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REGIONAL RESILIENCE THROUGH THE LENSES OF THE CAPABILITY APPROACH

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Abstract

Regional resilience has been widely studied in economics and economic geography. The extant literature proposes different measures and definitions, without achieving a unitary view of the concept. In this paper, an interpretation of regional resilience through Sen's capability approach is proposed. In particular, resilience emerges as a collective capability, and "being resilient" as a collective functioning. Individual characteristics of the agents operating in a region and the interaction between them lead to this interpretation. The definitions and measures adopted by the extant literature appear to be parts of a whole, which is difficult to capture in a single analysis.

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Keywords: regional resilience, capability approach, interactions

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1. INTRODUCTION

Economists have borrowed the concept of resilience from physics, ecology (Holling, 1973), industrial ecosystems (Zhu and Ruth, 2013), and psychology as Mamouni-Limnos et al. (2014) recall; and they have used it to study economic units and systems from an evolutionary point of view. Indeed, resilience may be viewed both as a static and as a dynamic characteristic of an observational unit, be it a single agent or a set of agents homogeneously constituting a “body.” Resilience is intimately linked to the ability of an organism to respond to individual and systemic shocks and, in the end, to survive, and is of the utmost interest not only for evolutionary economists, but also for economists in general (Reggiani et al., 2002 and Martin, 2012). Resilience has gained renewed relevance in the literature because of the international economic crisis begun in 2008.

Recent reviews (Bahmra et al., 2011; Mamouni-Limnos et al., 2014; Martin and Sunley, 2015, and Annarelli and Nonino, 2016) highlight that resilience is the (static) capacity to absorb an external shock and the (dynamic) ability to return to the initial conditions or go beyond them. So stated, the notion is very close to the original definitions in physics, where the focus was (and is) on the resistance of materials and systems to hits and perturbations. In other words, it is the capacity of a system to return to its original equilibrium after being perturbed. This concept of resilience has fascinated economists, who are taught about the importance of equilibria from their very first contact with the discipline. However, from an evolutionary perspective, resilience may entail something different from just returning to some initial equilibrium. Mixing physics with psychology and biology, resilience may also be interpreted as the ability of a subject or of a group of subjects constituting a complex organism to evolve to some (new) equilibrium after a shock (Zhu and Ruth, 2013). In this sense, resilience is the capacity of surviving and evolving after being hit by some shock, and, possibly, after internalising it. Adopting this view, resilience is an adaptive process that starts whenever the initial conditions change: whoever is able to adapt to the new conditions survives, the others perish, no matter whether they return to the initial situation or evolve towards a new equilibrium (Carmeli and Markman, 2011 and Doeksen and Symes, 2015). The speed of the recovery or of the transition to the new equilibrium is also a measure of how much a subject is resilient (Diodato and Weterings, 2015).

The concept is then multidimensional and multifaceted. Such a polymorphism has engendered a large empirical literature that has generally considered only one or a few possible measures of resilience at a time. Incidentally, it is noteworthy that these measures may well be seen also as outcomes of the more general process that is called “resilience.”

Economic geography in particular has focused on the resilience of economic systems at regional levels (Simmie and Martin, 2010), and on the capacity of a given area to respond to shocks successfully (i.e. surviving and evolving towards some new equilibrium). However, economic geographers (Frenken and Boshma, 2007) also recognise that the very core of resilience has to be examined at micro level: there is no regional resilience without individual resilience (Duschl, 2016). While a shock may kill some individuals, the population may still survive, although reduced in size, but there will be no survival for the population if too many of its members succumb (Diamond, 1997 and 2012). In this sense, resilience may be measured at both micro and macro level: a region is economically resilient to the extent to which the economic agents are (Weick, 1993 and Weick and Roberts, 1993). Gilly et al. (2014) and Mamouni-Limnios et al. (2014) show that the collective capacity of being resilient depends on the same capacity at firm level. The literature about resilience measured at micro (i.e. firm) level is wide and considers the issue from different perspectives; beyond the regional dimension, indeed, resilience may be considered at both firm and supra-regional level. With a view to interpreting resilience in the light of the capability approach, a third strand of literature on firm resilience is of particular interest: organizational resilience (Gibson and Tarrant, 2010). This refers to the ability of a firm to organise itself internally and externally to be resilient when facing a shock. However, resilience at the larger than regional level has hardly been studied, perhaps because any geographical aggregate is interpretable as having regional scale and because the strength of interactions between the agents of an economic system decreases with distance.

