

**Building Regional Economic Resilience:
What Can We Learn from Other Fields?
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Introduction

Within a variety of academic fields, the concept of resilience has been gaining currency as a way to understand how systems react to change, disruptions, and trauma. The idea of ‘resilience’ has become a common method of trying to capture different responses to an increasing number of systemic shocks. Frequently, however, many of these studies stay within their own fields, rarely branching out beyond the specific topic of interest to explore how resilience is conceptualized in other fields and what contributions that definition of resilience might provide to their own work.² Furthermore, even though most of those working on the topic believe resilience is not an innate concept but rather a capacity that can be built, there is generally a tendency to researchers to focus on how a system or individual bounces back, rather than why.

Within economics and urban policy, there has been some work to use the idea of resilience to examine how and why regions bounce back from economic shocks. This effort is still in a growth phase, however, even as the theory of resilience and its associated bounce back is applied to all manner of conditions, especially with regard to the series of economic disruptions experienced in the last decade. There has been an effort to understand why a regional economy reacts the way it does to disturbances, in an effort to limit the effect of shocks or maybe to prevent them altogether.

Since, as mentioned above, resilience is a faculty that can be built, one way to develop the skills leading to greater resilience is to build up the capacities that have led to resilience in other cases. In order to contribute to this goal, this paper attempts to synthesize the literature on

² Two exceptions to this field-centered tendency for resilience studies are to the inclusion of mentions to the study of resilience in the physical sciences, where the concept was originally used to describe a property of an item, as well as in ecology, where the idea is generally agreed to have gained a foothold for wider use with Holling’s 1973 publication, “Resilience and Stability of Ecological Systems.”

the capacities that have led to economic resilience in a variety of settings and to review the capacities that lead to resilience in other domains (such as disaster response, human development, and organizational systems) to determine which, if any, could also contribute to economic resilience. Especially in economics, much of this work is still highly theoretical and learned through case studies; in other fields, especially psychology, where resilience has been in use longer, there is more experimental analysis of why some people or institutions are resilient to trauma. This analysis results in four policy recommendations for decision makers attempting to increase regional economic resilience: develop a plan and prepare for disruptions; identify and build mechanisms that create flexibility; facilitate networks; and promote a positive vision of the region.

Defining resilience

Within a number of fields, resilience is becoming a popular method of exploring response to disruptions. Many writers on the subject date the interest in the idea of resilience to Holling (1973), who defined resilience as “A measure of the ability of these systems to absorb changes of state variables, driving variables, and parameters, and still persist. In this definition resilience is the property of the system ...” (p. 17). As just a sampling, however, this idea has now been applied to: economic systems (Dhawan & Jeske, 2006; Hill, Wial & Wolman, 2008; Rose, 2004; Rose, 2009); housing market foreclosures (Swanstrom, Chapple & Immergluck, 2009); businesses (Sheffi, 2005); natural disasters (Adger, Hughes, Folke, Carpenter & Rockström, 2005; Bruneau et al., 2003; Campanella, 2006; Colton, Kates & Laska, 2008; Norris, Stevens, Pfefferbaum, Wyche & Pfefferbaum 2008; Vale & Campanella, 2005a; Vale & Campanella, 2005b); terrorism (Coaffee, 2006); human response to trauma (Bonanno, 2004; Bonanno &

Mancini, 2008); community response to trauma (Ganor & Ben-Levy, 2003); human development (Rutter, 1993; Werner, 1993); organizational systems (Government Accountability Office, 2009); urban development (Burby, Deyle, Godschalk & Olkshansky, 2000; Godschalk, 2003); and social justice (Morrow, 2008).

Following on Holling's work, most definitions of resilience focus on the ability of a system to 'bounce back' from a disruption. In his book exploring resilient businesses, for example, Sheffi (2005) states that "For companies, [resilience] measures their ability to, and the speed at which they can, return to their normal performance level following a high-impact/low-probability disruption" (p. ix). Similarly, the Community and Regional Resilience Institute (CARRI) defines community resilience as "The capability to anticipate risk, limit impact, and bounce back rapidly through survival, adaptability, evolution, and growth in the face of turbulent change" (CARRI, n.d.); likewise, Handmer and Downs (1996) define resilience as "How a system copes with major perturbations to its operating environment" (p. 486).

As within many growing fields, there are still disagreements in resilience studies about how to measure and define resilience. For example, some researchers prefer to define resilience broadly, by looking at actions and capacities before, during, and after a disruption—Bruneau et al. (2003) categorize four dimensions of resilience, labeling two of the measures (redundancy and robustness) as "the 'means' by which resilience can be improved" and calling them "key in measuring system and community resilience" (p. 740), thus including pre-event decisions as part of the resilience effort. Other authors, such as Rose (2009), reject such a conception, preferring to focus only on actions that occur during the disturbance and terming pre-shock actions as "mitigation." Still others, such as Godschalk (2003), consider mitigation activities as part of the development of capacities for resilience.

A similar challenge is the tendency of those working in resilience studies to attempt to divide resilience from related concepts, such as resistance, prevention, adaptation, and recovery.

