i^{GDP}	$r_i^{GDP} = \dfrac{g_i^{GDP}}{g_{ITA}^{GDP}}$	Ranking	g_i^{EMP}	$r_i^{EMP} = \dfrac{g_i^{EMP}}{g_{ITA}^{EMP}}$	Ranking
Piemonte	-0,078	-1,56	19	-0,003	-0,50	5
Valdaosta	-0,060	-1,20	16	-0,001	-0,17	3
Lombardia	-0,055	-1,10	15	-0,006	-1.00	11
Trentino-AA	-0,028	-0,56	1	0,006	+1.00	1
Veneto	-0,044	-0,88	9	-0,003	-0,50	5
Friuli-VG	-0,064	-1,28	17	-0,007	-1,17	12
Liguria	-0,048	-0,96	13	-0,003	-0,50	5
Emilia-R	-0,065	-1,30	18	-0,001	-0,17	3
Toscana	-0,039	-0,78	4	-0,004	-0,67	9
Umbria	-0,078	-1,56	20	-0,007	-1,17	12
Marche	-0,044	-0,88	9	-0,003	-0,50	5
Lazio	-0,036	-0,72	3	0	0.00	2
Abruzzo	-0,054	-1,08	14	-0,007	-1,17	12
Molise	-0,039	-0,78	4	-0,019	-3,17	18
Campania	-0,045	-0,90	12	-0,023	-3,83	20
Puglia	-0,044	-0,88	9	-0,013	-2,17	18
Basilicata	-0,040	-0,80	6	-0,012	-2.00	17
Calabria	-0,033	-0,66	2	-0,009	-1,50	15
Sicilia	-0,042	-0,84	7	-0,01	-1,67	16
Sardegna	-0,042	-0,84	7	-0,004	-0,67	9
Italy	-0,050			-0,006		

Note: Column I reports the Region; Column II the growth rate of real GDP per capita in 2009 w.r.t. 2008; Column III the ratio between the regional real per capita GDP growth rate and the same growth rate at the national level in absolute value, so that it represents the resilience index in eq. (1) with reference to GDP; Column IV reports the ranking order of region according to the indicator of Column III (1 stays for the most resilient, 20 for the less resilient region); Column V reports the average growth rate in employment registered in 2009, 10, 11 w.r.t. to the previous year; Columns VI reports the ratio between the growth rate of employment as considered in Column V and the corresponding datum at the national level, in absolute value, so that the Colum reports the resilience index as defined in eq. (1) with reference to employment; Columns VII reports the region ranking according to the index of Column VI (with 1 denoting the most resilient region).

Table 2.a – List of cultural variables and their description

	Description	Norm	D vs S
1. MUSEUMS	Number of State museums per 1,000 squared kilometer	Surf	S
2. MUSATTRACT	Number of visitors to State museums (free and charged tickets) per sq. km.	Surf	S
3. MUSATTEND	Percentage of residents (aged 6+) who visited at least one museum in the previous 12 months	Pop	D
4. UNESCO	Number of World Heritage List sites in the region per 1,000 sq. km.	Surf	S
5. LIBR	number of libraries (State and private) in the region per 100,000 residents	Pop	S
6. LIBRBORR	number of books borrowed to private citizens from State libraries per 100,000 residents	Pop	D
7. EDITORS	number of active editors in the region per 100,000 residents	Pop	S
8. READBOOK	Percentage of residents (aged 6+) who read at least one book in the previous 12 months	Pop	D
9. THEATPERF	number of theatrical and musical performances given in the year, per 100,000 residents	Pop	S
10. THEATERATT	number of tickets sold for theatrical and musical shows per 100 residents	Pop	D
11. CINEMASHOW	number of movie showings in the region per 100 residents	Pop	S
12. CINEMAATT	Percentage of residents (aged 6+) who watched at least one movie in cinema in the previous 12 months	Pop	D
13. RADIOST	Number of private radio stations per 100,000 residents	Pop	S
14. RADIOLIST	Percentage of residents (aged 3+) who listened to radio in the previous 12 months	Pop	D
15. TVST	Number of private TV stations in the region per 100,000 residents	Pop	S
16. TVWATCHER	Percentage of residents (aged 3+) who watched TV in the previous 12 month	Pop	D

Note: all data are from ISTAT (2009) and refer to year 2007.