This paper will explore the concept of resilience in the light of Sen's capability approach (Sen, 1993, 1999, and 2002); in particular, the concept of collective capabilities (Ibrahim, 2006) will be used. Indeed, the literature on resilience summarised before suggests that regional resilience entails both individual and collective resilience, for the latter does not exist without the former. As the paper will clarify, there are individual and collective capabilities and functionings, which can be achieved only through the cooperation of several individuals (Ibrahim, 2017). Such a process is typical of the survival of human communities and populations: those which have been able to achieve collective capabilities have survived, others have perished (Diamond, 1997 and 2012). In particular, the paper will show that resilience cannot emerge as a capability nor be attained as a functioning, without interactions between different economic agents. These necessarily render resilience the result of a collective structure and process. The paper shows that as regional resilience entails the interaction between several economic and institutional agents first to be achievable and then to be attained, it is a collective capability and a collective functioning. Moreover, the measures of resilience adopted in the literature are all parts of the same phenomenon, as interpreting it as a collective functioning will show.

Looking at resilience through the lenses of the capability approach could be useful for several reasons. First, it offers a new interpretative framework for the concept of resilience in economics, showing its complexity and the nature of its dependence on the different single economic agents. Second, it frames resilience in a context often used in development economics, providing more citizenship to it in the debate on economic development. Third, it highlights the very cooperative nature of resilience, as collective capabilities necessitate cooperation between the economic agents. From here policy implications stem, as policymakers should enact policies that create and foster the functionalities that are necessary for regional resilience to emerge. Finally, it is important to highlight that the following discussion aims at showing that regional resilience is an emergent¹ collective capability. However, it should be stated that measuring capabilities is a partially open question (Walby, 2012), and this paper does not aim at this goal. Rather, it will propose some possible policy interventions to foster regional resilience in the light of the capability approach. In addition, as resilience is a fundamental element of regional development, the paper will also mention the connections between the two.

2. RESILIENCE

As mentioned in the introduction, economists have borrowed the concept of resilience from other sciences. Without any pretention of reviewing the extant literature on resilience exhaustively, this section of the paper will provide the main definitions of resilience at firm and regional level used in economics, which are necessary to understand why it may be considered a collective capability and identify its characteristics that allow for such an interpretation.

Holling (1973) proposes definitions of resilience in the field of ecology. While his article does not address an economics audience, it contains interesting insights also for this discipline. In particular, he argues that “a system can be very resilient and still fluctuate greatly.”² Such a perspective suggests that resilience is a dynamic process. In addition, in the same article, the author suggests also that a measure of resilience is the speed with which some system goes back to its equilibrium after a shock. While these the definition and the measure seem to be – at least partially – at odds, however, the apparent contradiction is solved by the dynamics of the adjustment process: indeed, as resilience is the ability of returning to the equilibrium, it is achieved even when the path to it features fluctuations. Some years after, another seminal paper on the topic (i.e. Pimm, 1984) reinforced the idea that resilience “how fast the variables [of a system] return to their equilibrium following perturbation.”³

¹ On the concept of emergence used here, see Martin and Sunley (2012).

² Holling (1973), p. 17.

³ Pimm (1984), p. 322.

In the same article, the author adds: “Resilience is not, therefore, defined for unstable systems.”⁴ The emphasis placed by both authors on both equilibrium and adjustment path is of particular interest for economists, as both concepts are central in the economics theory. Both the cited seminal works underline the importance of returning to the equilibrium; however, economics theory allows, in many circumstances, the existence of multiple equilibria, which might be more or less favourable to the agents. The difference between the Nash equilibrium and Pareto’s optimum in the prisoner dilemma offers an example of a game where the equilibrium is not optimal for the agents, yet is an equilibrium. Defining resilience to the ability of returning to one of the possible equilibria, when many exist, implies that resilience in the sense depicted by Holling and Pimm may not always lead to a favourable (or optimal) outcome for the agents involved.