Rose (2009) also makes note of this drive for distinctions, observing that:

Some have contended that resilience and vulnerability are opposites, while others see them as interrelated ... My view is that vulnerability is primarily a pre-disaster condition, but that resilience is the outcome of a post-disaster response. Resilience is one of several ways to reduce vulnerability, the others being adaptation and the entirely separate strategy of mitigation (p. 3).

Rose also explains how resilience differs from stability, sustainability, mitigation, and adaptation, among other ideas. Similarly, Norris, Tracy, and Galea (2009) distinguish resilience from resistance, relapsing/remitting, delayed dysfunction, recovery, and chronic dysfunction. (p. 2191). However, as Sheffi (2005) astutely notes, in many cases there is no “bright line” between resilience and related concepts (p. 274); he recognizes this problem even as he divides business actions into those that reduce the probability of a business disruption (“security”) and those that enable a disrupted business to bounce back (“resilience”). Further, the same action may both decrease the risk of a disruption but also enable a system to bounce back should the disruption occur.

Resilience can be developed. It is important to note that resilience is generally conceived in the various fields as a capacity that can be built in both individuals and systems (American Psychological Association, n.d.c; Egeland, Carlson & Sroufe, 1993; Norris, Stevens, Pfefferbaum, Wyche & Pfefferbaum, 2008; Wilbanks, 2008). Foster (2010) states that “Resilience is not simply an inherent personal trait but also capacities, behaviors, and resources *one can develop* to deal with difficult challenges. Resilience can be *acquired and fostered* through internal steps ... and through society’s external interventions” (p. 4, emphasis added). By identifying the capacities that lead to resilience, a system or an individual can begin to

develop those resources in itself in order to bounce back to future disruptions. Learning from the results of past disruptions or traumas also seems to help build resilience.

Factors leading to economic resilience

In order for an economy to remain strong, it needs to be able to bounce back from a variety of threats. As Simmie and Martin (2010) note, economies can be disrupted for numerous reasons: “Periodic economic recession, the unpredictable rise of major competitors elsewhere, unexpected plant closures, the challenges arising from technological change and the like” (p. 27). To that list, we could add external shocks that, while not economically-based, might have considerable effects on an economy, including health disruptions (whether natural, such as pandemic flu, or man-caused, such as an anthrax attack) and disasters both natural (e.g., earthquakes and hurricanes) and man-made (e.g., terrorist attacks). Indeed, it often does not matter what the cause of the shock—what matters more is how the system responds and if it is able to recover (Sheffi, 2005).

Economic resilience can be defined geographically, at the international, national, regional and local level, as well as for individual businesses and consumers. For example, while the city of Detroit may not be considered resilient to the shocks it has experienced since 2000, the region of Detroit (which includes the surrounding counties) has proved relatively resilient (Hill et al., 2010). In this paper, while our focus is on regional economic resilience, we will consider economic shocks and resilience at all economic levels—in most instances, the level does not need to be defined, but in those cases where it does need definition, the level will be described as necessary.

The resilience of economic systems is affected by the interconnectedness of today’s economy. Rose (2009) notes that “Macroeconomic resilience is not only a function of individual

business or household actions but also of all the entities that depend on them or that they depend on directly or indirectly” (p. 12). Sheffi (2005) also recognizes this fact from the vantage point of individual businesses, observing that “Each enterprise is only as resilient as the weakest link in its supply chain” (p. 15). The global economic recession of the previous two years shows the resilience—or lack thereof—of the global economy, as nations have been unable to recover to their previous level of GDP due partly to economic conditions in other countries or within their own cities or regions.

Throughout the literature on economic resilience, there are a number of factors that have been cited as leading to resilience. The structure of the economy—especially high levels of human capital, organizational capital, and its leading industries—can increase a region’s resilience, as can flexibility and diversity. In addition, resilient regions tend to be those that plan and prepare for disruptions and learn from previous experiences. Developing these capacities have led some regions to increase their resilience and may provide a guide for others trying to do likewise.

Structure of the economy. The structure of an economy—especially at the regional level—may aid or harm the economy’s capacity for resilience. A number of studies have tried to empirically discover which characteristics led regional economies to either display or not display resilience. Chapple and Lester (2007, 2010) used discriminant analysis as an exploratory tool in trying to find what characteristics contribute to a region’s resilience. They ultimately found that human capital seems to be an important characteristic for resilience with regard to average earnings per worker—“Those regions which attract highly-skilled workers and are engaged in innovation create enough regional income to increase the average earnings per worker over time” (2007, p. 12). They argue that both Austin, Texas, and Trenton, New Jersey, were aided in

growth by their highly educated citizens (2010). Both Foster (2009) and Christopher, Michie, and Tyler (2010) also theorize that human capital can lead to increased resilience because, as the former notes, “Workers with college and advanced degrees are more flexible and nimble in an economic downturn” (p. 35).