Table 2.b – Cultural variables: Descriptive statistics

	Mean	Median	Min	Max
1. MUSEUMS	0.6747	0.6136	0.0000	2.3213
2. MUSATTRACT	133.93	38.660	0.0300	658.64
3. MUSATTEND	27.445	28.350	14.700	43.000
4. UNESCO	0.1433	0.1182	0.0000	0.3693
5. LIBR	25.052	23.041	14.186	44.924
6. LIBRBORR	431.33	332.00	0.0000	1590.3
7. EDITORS	2.8406	2.8944	0.9458	5.7223
8. READBOOK	42.650	45.000	28.900	55.000
9. THEATPERF	364.15	382.50	148.00	663.00
10. THEATERATT	8.4170	8.6100	1.4800	17.480
11. CINEMASHOW	2.2041	2.1521	0.5868	3.8033
12. CINEMAATT	47.030	47.800	37.400	54.000
13. RADIOST	3.6443	3.4150	0.8247	7.9629
14. RADIOLIST	63.065	62.450	54.500	73.600
15. TVST	1.2228	1.0421	0.3038	3.2089
16. TVWATCHER	93.705	94.050	90.200	95.700
1.bis. MUSEUMS_No0	0.7937	0.7126	0.1576	2.3213
6.bis. LIBRBORR_No0	616.20	517.35	41.938	1590.3

Note: each variable (from 1 to 16) contains 20 observations, corresponding to the 20 Italian regions. Description of variables is in Table 2.a; Variable 1.bis and 6.bis exclude observations with zero minimum values, for MUSEUMS and LIBRBORR respectively.

Table 3.a – Simple correlation: cultural variables and resilience indicator r^{GDP}, r^{EMP}.

I. Variable	II. Corr with r^{GDP}	III. Corr with r^{EMP}
MUSEUMS	0.4776**	-0.2341
MUSATTRACT	0.0279	-0.1051
MUSATTEND	-0.3051	0.7949***
UNESCO	0.0624	-0.0693
LIBR	-0.1104	0.2705
LIBRBORR	-0.2111	0.2581
EDITORS	-0.3015	0.6921***
READBOOK	-0.3399	0.7482***
THEATPERF	-0.3722	0.7186***
THEATERATT	-0.1474	0.5274***
CINEMASHOW	-0.4453**	0.5053**
CINEMAATT	-0.4216	-0.0526
RADIOST	0.0611	-0.0493
RADIOLIST	-0.0279	0.4624**
TVST	0.0786	-0.4023
TVWATCHER	-0.2034	-0.4305
POP	-0.0261	-0.0818
SURF	0.1347	-0.1692
MUSEUMS_(No0)	0.2623	0.1451
LIBRBORR_(No0)	-0.4274	0.4514

Note: ***,**,* denote statistical significance at the 1%, 5%, 10% level (two tail test), respectively: critical values in the case of 20 observations are: 0.378, 0.444, 0.561. The correlation with MUSEUMS_(No0) is based on 17 observations, while the correlation with LIBRBORR_(No0) is based on 14 observations: in these cases, the appropriate critical values are considered, and the reported correlations are not-significant (critical values for significance at the 10% level are 0.412 and 0.457, for 17 and 14 observations, respectively).

Table 3.b - Simple regression analysis: the effect of any cultural variable on resilience indicator r^{GDP}, r^{EMP}

Regressand Regressor	r_i^{GDP}			r_i^{EMP}		
	C	B	R2	C	B	R2
MUSEUMS	-1.06 (-11.1)***	0.12 (1.09)	0.06	-0.78 (-2.03)*	-0.44 (-1.02)	0.06
MUSATTRACT	-0.98 (-12.6)***	3.97e-05 (0.12)	0.001	-0.99 (-3.21)***	-0.001 (-0.45)	0.01
MUSATTEND	-0.69 (-3.12)***	-0.01 (-1.36)	0.09	-4.07 (-7.26)***	0.11 (5.56)***	0.63
UNESCO	-1.00 (-9.77)***	0.15 (0.27)	0.004	-0.98 (-2.41)**	-0.65 (-0.29)	0.01
LIBR	-0.89 (-4.71)***	-0.003 (-0.47)	0.01	-1.90 (-2.59)**	0.033 (1.19)	0.07
LIBRBORR	-0.93 (-11.2)***	-3.1e-06 (-0.79)	0.03	-1.33 (-4.07)***	1.8e-05 (1.18)	0.07
EDITORS	-0.81 (-5.88)***	-0.06 (-1.34)	0.09	-2.59 (-6.23)***	0.53 (4.07)***	0.48
READBOOK	-0.54 (-1.85)*	-0.01 (-1.53)	0.12	-4.92 (-5.99)***	0.09 (4.78)***	0.56
THEATPERF	-0.72 (-4.41)***	-0.001 (-1.70)	0.14	-3.65 (-6.29)***	0.005 (4.38)***	0.52
THEATERATT	-0.90 (-6.79)***	-0.01 (-0.63)	0.02	-2,13 (-4.68)***	0.13 (2.63)**	0.28
CINEMASHOW	-0.65 (-3.97)***	-0.15 (-2.11)**	0.20	-2.55 (-4.03)***	0.67 (2.48)**	0.26
CINEMAATT	0.29 (0.45)	-0.03 (-1.97)*	0.18	-0.45 (-0.16)	-0.01 (-0.22)	0.003
RADIOST	-1.02 (-6.66)***	0.01 (0.28)	0.004	-0.96 (-1.58)	-0.03 (-0.21)	0.002
RADIOLIST	-0.87 (-0.98)	-0.002 (-0.12)	0.001	-8.04 (-2.55)**	0.11 (2.21)**	0.21
TVST	-1.01 (-8.16)***	0.03 (0.33)	0.01	-0.35 (-0.77)	-0.59 (-1.87)*	0.16
TVWATCHER	3.37 (0.68)	-0.05 (-0.88)	0.04	35.61 (1.96)*	-0.39 (-2.02)*	0.19
POP	-0.97 (-9.45)***	-3.04 (-0.11)	0.0007	-0.96 (-2.37)**	-3.8e-08 (-0.35)	0.01
SURF	-0.99 (-6.71)***	8.07 (0.09)	0.0005	-1.40 (-2.41)**	2.17e-05 (0.63)	0.02
MUSEUMS_(No0)	-1.16 -10.4***	0.21 (1.81)*	0.18	-1.06 (-2.78)**	0.20 (-0.42)	0.01
LIBRBORR_(No0)	-0.81 (-7.06)***	-0.0003 (-1.63)	0.18	-1.74 (-3.84)***	0.001 (1.75)	0.20