The literature on resilience has evolved, building on the seminal definitions provided by Holling and Pimm. Pendall et al. (2010) survey the definition of regional resilience through different perspectives taken from ecology, psychology, disaster studies, and others. According to them, the basic definition is “a return to normalcy”⁵ after some shock; in other words, a shocked system is resilient if it is able to go back to its initial state in some time. Such a view – the authors note – assumes the existence of a unique equilibrium of the shocked system, and, therefore, it is resilient if it can return to its equilibrium after the shock. The same authors, however, acknowledge the possible existence of multiple equilibria; in such a case, a system is resilient if, once perturbed and displaced from an equilibrium, it can reach one of the other admissible equilibria. The difference with respect to the previous definition is big: on the one hand, the new equilibrium may be worse or better than the starting one; on the other hand, some equilibria are more stable – i.e. more resistant to perturbations – than others. Therefore, moving from a relatively stable to a less stable equilibrium is interpretable as a reduction in the system’s resilience. In both cases – single and multiple equilibria – the speed of return to the (an) equilibrium is a measure of resilience. Finally, Pendall et al. (2010) present an interpretation of resilience “beyond equilibrium,” which characterises adaptive systems in particular. Indeed, a system may respond to a shock through continuous evolution; hence, in this case, there are no equilibria, and resilience is the ability of evolving in adaptation with the mutated and mutating conditions of the framework in which the system is embedded. Martin and Sunley (2015) add another definition to those already mentioned: the ability to absorb shocks. A system may return to some (previous) equilibrium, evolve continuously, or keep the initial equilibrium. In this last case, the shock does not alter the original situation as if the system were insensible to the perturbation.

⁴ Ibidem, p. 322.

⁵ Pendall et al. (2010), p. 72.

Regional economists and economic geographers have often used the last approach to resilience presented by Pendall et al. (2010). Boschma (2015) highlights that they often refer to an evolutionary perspective of regional resilience. In his article, the author first extends the concept of adaptive resilience beyond the ability to cope with shocks to that of developing new growth paths. It is necessary to stress that, for the author, evolution and adaptation are different concepts, although sometimes equated, as resilience overcomes “the tensions between adaptability and adaptation.”^{6,7} Boschma (2015) provides historical evidence of regional resilience through adaptive evolutionary paths. There, resilience grounds on two main pillars: the strength of the region’s industrial base and the territorial institutional context. With reference to the former, the author highlights that related variety and skilled-related industries render regions resilient (see also Quatraro, 2010). The author individuates also the existence of knowledge networks among the factors that explain the resilience of a region: the spillovers and the cooperation potentialities that arise from these networks allow local systems to evolve in accordance with the market needs and to cope with negative shocks. Additionally, Boschma (2015) stresses the role of institutions: indeed, these help to make regions resilient if they are coherent, open to radical changes, and able to reform themselves after shocks. Several actors and interactions between them are therefore needed to achieve resilience. Modica and Reggiani (2015) offer a diachronic review of the literature on spatial resilience, showing that institutions, infrastructure, innovation (at both firm and territorial level), natural environment, and socio-economic factors are all relevant to ensure resilience. Pike et al. (2017) highlight the regional peculiarities of institutions and their policies: particular local governances and institutions adopt diverse and context-specific interventions in the local economies.

Martin and Sunley (2015) stress that regional economic resilience is a process, and they individuate four steps of response to a shock: exposure, depth of reaction, extent, and nature of the adjustment, and post-shock growth path. The last phase implicitly assumes that resilience is evolutionary, as it is the regions that keep growing in the long run that are resilient. In addition, the authors highlight that structural diversity and diversified specialization enhance resilience, as they render the region stronger when confronted with shocks, and more able to recover afterwards. Again, this article shows that resilience arises from the co-presence of different agents, which interact among themselves and with the institutions. Indeed, the authors individuate some possible strategic adjustments at firm level, which also imply indirect interactions: when a shock hits a sector, in the presence of diversified specialization, the firms operating in other sectors absorb part of the workers fired by that hit. Martin et al. (2016) apply a four-step scheme to study the resilience of UK regions between 1971 and 2013.

⁶ Boschma (2015), p. 737.

⁷ On the difference between adaptation and adaptability and their relationships with resilience, see Pike et al. (2010).

They find evidence of evolutionary resilience, and of the ability of the examined regions to go beyond the initial equilibrium. In particular, the authors find evidence that both the industrial and the institutional structure at regional level generate and enhance regional resilience.