High levels of human capital can also lead to a strong organizational culture, which is an important capacity of resilient businesses because, as Sheffi (2005) learns through his case studies, it allows an organization “to respond quickly and flexibly,” which is also important for resilient economies. He finds that an effective organizational culture is comprised of four traits: “Continuous communications among informed employees, distributed power [which allows for immediate response by front line employees], passion for the work, and conditioning for disruption” (p. 255). It should be noted that these capacities are usually the result of robust planning and preparation for disruption, one of the capacities outlined below, but also endow the employees with the skills necessary to respond when planning and preparation are not adequate for the disruption encountered. In addition, this culture creates the necessary conditions for employees at all levels to learn how to distinguish between true disruptions and the normal fluctuations of a business, since repeated responses to the latter can result in complacency and a lack of immediacy when a true disruption strikes (Sheffi, 2005). Regional decision makers can apply Sheffi’s four traits to both their employees and their citizens by increasing communications, providing the tools for immediate response, showing passion for their region, and planning and preparing for shocks.

The leading industries in a region can also play a role in increasing the capacity for economic resilience. Chapple and Lester (2007, 2010) find evidence that regions moving into technology and knowledge-based work—the ‘New Economy’—show greater levels of resilience

with regard to both average earnings per worker as well as income equality. They also find that Trenton was resilient partly due to the increasing number of government jobs in the city. Further, for cities with a large portion of their employment in manufacturing, an important capacity for resilience is the ability to produce innovations and to stem job losses. Chapple and Lester argue that these two characteristics helped Detroit remain resilient through the 1990s, and, further, find through their analysis that “The ability to bounce back, or even to stem decline, derives in part from a region’s industrial history and structure, i.e. the types of industries that remain, their internal restructuring processes and their workforce strategies” (2010, p. 102).

Flexibility. Resilient systems also display flexibility, usually as a result of pre-disruption planning but also during the shock through innovation and creativity. This flexibility can take a number of different routes, including flexible sourcing of inputs, flexible factors of production, flexible markets to consume finished goods, and a diverse economy that is not reliant on one industry or company. Flexibility can also take the form of redundancy through the extra capital, employees, or inventory an economic system can make use of during a disruption. In some cases, this redundancy may provide an alternative method of production or source of goods or services during a shock; at other times, it allows an economy to cut workers, goods, or services when the economy is in distress (by ‘cutting the fat’). The challenge in this latter case is not cutting too much so essential people or items are lost and, thus, negatively impacting potential resilience.

At the level of an individual company, Sheffi (2005) outlines the characteristics of a flexible enterprise, which:

Involves close partnerships with suppliers, who can be called upon to help; flexible contracts, allowing for changes in quantities and delivery schedule; flexible manufacturing facilities that can be used to produce multiple products; a multi-skilled work force with empowered employees who can move quickly from one task to another; and strong customer relationships ensuring continuity in troubled times (p. 179).

In his book, he outlines how flexibility helped UPS and Caterpillar respond to economic shocks with minimal disruption. Sheffi also analyzes the resilience of Dell Computers, which was able to shift demand for a specific microprocessor after an earthquake disrupted production in 1999—because most of its computers are customized by the consumer during the ordering process, Dell simply increased prices for the microprocessor in order to limit demand for that specific component (Sheffi, 2005). In addition, Rose (2009) theorizes that “The more inputs that are fixed, the fewer the resilience options and the less likely the economy achieves an ultimate level of efficient resource allocation” (p. 9), which leads him to develop a series of options for businesses, households, and governments trying to increase their resilience.

Diversity. An additional trait that leads to flexibility and resilience in some systems is diversity. Hill et al. (2010) find that diversity, either as the region’s degree of economic concentration or its diversity of exports, made it less likely that a region would experience a downturn and, if it did enter a downturn, the economy would be shock-resistant. Likewise, Simmie and Martin (2010) observe that Cambridge, UK’s economic resilience in the 1990s was partly due to “The ability to continually branch out of the existing specialized industrial sectors” (p. 39). In addition, Garmestani, Allen, Mittelstadt, Stow, and Ward (2006) show that, in a study of firms in South Carolina, “Economic stability is enhanced when firms of different sizes emerge or are encouraged to emerge within industries” (p. 544). Further, anecdotal evidence from interviews in Detroit, for example, also demonstrate the convention wisdom—city leaders and economic development experts believe that the city’s industrial concentration in the automotive industry has led to a decreasing level of resilience with each new economic shock since 2000 (Hill et al., 2010).

Plans and preparations for disruptions. Case studies show that resilient economic systems are those that have planned and prepared for the disruptions they may face. This planning needs to go beyond simply having a business continuity plan in case of a disruption; systems should identify vulnerabilities and stage mock emergency drills so the people involved—whether employees, citizens, decision makers, or others—know what to expect in case the shock occurs and, more importantly, how to react in order to decrease the effect and limit the duration.