Note: A regression equation a regression equation of type $r_i = C + B \cdot x_i + \eta_i$ is considered. C and B denote the constant term and the slope coefficient, respectively. Estimates of C and B (and t-stat in parenthesis) are reported, along with the R-squared of the simple regression. ***,**,* denote statistical significance at the 1%, 5% and 10% level, respectively.

Table 4 – General significance of multiple regression to explain r_i^{EMP}

	I All observations	II _(No0) observations
Supply-related variable inserted: MUSEUMS, MUSATTRACT, UNESCO, LIBR, EDITORS, THEATRPERF, CIMENASHOW, RADIOST, TVST	R2=0.79 R2bar=0.59 $F_{7,12}$=4.09 p=0.019**	R2=0.94 R2bar=0.80 $F_{9,4}$=6.80 p=0.040**
Demand-related – variables inserted: MUSATTEND, LIBRBORR, READBOOK, THEATERATT, CINEMAATT, RADIOLIST, TVWATCHER	R2=0.69 R2bar=0.51 $F_{7,12}$=3.81 p=0.021*	R2=0.75 R2bar=0.46 $F_{7,6}$=2.62 p=0.130

Note: Column I uses all observations; Column II omits observation with zero minimun values for LIBRBORR and MUSEUMS.

Table 5 – A multiple regression specification for r_i^{EMP}

	I. All obs	I (No_0) obs
Const	-3.094 (-7,67) [0.000] ***	-3.27 (-8.12) [0.000]***
MUSATTRACT	−0.002 (-2.72) [0.015]**	-0.003 (-4.14) [0.002]***
EDITOR	0.399 (2.43) [0.027]**	0.38 (2.40) [0.038]**
THEATPERF	0.003 (2.01) [0.052]*	0.004 (2.94) [0.015]**
R2; R2bar	0.71; 0.65	0.81; 0.76
F-stat p	$F_{3,16}$=12.86 p=0.000	$F_{3,10}$=14.41 p=0.001

Note: *t*-stat in parenthesis; *p*-value in squared. Column I uses all observations; Column II omits observation with zero minimun values for LIBRBORR and MUSEUMS.

Table 1.bis – Conditional coefficients as indicators for regional resilience

I	II	III	V	VII
REGION	β_i^{GDP}	Ranking according to β_i^{GDP}	β_i^{EMP}	Ranking according to β_i^{EMP}
Piemonte	-0.0736	18	-0.0096#	4 (1)
Valdaosta	-0.0493	4	-0.0135#	9 (1)
Lombardia	-0.0490	3	-0.0124	8 (11)
Trentino-AA	-0.0440	1	-0.0153	10 (12)
Veneto	-0.0681	15	-0.0202	13 (14)
Friuli-VG	-0.0769	20	-0.0089#	3 (1)
Liguria	-0.0527	7	-0.0213#	14 (15)
Emilia-R	-0.0690	16	-0.0098	5 (9)
Toscana	-0.0498	6	-0.0113	6 (10)
Umbria	-0.0767	19	-0.0070#	1 (1)
Marche	-0.0639	14	-0.0195	12 (13)
Lazio	-0.0533	8	-0.0116#	7 (1)
Abruzzo	-0.0601	12	-0.0194#	11 (1)
Molise	-0.0706	17	-0.0261#	17 (1)
Campania	-0.0536	9	-0.0222	16 (17)
Puglia	-0.0606	13	-0.0222	15 (16)
Basilicata	-0.0583	10	-0.0340	18 (18)
Calabria	-0.0495	5	-0.0081	2 (8)
Sicilia	-0.0589	11	-0.0368	19 (19)
Sardegna	-0.0451	2	-0.0414	20 (20)

Note: The reported estimates are borrowed from Cellini *et al*. (2017, p. 320). Coefficients not statistically significant at the 10% level are denoted by #. The ranking according to β_i^{EMP} is made on the basis of algebraic values or, in parenthesis if the non-significant coefficients are put in the first position of the ranking.