Many studies evaluate regional resilience in terms of the reactions of the local labour market to a shock and investigate the role of institutions. In particular, fast employment recovery, small numbers of job losses during a crisis, and higher level of employment after than before the shock are indicators of resilience in such a case. Diodato and Weterings (2015) and Eraydin (2016) highlight that interactions between workers and firms are necessary for resilience, but not sufficient. Institutions that ease labour mobility and the quality of the educational system are crucial elements in determining the resilience of a regional labour market. McCann and Ortega-Argilés (2015) indirectly suggest that national and supra-national political and economic institutions also play a crucial role in rendering labour markets able to face shocks resiliently. Rodriguez-Pose (2013) has already clearly stressed the role and the importance of institutions in sustaining regional development and, therefore, in helping areas to respond effectively to negative shocks. However, Hudson (2009) has noted that the evaluation of resilience at the level of single regions might be misleading, as the resilience of one area may undermine that of another: in a global world, regions and countries are interdependent and the policies enacted by local actors have consequences elsewhere. Therefore, moving from the regional to a wider level, the number of actors involved in ensuring resilience grows. Davies (2011) analyzes EU regions during the economic crisis between 2008 and 2010; her main results highlight the interdependence of EU regions, the importance of economic factors (such as the presence of asset bubbles and industrial inclination), and that of the institutional responses to the shock. In other words, her empirical analysis offers evidence of the complexity of resilience, as a phenomenon that involves many different agents, which interact – even indirectly and involuntarily – to secure (or not) the resilience of a system at regional or higher level.

Martin (2012) claimed that the concept of resilience was (and perhaps still is) far from being clearly delimited and defined. Indeed, in spite of several attempts at systematising, reordering, and providing some taxonomy (see some of the cited survey articles), there are still a large number of indicators, used for the same purpose: showing that (some) regions are resilient, while (some) others are not. However, Cellini and Torrisi (2014) and Dubé and Polèse (2016) claim that resilience is an elusive concept, as different measures and different dimensions of resilience applied to the same set of regions (those of Italy and Canada in the case of the cited articles) render disentangling resilient and non-resilient regions difficult. In addition, only small differences between regions are detectable over the long run. An interpretation in terms of collective capabilities could at least help in nuancing the

different degrees of resilience between regions. In particular, instead of proposing another possible way of measuring resilience, the capability approach will suggest a unification of the measures that have been used so far under the common umbrella of collective capabilities. This will not reduce the complexity of the concept, nor that of the interactions between agents that are needed to achieve resilience. Nevertheless, the reduction of the existent plurality to one – though large – macro-concept will help researchers to understand better what resilience is and that studying parts of a more general phenomenon is useful and fruitful, if, in the end, all the parts are joined together.

3. CAPABILITIES AND COLLECTIVE CAPABILITIES

Amartya Sen (1993, 1999, and 2002) and Martha Nussbaum (2000) are the parents of the capability approach. In Gasper's (2007) words: "Capability is the full set of attainable lives that face a person. [...] Functionings are components of how a person lives."⁸ More explicitly, Fleurbaey (2006) writes: "Capabilities are defined in Sen's work as sets of vectors of functionings [...] A functioning may be any kind of action performed, or state achieved, by an individual, and may *a priori* cover anything that pertains to the full description of the individual's life. Functionings are achieved states which give the owner the freedom of choosing some 'life' (capability) among his set of possible 'lives' (capabilities)."⁹ In other words, examples of functionings at individual level are being fed or literate, while capabilities are the "genuine opportunities or freedoms to realise these functionings."¹⁰ The basic distinction between capabilities and functionings is that the former are freedoms and opportunities to achieve some state, while the latter are the states themselves. These may be expressed in terms of either "being" (for example "being housed in a safe house") or "doing" (for example "voting"). Such an achievement is subordinated to the possibility of accessing the capability that permits to reach it. Grandjour (2008) highlights that functionings are both the consequence and the prerequisite of capabilities, and the same holds for the latter with respect to the former, in a spiral-shaped and virtuous process of continuous mutual activation.

The definitions provided at the beginning of this section highlight the individual dimension of capabilities and functionings in their original formulation. Indeed, Sen was concerned with individual empowerment and development as the engine of the social and macroeconomic process of development. There, the idea is that there is no social progress if each individual is not freely permitted to choose her preferred life from the set of all the possible lives. In other words,

⁸ Gasper (2007), p. 336.

⁹ Fleurbaey (2006), p.

¹⁰ Robeyns (2006), p. 251.

development is a macro phenomenon grounding on necessary micro bases. As such, already in its first micro-level formulation it contained some idea of collectiveness, which was explicitly developed by Ibrahim (2006). In developing countries the poor are often neglected by local and national authorities and sometimes it is difficult for international aid to reach them. However, development economists have shown that the poor are often able to “self-help,” i.e. to act together to reach some common goals, for example the construction and maintenance of dwellings. Voluntary provision of public goods is another typical example of this process. Ibrahim (2006) briefly recalls some literature on the interconnections and interdependence between each individual and others (i.e. the society) in the human world. Durkheim (1972), Granovetter (1985), and Putnam (1993) had already given the individual a central place in a networked and interconnected society, where social interactions and relationships are the daily basis for progress and development. From these interdependencies and interactions, the concept of collective functionings and capabilities arises. These are those capabilities and functionings that cannot be reached individually, and exist only as the consequence of collective actions (Stewart, 2005). What allows the sum of coordinated individual actions in collective action to become a new, collective, capability is, according to Ibrahim (2006), social capital.¹¹ It is noteworthy that they are not simply the sum of individual capabilities and functionings; the typical example is playing a match in competitive team sports: the capability of playing such a match depends on the individuals’ ability to play the sport, but also on the existence of teams. Consider, for example, football; here, there is the sum of the individual functionings “being a footballer” and the collective functioning “being a football team,” which requires that at least eleven football players work together. The sum of these functionings activates the capability “playing football,” which is one of the possible opportunities that the eleven players can choose.