In his book, *The Resilient Enterprise*, Sheffi (2005) provides numerous case studies of businesses that, thanks to foresight, were able to respond to interruptions. For example, due to the high-cost and long use-life of its manufactured parts, Caterpillar, Inc. does not find it cost-efficient for the company or its dealers to maintain a large inventory of these pieces. Therefore, Caterpillar created a computerized system that the headquarters operation and its dealers all have access to in order to locate parts that a customer may need, so the company can buy back a part as needed from a dealer.

Such planning and preparation need not occur only at the level of an individual business. Economic systems at all levels—from a local community to a national economy—can have plans in place for dealing with potential economic dislocations such as industry shocks and trade wars as well as non-economic disruptions with economic impacts, including war, health threats, and natural disasters. Such planning can limit disruptions when and if they ultimately occur and allow time for the actors in the economy to regain their bearings before a negative impact occurs or becomes permanent.

Learning from experience. One method of developing planning and preparation—and thus building resilience—is by learning from past experience. Resilient systems are often those

that have applied past experience in dealing with disruptions to planning for subsequent shocks (Sheffi, 2005). However, most systems actively work to avoid disruptions in the first place, and, during the recovery period from a disruption, may be more focused on resuming the prior circumstances than in learning from the shock; therefore, Sheffi notes that “Learning from disruptions elsewhere does not need to be confined to disruptions within one’s own organization” (p. 27). While his advice is directed to companies, it is just as applicable to larger economic systems, such as a regional or national economy; this includes when he goes on to say “There are several types of experiences from which organizations can learn. These include near misses that happen to them, accidents that happen to them, near misses that happen to others, and accidents that happen to others” (p. 44). However, economic systems may find their resilience diminished by repeated shocks, as if the cushion deflates a little each time and is not reconstructed.

Factors leading to other types of resilience

As noted above, the use of resilience is growing in an array of disciplines, both practical and academic. Fields as diverse as psychology, health, disaster preparedness, counterterrorism, and others have explored ways that people and systems can bounce back from a serious disruption. Some of the capacities that lead to these other types of resilience are the same as those that lead to economic resilience, namely flexibility as well as planning and preparation. However, there are many additional capacities that can build resilience in these other fields, and many of these other capacities can be directly analogized to factors that may increase economic resilience.

Plan and prepare for disruptions. Planning and preparation are especially important for resilience because the best time to prepare for a disruption—whether it affects an individual or a system—is before it happens, since there is adequate time to think through various possibilities. Berke and Campanella (2006) note the importance of pre-disaster planning in their work on postdisaster resilience: “Federally supported mitigation efforts at the state and local level tend to be driven by plans hastily prepared during the disaster recovery period rather than before the event when there is time to *prepare well-conceived plans*.” (p. 196, emphasis added). Such planning can be complex and multi-faceted—as Godschalk (2003) points out, “Planning for resilience in the face of urban disaster requires designing cities that combine seemingly opposite characteristics, including redundancy and efficiency, diversity and interdependence, strength and flexibility, autonomy and collaboration, and planning and adaptability” (p. 139).

Planning and preparation for other kinds of system resilience needs to include both detailed steps on how to respond to potential disruptions as well as simulations of a disruption so that those involved know how to react to an occurrence. For example, during an audit of resilience at the Internal Revenue Service (IRS), the Government Accountability Office ([GAO], 2009) found that emergency planning is one of the primary capacities that lead to organizational resilience. As part of its emergency planning, the IRS has business continuity plans in place and is supposed to operate “tabletop exercises” both among business units and by geographic area, which produce lessons learned to be incorporated into future resilience planning.³ A similar kind of advance planning aids in recovering from economic shocks.

Planning and preparation are also important for an individual’s ability to respond to trauma. Rutter (1993) found that “Resilience may be fostered by steps that make it more likely

³ While the GAO (2009) report notes that the IRS does operate these exercises, it also found that “The tabletop exercises ... are not regularly conducted. ... In addition, IRS officials noted that the tabletop exercises are not always well designed” (p. 13-14).

that people will feel in control of their lives and become effective in shaping what happens to them” (p. 628) or by ‘planning’ how to deal with situations that arise in marriage and the workplace. The American Psychological Association (APA) includes making a plan as one of its steps that can increase individual resilience to both war and to the Gulf oil spill (APA, n.d.a; APA, n.d.b).

Learning from history. An important capacity that can lead to resilience in both systems and individuals is the ability to learn from past experience, an attribute noted above that aids in developing economic resilience. Lessons learned in during previous disruptions or traumas can be used to inform plans and preparations for future disruptions. Rutter (1993) finds an analogy from vaccination to the development of resilience:

Immunity to infections, whether natural or therapeutically induced through immunization, derives from controlled *exposure* to the relevant pathogen, and not through its avoidance. Resilience results from having the encounter at a time, and in a way, that the body can cope successfully with the noxious challenge to its system. In short, resistance to infection comes from the experience of coping successfully with lesser doses, or modified versions, of the pathogen (p. 627, emphasis in original).