Collective capabilities and functionings, therefore, require the existence of social relationships and interactions between the agents that operate in a region. These social links express themselves through informal and formal institutions that mediate between individual and collective capabilities and functionings, allowing the existence of the last. Migheli (2011) stresses the social dimension of capabilities and functionings, claiming that social capital allows people to reach new capabilities (i.e. to enlarge their set of possible lives): networks allow people to consume relational goods, to access crucial information, and in general the resources embedded in social networks, and to benefit from the spillovers. Coleman (1988) and Schuller (2001) have shown that social capital fosters the accumulation of human capital, both in formal and informal terms.

¹¹ See Putnam (1993) for a definition of social capital.

Institutions, both formal and informal, are fundamental in collective capability building. Social capital is indeed an informal institution based – at least to a certain extent – on formal institutions (associations, political elections, etc.). Ballet et al. (2007) highlight the role of individual responsibility to the community as a major source of collective capabilities: “Responsibility expresses the capability to feel and be responsible, not only *ex-post* (i.e. once freedom has been exercised), but also *ex-ante*, by the capacity to exercise self-constraint on a voluntary basis in order to satisfy one’s obligations towards others.”¹² The aforementioned definition involves principal-agent relationship and agent-agent interactions. On the one hand, such relationships may be established on a voluntary basis and rely on the informal institutions of trust, reputation, social capital, etc. However, some complex relations require formal institutions: innovation and knowledge transfer via patents and the school system, democratic process via constitutional rights and laws, etc. are examples of social interactions and goals that necessitate formal institutions. Tsai (2011) puts forward the tight link between institutions and capabilities to enhance economic development. There, the author stresses that as capabilities are freedoms to achieve functionings, there must exist institutions that grant those freedoms. Many of such institutions should therefore be formal – laws, judicial systems, and constitutions are examples – as they should define freedoms, regulate, and defend them. Huggins and Thompson (2019) develop the role of agencies in the context of regional development: the authors offer a perspective that interrelates the micro level, represented by personality psychology, to the macro level, represented by socio-spatial culture. In particular, they argue that the interplay between these two levels determines the behavioural intentions of the players. These translate into actual behaviours that affect regional development through the mediation of agencies, which translate potential into action. Individuals and groups are able to activate this process of translation through access to “power through their social positions and relations.”¹³ This theoretical framework provides substantiation to the idea that economic achievements (including the realization of regional resilience) are functionings (beings), as well as policies (doings), which are made achievable by the capabilities created by the institutional framework.

In sum, collective capabilities require the coordinated and collaborative action of individuals – generally human beings – in a framework (see Ibrahim, 2017), where such capabilities are allowed to exist by formal and informal institutions. Moreover, existing and achieved capabilities and functionings at both individual and collective level may generate new capabilities and functionings. It is important to highlight that as collective capabilities exist, so collective functionings can or cannot. Consider football again. Once some players come together they can surely start playing; however, for

¹² Ballet et al. (2007), p. 185.

¹³ Huggins and Thompson (2019), p. 139.

a formal match to be played, some formal rules need to be respected; in particular, two teams made up of the minimum number of players are needed. The capability of playing a formal football match is thus activated by the existence of at least two teams with eleven players each (this corresponds to the collective functioning “being a formal football team”).¹⁴ At this point, if the two teams start a match, the functioning “playing a football match” is achieved. However, if the two teams decide not to play, the same functioning is not achieved, though the corresponding capability still exists.

The next section will discuss the concept of regional resilience through the lenses of the capability approach, to highlight how the first may be interpreted as a collective capability and its achievement (i.e. being resilient) as a consequent collective functioning.

4. REGIONAL RESILIENCE, COLLECTIVE CAPABILITIES AND COLLECTIVE FUNCTIONINGS

The goal of this section is to show that resilience is a collective capability, matched with its collective functioning “being resilient.” A terminological distinction between “resilience” as an opportunity and “being resilient” as a being is crucial for the discussion that will follow. Resilience is indeed defined as the “ability of being resilient,” and as such matches the definition of capability as one of the states (lives) that can be reached. Instead, “being resilient” is an achieved state and, thus, a functioning. The extant literature on resilience that is summarised in the second section of the paper does not pay much attention to this distinction, which is both theoretical and practical. While the present paper aims at providing a theoretical tool for unifying the different measures and definitions of the concept used in economics and economic geography, practical implications should not be neglected; therefore, the mentioned terminological distinction is important.

The first step will be to show that regional resilience is a capability and then that it is of a collective type, at least in economics.¹⁵ Such a result will be independent of the definition of resilience adopted, i.e. the ability of returning to the initial situation, or that of reaching a new, more advanced, equilibrium after a shock. Overcoming and unifying the existing definitions, thus, resilience is generally the opportunity to respond positively (i.e. securing healthy survival) to some negative shock. Such an opportunity can be categorised as a capability, as it is a possible outcome for a region, among

¹⁴ Of course, one may claim that the “individual” in such a case is the team and not the single player. Therefore, one may reduce teams to individuals and the collective functioning “playing a team sport” to an individual one. However, as the focus of the capability approach is generally the single person, such a reductionist perspective should be considered with skepticism.

¹⁵ Indeed, in psychology resilience is a concept that refers mainly to each individual person.

those in the feasible set of outcomes when a negative shock hits. Stagnation, stagflation, and de-growth are indeed other possibilities. Regional economic systems are sets of individual economic agents and public institutions; all of them interact within and between each category and are linked by informal institutions such as social capital and trust. As discussed in the second section, regional resilience can be evaluated through different indicators (GDP, employment, turnover of firms, ability of innovating, etc.), whose number has generated confusion about how resilience has really to be measured. However, all these indicators are the result of economic and political processes that involve a number of different actors. Perrons (2012) offers an attempt to link indicators of regional economic performance and social development through the capability approach: she bases her definition of regional development on an index calculated on the functionings achieved at the same geographic level. While her goal is to show that GDP is not a universal indicator of well-being, she suggests that phenomena such as inequality, unemployment, and the share of highly-educated people are collective functionings that exist at regional level.

The concepts of resilience developed in ecology are relevant here, as regional systems are ecological systems, being aggregations of agents and sets of interactions between them; these characteristics render resilience a collective capability, and its achievement a collective functioning. A practical example may help to better understand why resilience is a capability. Regions may be resilient with respect to employment, and this possibility depends on several functionings measured both at individual and regional level. These include skills, training and education levels, and quality of workers, the ability of firms to recover high production volumes after a shock, variety relatedness of the firms operating in the region, and public programs to train the unemployed. Being well-educated, producing related varieties, etc. are functionings, as they are classifiable as beings and doings. Some of them have a clear collective characteristic: the production of related varieties at regional level, for example, depends on the presence of different firms producing such varieties. Education itself is a collective capability, as it is possible only in the presence of people willing to invest in human capital and schools and universities of high standing, and this is true both at individual and regional (collective) level. Quality schools and universities provide quality education, which allows better responses to shocks in the labour market. Variety relatedness eases the movements of workers between firms, allowing reductions in the duration of unemployment. Resilience is also more probably present in the feasible set of outcomes of regions with scarce long-term unemployment than in those with high levels of long-run unemployment, because the depletion of human capital is larger in the latter than in the former case.

The ability of firms to recover high production volumes after a negative shock depends also on the degree of innovativeness of products and production techniques; these depend (also) on the quality of human capital. In sum, the possibility of being resilient depends on the institutional and productive characteristics (i.e. functionings) of the relevant players in the region. Is this a collective capability? The answer is yes. On the one hand, variables at regional level are the sum of the same variables at individual level, as regional systems arise from the sum of the agents operating there. One firm alone does not generate any regional system, nor does one single worker. Collective capabilities and functionings emerge from interactions and interdependence between agents: they do not operate alone, as if they were self-sufficient islands. Firms and workers interact through the labour market; institutions, firms, and workers meet in the market of education, and interact through elections, policies, negotiations. Each single actor alone would not be able to allow the region to be resilient. The presence of one single well-trained and well-educated worker among a number of poorly trained and poorly educated workers is clearly not enough to allow a regional labour market to be resilient; a single innovative firm amid several others that do not innovate will never suffice to secure resilience. In addition, the economic agents need to rely on institutions and policies, which should render resilience a feasible outcome. Training programs for the unemployed, education policies that respond to the changing needs of the labour market, policies oriented to promote R&D are fundamental for resilience to be part of the feasible set of the possible outcomes after a negative shock. For all these reasons – and others may exist – resilience is a collective capability.