Rutter also cites evidence that individuals who were children during the Great Depression were more resilient to trauma in later life. Similarly, Egeland, Carlson, and Sroufe (1993) find that individuals who successfully dealt with challenges during an early period in life were more adaptable later. There are some, however, who dispute the necessity of learning from past experiences for individual resilience. For example, while Bonanno and Mancini (2008) do argue that exposure to past traumas may increase a person’s resilience, they also find that being a “repressive copier”—or tending “to avoid unpleasant emotional experiences”—also provides benefits for resilience (p. 372).

Learning from history is also important for the resilience of systems. GAO (2009) found that the IRS’s successful responses to past disruptions allowed it to be resilient at other times,

such as by being able to call upon seasonal employees during emergencies. Likewise, the Tuti people of Khartoum have experienced repeated flooding of their small island in the middle of the city and have used the knowledge developed from these events to prevent erosion (and, hence, future flooding) and to develop plans for use during future floods (International Federation of Red Cross and Red Crescent Societies [IFRC] Staff 2004). These lessons learned have enabled the Tuti to bounce back from floods with minimal assistance from the Sudanese government.

Flexibility. Although planning and preparation are important for resilient systems and individuals, flexibility can also lead to resilience, both in an economic system (as noted above) and in other types of situations. As Godschalk (2003) notes with regard to the resilience of urban areas, “The public and private organizations of a resilient city would both plan ahead and act spontaneously. ... They would set goals and objectives, but *be prepared to adapt these in light of new information and learning*” (p. 139, emphasis added). Jacob and Showalter (2007) also explore the factors leading to resilience in the context of the response of coastal areas to climate change and growth, and find that “Adaptive capacity to recover from disasters is a primary hallmark of long lasting, resilient coastal cities” (p. 24).

While planning and preparation help outline what should be done before, during, and after a disruption, flexibility allows a system or individual to deal with unforeseen situations; flexibility allows adaptation to changing circumstances and new knowledge that would enhance future resilience. At the level of the individual, Bonanno and Mancini (2008) argue that “A core aspect of flexibility is the capacity to shape and modify one’s behavior to meet the demands of a given stressor event” (p. 372). With regard to community resilience, Colton, Kates, and Laska (2008) argue that “In every hazard event and resulting disaster, creativity and improvisation are required” (p. 4). Horwich (2000) determines that one of the main reasons that Kobe, Japan, was

able to bounce back quickly from the 1995 earthquake was because local residents and businesses were able to switch between capital- and labor-intensive processes; likewise, Adger, Hughes, Folke, Carpenter, and Rockström (2005) note that the Cayman Islands, after experiencing three strong hurricanes in 1998 and 2000, executed a series of national and local changes in order to build resilience to future hurricanes—“Adaptations included changes in the rules and governance of hurricane risk, change in organizations, establishment of early warning systems, and promotion of self-mobilization in civil society and private corporations” (p. 1038). These changes allowed the islands to demonstrate resilience in the aftermath of 2004’s Hurricane Ivan. Flexibility also creates the space and time needed for a system or individual to respond to a disruption.

Redundancy within systems also allows a system to fall back on additional resources or trim unnecessary waste, thus offering maneuvering room for responses to severe disruptions and increasing the likelihood of a system’s resilience to trauma. Handmer and Dovers (1996) argue that “One way of increasing our ability to cope with, or to resist, sudden environmental change (i.e., decreasing our vulnerability) is to have some redundancy or spare capacity in the system” (p. 492). Redundancy is also important to organizational resilience. According to the GAO, the IRS improves its resilience by operating redundant tax processing centers across the country, even as the IRS strives to cut costs:

IRS has a strategy to build resilience through geographic dispersion of leadership, data systems, personnel, and other capabilities. Accordingly, IRS’s campus operations are carried out at eight locations across the country; each campus has the capability to handle taxpayer calls and process tax returns. ... The network of IRS campuses is geographically dispersed and also highly redundant in function (p. 15).

Redundancy has also shown its value in the response to both natural and man-made disasters (Mitchell & Townsend, 2005; Colton, Kates & Laska, 2008).

As in economic resilience, however, redundancy can be compromised by the effort to decrease costs. For example, milk pasteurization was halted in Melbourne, Australia, in 1998 after a natural gas leak disrupted power there; Montenegro (2010) places part of the blame on the dairies' quest for efficiency:

If the dairies had hedged their risk with backup fuel supplies, building more resilience into the system, milk pasteurization would not have ground to a complete halt. The number of supervisors at the gas plant had been reduced from four to one, and all the engineers had been relocated to the head office in Melbourne, leaving just one person at the controls. Simply having more people could have helped safeguard against catastrophe (p. 2).

Montenegro also examines the role of redundancy in ecological resilience, since “This redundancy can help a system absorb disturbance—or when it’s lost, make it vulnerable to attack” (p. 2).

Diversity. Just as in economic resilience, diversity can be an important component of flexibility for individuals and systems exposed to disruptions, because it allows for variation in the possible responses to a disruption. Adger, Hughes, Folke, Carpenter, and Rockström (2005) argue that “Biodiversity enhances resilience if species or functional groups respond differently to environmental fluctuations, so that declines in one group are compensated by increases in another” (p. 1037), while “diversity of lifestyle choices” contributes to social resilience (p. 1038).