As stated before, capabilities come after the achievement of some functionings. “Being innovative,” “being well-trained,” “being well-educated,” and “being able to move from a firm to another (because of variety relatedness)” are examples of functionings that allow employment resilience in the set of the possible achievable worlds after a negative shock. In other words, resilience arises from the presence of a mix of individual (for example “being well-educated”) and collective (for example “producing related varieties”) functionings; moreover the first must be achieved by the largest share of players possible to increase the probability of achieving resilience. Indeed, once this last becomes a feasible opportunity, i.e. is a capability for a regional economic system, such a system must aim at “being resilient,” i.e. transforming that capability into the corresponding functioning. “Being resilient” is a collective functioning, as it arises from a collective capability, i.e. from interactions between players and from other collective functionings, which render regional systems capable of being resilient. The condition of “being resilient” entails the co-working of several different players in the same region.

It starts now to be clear that the different measures of resilience adopted by the literature capture different functionings at individual and/or collective level; on the one hand, they are prerequisites for resilience. On the other hand, they are components of that functioning “being resilient,” which scholars aim at measuring through the functionings that allow resilience. In other words, this capability and its associated functioning are the result of a mix of other functionings and capabilities (such as freedom of education), which interact with and depend on each other through complex mechanisms. The perplexity present in the literature about what resilience is and how it has to be measured may arise therefore from this complexity and from the necessity of focusing on a few functionings at a time. However, partial analyses should not distract from the more complex whole.

Organised economic players may also activate resilience as a capability, even when it is initially absent. Indeed, they may work together and induce policymakers to build the institutional infrastructures (which are functionings), which render resilience a feasible outcome after a shock. In other words, contexts that are lacking the necessary collective functionings may have the capability of stimulating those that are necessary to activate resilience. Such a process may explain why, while in the short run some regions are more resilient than others, in the long run such a diversity is hard to find, as Cellini and Torrisi (2014) showed. There is perhaps no measurement error in their paper, nor ambiguity about the measures adopted; simply regions that were not able to be resilient at a given time were able to activate the functionings necessary to render resilience a feasible option. In such a way, resilience is not a fixed property that is present or absent; rather it is a collective capability, which the presence of the necessary collective functionings may activate. In other words, all regions can be resilient, although not all at the same time.

Lastly, it is noteworthy that resilience is always a collective capability, as being resilient is a collective functioning, no matter whether it means returning to the situation before the shock, or achieving improvements with respect to that situation. The discussion presented in this section cannot be confined to regions, if we want to obtain a more complete understanding of what resilience is when we analyse it through the capability approach. Indeed, regions are aggregates of agents, but also some of these are aggregates of people, working together to allow organizations to be resilient. Therefore, as a capability, regional resilience has an emergent nature (Martin and Sunley, 2012), as it results from the interaction and cooperation of several actors. Indeed, the economic landscape is a self-organising complex system that is constituted by several self-organising sub-systems (e.g. firms), that interact with each other to activate the collective capability of resilience.

The ability of preserving employment, innovation, generation of value added, income, etc. at regional level strongly depends on how firms react to a shock. Yet, they are composite – i.e. collective agents,

as they are aggregations of people working together for that organization. The resilience of a region entails that of the agents operating there, and vice-versa. Of course, not all of these agents are resilient when a region is; however, for the last outcome to be realised, many of the agents must be resilient. The extant literature has studied firm resilience from many points of view and in the face of many happenings.

Eddleston et al. (2008) highlight the collective interior of firms' governance, by showing that families contribute to firm resilience through social interactions and strategic planning. Indeed, owners may perceive their businesses as a "way of life" (Brewton et al., 2010), thus putting much effort in trying to be resilient to shocks. In particular, resilience relates to social capital: families with large endowments of this resource are more likely to render their firms resilient to shocks (unless these destroy large amounts of social capital) than families less endowed with it. Such a result suggests already that resilience at firm level requires cooperation between different agents: on the one hand between firm owners and their employees; on the other hand, between the former and other economic and institutional agents present in the territory. Le Breton-Miller and Miller (2011) argue that family firms are more likely to adopt long-run plans, as they pursue multi-temporal (i.e. multi-generational) goals. Van Essen et al. (2015) find that, during crises, family businesses are less likely than other firms to downsize employment and to cut wages; and despite these policies that are generally the opposite of those adopted by non-family firms, they retain higher levels of resilience (Minichilli et al., 2016). Tasavoru et al. (2018) show that one of the main reasons that explain these outcomes is the presence of internal social capital, especially in family firms. Indeed participative governance is likely to enhance resilience at firm level, both because such a model allows for better planning and because both the workers and the managers feel more involved in facing adverse conditions, when they have all participated in defining the strategies to be adopted. The authors suggest therefore that co-working between managers and other workers in a firm is essential to maximise the chances of resilience.