Effective governance. One factor often cited for the development of resilience in systems is effective governance. Foster (2010) argues that “strong governance” is a basic capacity for regional resilience; in another paper, Foster (2006) uses a case study of resilience in Buffalo, New York, to outline the components of governance to include “The significance of qualitative factors such as internal and external relations, levels of coordination and collaboration, and the byproducts of regional structure as important determinants of regional

resilience” (p. 36). Christopherson, Michie, and Tyler (2010) also find evidence that, in one example, “Longer-term political decisions contributed to the deterioration of physical capacity for regional resilience” (p. 5). Effective governance especially provides a foundation for resilience after disasters (Adger, Hughes, Folke, Carpenter & Rockström, 2005; Berke & Campanella, 2006; Burby, Deyle, Godschalk & Olshansky, 2000; Coaffee, 2006; Colton, Kates & Laska, 2008; Godschalk, 2003; Jacob & Showalter, 2007).

Such effective governance would seem to be necessary to economic resilience. Without effective governance, it would be difficult to establish the other conditions—such as planning and preparation (described above) and collaboration and infrastructure (described below)—necessary for resilience. This governance needs to operate at various levels of government, as noted in the examples of Florida’s water management districts and the Gulf Coast’s recovery after Hurricane Katrina (Jacob & Showalter, 2007) as well as the example of Dutch waterboards (Ostrom & Janssen, 2004) so different efforts can be integrated and the knowledge of various players—from local citizens to outside experts—can be appropriately utilized.

Collaboration. Another important capacity that can increase system resilience is collaboration among the various actors in a system. Colton, Kates, and Laska (2008), for example, note how a group response to Hurricane Betsy enabled the New Orleans area to bounce back from one of the worst hurricanes it ever experienced:

Local, state, and federal officials coordinated a massive evacuation and a swift emergency response. Together with private companies and the Red Cross, the joint response had infrastructure, schools, and businesses functioning a near-normal levels 1 month after Betsy roared through the city (p.7).

Adger, Hughes, Folke, Carpenter, and Rockström (2005), Godschalk (2003), the Department of Health and Human Services (2009), and the Government Accountability Office (2009) include collaboration among their capacities leading to resilience. Collaboration can also contribute to

the resilience of economic systems, as actors including businesses, policy makers, and consumers work for the benefit of the entire system.

As part of collaboration, it is important to include the voices of the more vulnerable in resilience efforts. Norris, Stevens, Pfefferbaum, Wyche, and Pfefferbaum (2008) find that “Previous discussions have likewise emphasized the importance of social support for community resilience” (p. 139), while Berke and Campanella (2006) argue that “Early and continuous involvement generates increased commitment and a sense of ownership and control over policy proposals” (p. 200). Jacob and Showalter (2007) note that:

Not only are plans developed with substantive citizen involvement less likely to face opposition from the local communities whose lives will be impacted, they might also be better technically, by incorporating details that emerge from locally engaged citizens, and more effectively monitored by the citizens (p. 30).

With regard to economic resilience, such collaboration could include individuals at all economic levels within a region, from high-ranking decision makers such as mayors or city council members to workers to the poorest in society, who, if their needs are not considered, could encumber impede the development of resilience.

Supportive relationships. Effective governance and collaboration at the system level may be analogized to supportive relationships at the level of individual resilience. The capacity of supportive relationships is related to effective governance in that both provide reinforcement in times of disruption as well as leadership before, during, and after a trauma. A number of studies have found that supportive parenting or relationships with individuals such as grandparents or teachers provides children with the resilience needed to move past severe trauma (Bonanno & Mancini, 2008; Egeland, Carlson & Sroufe, 1993; Rutter, 1993; Werner, 1993). Werner also found that this capacity of resilience extended into adulthood, as supportive spouses or other close friends helped a person to show additional resilience.

Economic resources. Another capacity of a system or an individual that can lead to resilience is economic resources, both over time and for assistance in response to a specific disruption. This is especially true of community or regional resilience, as Paton and Johnston (2001) reason, because it “Involves ensuring that community members have the resources, capacities and capabilities necessary to utilise [sic] these physical and economic resources in a manner that minimises [sic] disruption and facilitates growth” (p. 273). In recent years, the effect of economic resources has been increased by globalization and internationalism (Adger, Hughes, Folke, Carpenter & Rockström, 2005). Similarly, however, an individual’s personal wealth can also aid resilience during a trauma (Morrow, 2008; Werner, 1993).