The literature on firm resilience is thus aware of the collective nature of firms, and, in particular, of the necessary interactions between workers to secure resilience. An in-depth look into firms suggests that their resilience is therefore both a collective capability and a collective functioning as it is for regions. Indeed, a single worker with her abilities, effort, and commitment will never be able to secure the resilience for the firm where she works; this outcome is thus reachable only through the joint work of different and many individual agents within the firm. Once again, resilience – at firm level – is the result of the interaction between several single agents, i.e. it is a collective capability and a

collective functioning, once attained. Firm resilience is also the result of its internal organization, and of the ability of this last to be resilient to external shocks, i.e. to respond appropriately.

5. CONCLUSIONS

This paper proposes an interpretation of resilience through the lenses of the capability approach. Here resilience is a capability and “being resilient” is its associated functioning, i.e. the act derived from the power that resilience represents in an Aristotelean sense. In addition, such an interpretation suggests that all the measures of resilience adopted in the literature may be considered as parts of a unique entity; therefore the debate about how resilience should be measured, is a debate on which parts of it are missing in the existing analyses. While it is impossible to introduce all these parts in one study, it is important to study all of them. The geographical nature of regional resilience and the consequent fact that it involves several different players imply collective functionings and capabilities.

Regional resilience is a collective capability, while its realization is a functioning: both require institutional and structural prerequisites to be achievable. Economic agents that operate in areas where resilience is not a capability may however organise to induce institutional changes, which allow resilience in the set of the feasible choices. In other words, they may use another functioning – the ability of influencing the existing institutions, to reach a new capability and a new functioning. Indeed, both capabilities and functionings do not exist isolated from each other: they are concatenated in a sequence, where each capability and each functioning represents a precondition for the enlargement of the capabilities set. Resilience and being resilient are part of such a chain and allow regions to pursue their growth path over time. Being resilient is a prerequisite for surviving, and furthering the economic and social life of a region, which will produce innovation both at the technological and social level. The paper highlights that while regional resilience is a collective capability and its realization a collective functioning, so is the resilience of the firms operating in a region.

Bearing in mind Holling (1973) and Pimm (1984) a caveat emerges: shocks may also be positive. If resilience implies that systems return to their original equilibrium, then recessive processes should activate after a positive shock. Clearly, such events are negative, as they would cancel the benefits of the initial positive shock. While the paper has taken a positive perspective, presenting resilience as a positive phenomenon in the light of the capability approach, it might have negative sides, which may deserve further research.

Policy makers can facilitate resilience, by creating and incentivising the conditions that allow it to emerge. As discussed earlier, interaction between the regional actors is necessary to build regional

resilience. Hence, the policy makers may intervene through the constitution of advisory boards that include the representatives of all the economic and political agents in a specific area. In other words, policy makers should build and activate the functionings that are necessary for regional resilience to emerge. These boards should serve to identify the problems common to the economic agents, to design appropriate policies (for example the activation of training programmes for unemployed or unskilled workers) that may help the region to cope with negative shocks. Indeed, policy makers may have only partial knowledge of existing problems, and limited ability in identifying the correct interventions; advices from the economic agents hit by negative shocks may instead provide them with relevant information. Similarly, the dialogue between economic agents and educational institutions may help the latter to better understand the needs of the formers, and to design educational programmes that are respondent to the real needs of the territory. When this type of cooperation exists, resilience may emerge easier, than when such interactions are absent. Policy makers may intervene here through incentives to both economic agents and educational institutions, which engage in such a cooperative process. In addition, scholarships for students enrolling courses born from these collaborations may constitute another intervention.

The regional dimension is crucial for resilience to be a collective capability and for “being resilient” to be a collective functioning; indeed, economic systems require different agents to operate and interact between each other. What may be puzzling, however, is the definition of “region” itself: many works in the literature take ready-made definitions, such as NUTS-2 and NUTS-3. While it is true that such a choice may ease the analysis, as statistical data are available at these regional levels, resilience may arise also at different geographical scales.

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