In some ways, the economic resources of a community with regard to resilience can simply be condensed to economic development—those communities, cities, and countries that are more economically developed tend to have greater resilience when a shock hits because they have more resources on which to fall back. Rozario (2005) argues that the economic conditions of late 19th century Chicago and early 20th century San Francisco—“The communications advances, technological innovations, economic reorganizations, and migration of the post-Civil War period ensured the availability not only of essential resources like lumber, steel, and labor, but also of insurance money and investment capital” (p. 29-30)—allowed the cities to bounce back from large scale disasters; likewise, the IFRC (2004) found that, after a cyclone in 1999, villagers in Samiapalli, India, were able to bounce back faster than those in neighboring villages because new homes protected them during the cyclone and a new water system kept their drinking water clean from potential contaminants. Foster (2010) includes wealth as a basic capacity of a region in her Capacity Index because “Having more money or wealth in a region provides a cushion for the unexpected and enables responses of greater magnitude” (p. 34; see

also Cutter, Boruff & Shirley, 2003). Norris, Stevens, Pfefferbaum, Wyche, and Pfefferbaum (2008) also include economic development as one of their “four primary sets of adaptive capacities” that lead to community resilience (p. 127). Many of those who argue that economic resources are helpful in developing resilience also note that resilience is further heightened when those resources are equitably distributed—Morrow (2008) makes this argument in her analysis of the relationship of resilience to social justice (see also Cutter, Boruff & Shirley, 2003).

Economic policies can also lead to a loss of economic resilience, as noted by Adger, Hughes, Folke, Carpenter, and Rockström (2005), who argue that modern agricultural and management practices, including export-focused production, increased the vulnerability of communities in Latin America after Hurricane Mitch in 1998. Likewise, Swanstrom (2008) finds that some economic processes can lead to a lack of resilience, especially those processes that lock in certain behaviors, decrease the role of the state, or increase cronyism.

Infrastructure. Economic resources are also important for a system’s resilience because they allow the system to maintain, repair, or upgrade the infrastructure, which is also a capacity for resilience. This infrastructure can take the form of both physical elements, such as housing, highways, and communication tools, and institutional elements, such as community nonprofits and other organizations. Bruneau et al. (2003), for example, find that “Improving the resilience of critical lifelines such as water and power and critical facilities and functions such as emergency response management is critical for overall community resilience” (p. 735-736). Without these lifelines, systems may not be able to return to their pre-disaster level of operations or to aid recovery, thereby limiting resilience. Jacob and Showalter (2007) also find that construction methods are important for resilience, as demonstrated in New Orleans, and that “Three issues—*good siting, proper building codes, and a compact urban pattern*—form the core

elements of resilient coastal communities” (p. 8, emphasis in original). With regard to institutional infrastructure, Vale and Campanella (2005b) note that organizations set up in aftermath of urban tragedy—“such as civil defense organizations, law enforcement agencies, charities, insurance brokers, and victims compensation funds—are certainly vital aspects of urban resilience” (p. 12).

Infrastructure, therefore, can be an important capacity for economic resilience, since it can enable an economy to resume operations after a disruption. Without working highways or other transportation mechanisms, recovery help cannot be moved into an area that has experienced a disruption and people cannot exit the area to access help or find another place to live. In times of economic shocks, communication tools can provide ideas, plans, and resources for recovery, while physical infrastructure allows access to other markets or consumers. Social infrastructure also aids economic resilience, as charitable entities provide services (including education) to those impacted or disadvantaged.

Personal characteristics. There are several personal characteristics of that can help foster an individual’s resilience and which can be analogized to economic resilience. First, Bonanno (2004) finds that hardiness can increase an individual’s resilience, and it:

Consists of three dimensions: being committed to finding meaningful purpose in life, the belief that one can influence one’s surroundings and the outcome of events, and the belief that one can learn and grow from both positive and negative life experiences. Armed with this set of beliefs, hardy individuals have been found to appraise potentially stressful situations as less threatening, thus minimizing the experience of distress (p. 25).

Hardiness could also help develop economic resilience. In the case of an economic system, hardiness would need to be demonstrated by both the leaders and those at lower levels.

Individually and as a group, they would need to fulfill Bonanno’s three dimensions of hardiness: showing a purpose, believing that they can affect events, and learning from past experiences.

A similar personal trait that can increase resilience and be applied to economic resilience is the development of a positive attitude and self-image. Rutter (1993) argues that a positive frame of mind can help increase a person's resilience, possibly because "Success in one arena gives people positive feelings of self-esteem and self-efficacy that make it more likely that they will have the confidence to take active steps to deal with life challenges in other domains of their lives" (p. 629). Rutter as well as Werner (1993) find that a positive social orientation can increase a person's resilience. The APA (n.d.c) encourages individuals to have a positive self-image in order to increase their resilience. A positive attitude may also be a characteristic leading to resilience in an economic systems, as the positive attitude could encourage support for the system from both members of that system as well as those outside the system that could provide reinforcement; this positive attitude would also be a result of and help lead to more hardiness of the economic system, as outlined above.

Public policy recommendations

As noted at the outset, resilience is not an inherent quality of a system but rather something that can be developed. Therefore, there may be room for public policy to aid the development of economic systems at all levels, although here we focus on policies that aid resilience at the regional level. Ideally, to build an economically resilient region, policy makers should: develop plans and prepare for disruptions; identify and build mechanisms that create flexibility; facilitate networks among the various actors, including citizens; and promote a positive vision of the region. These tools will help a region both to prepare for a disruption as well as to bounce back successfully from one. However, there are also several constraints that

limit the development of resilient economic systems, including trade-offs, costs, and moral hazard.

Develop plans and preparing for disruptions. As noted above, one of the key components of resilience for economic systems as well as for other systems and for individuals is planning and preparation for disruptions. Having a plan allows a system or individual to know what physical and emotional resources can be called upon during times of distress, as well as how to act when the disruption occurs. A plan provides breathing space and permits the involved actors time to think and consider next steps.

Many individual organizations and governments have put such efforts in place through business continuity plans, especially in the aftermath of September 11, 2001, but these plans need to be regularly practiced and updated. Plans for resilience cannot reflect every possible hazard that could face the system, which would be almost limitless, but should reflect the greatest threats and common responses to different disruptions. Indeed, the asset hardening that can result from such planning may make other parts of the system unexpectedly more vulnerable to a disruption, so it is best to be prepared in general for disruptions to occur.

A region's economic and political leadership (including representatives from civic organizations) should come together and develop plans that can help the region weather possible economic shocks. They could use Sheffi's (2005) three questions to assess vulnerability: "1. What can go wrong? 2. What is the likelihood of it happening? 3. What are the consequences if it does happen?" (p. 20). The planning team could work through possible responses to different types of shocks to the region, in order to develop plans to minimize the effects and, therefore, aid resilience. For example, if the region is heavily dominated by one industrial sector, plans could be developed that would help redirect the industry in case of an input shock or sudden decrease

in demand. Likewise, there could be a plan in place in case a national recession affected the region, leading to higher unemployment and greater demand for social services—the planning team could identify which service providers would face increased demand and where additional resources could be obtained. Such planning would not guarantee resilience in the face of a shock, but it could help cushion any blow, provide time for recovery, and provide guidance for possible regional changes (such as increased diversity) that would lead to general economic development even without a shock prompting change.

Identify and build mechanisms that create flexibility. Flexibility is also a key factor in resilient systems and individuals. Economic resilience can be increased if policy makers encourage this flexibility to develop in a variety of ways. Policy makers can also encourage the actors in the economic system to develop their own flexibility. One common way to develop flexibility in a regional economic system is through a diverse mix of industries and companies, so that the economy is not dependent on one major import or export. Likewise, a city or region with a mix of fiscal inputs is better placed to withstand a disruption than a region that relies only on one such input—this has been shown recently as areas that rely solely or primarily on property taxes have struggled greatly during the current economic disruption. It is also useful to provide education and workforce training to the population, so the region’s human capital is more flexible and can apply their skills to another field or industry, should a disruption occur.

While redundancy is useful in many settings for building resilience, it must be carefully considered by policy makers as a tool for increasing regional economic resilience, primarily due to the current fiscal situation of economic actors at all levels as well as the current climate against public spending in much of the country. Lower-cost redundancy, such as IT backups, as well as the ability for people to move via both private transportation and mass transit, may be

more politically feasible than large outlays of funds on redundant operating facilities, machinery, or employees.

Facilitate networks. Collaboration is an important facet of resilience for economic systems, just as networks can provide support to systems and individuals in times of trauma. Policy makers can help foster economic resilience by encouraging the creation of networks among the various actors in an economic system, including public, private, and nonprofit organizations, as well as citizens, especially those vulnerable to the effects of a disruption because they lack their own resources on which to depend. Collaboration among the actors is important, since, as has been noted, each party in a system is only as resilient as the weakest actor—due to the highly integrated nature of our society, weakness demonstrated by one party can ripple across those dependent on it and magnify the original shock.

These collaborative networks can be formal or informal, but the significant crucial factor is their development before the disruption occurs, so that the actors know that they can rely on others and the others' roles in the system. In this way, the networked actors can also help develop the plans that are a factor in resilience. Including residents in the networks would also allow for more input on less visible issues. Policy makers could start by bringing together interested parties already active in relevant regional issues, such as job training and education or transportation, to encourage the networks to build and develop into a greater system that can be called upon in times of crisis. These networks would also allow the development of a system of identifying the vulnerable points in the economic system and planning how to provide helpful services to them in case of a disruption.

Promote a positive vision of the region. Just as a positive attitude and self-image is important to an individual's resilience, so is it important for a region to develop and promote a

positive vision to those both inside and outside the region. Such a positive vision encourages others to invest in the region and to continue to try to make the situation better, while negative words and actions may discourage investment and support, hampering resilience. Many cities and states have moved in this direction recently with regard to tourism and promoting the amenities that outsiders can experience during short stays, but it is important that locals also feel a sense of optimism about their regions. Possible investments in infrastructure, such as new mass transit, new stadiums, or waterfront developments, can lead to increased enthusiasm for a region, while identifying bright spots and progress in school systems and new development, for example, would build a sustainable positive attitude and image.

Challenges in developing capacities for resilience. There are a number of challenges that face actors trying to develop the capacities for resilience within an economic system. First, while many capacities that lead to resilience also increase economic development or social justice, there will often be trade-offs involved in such decisions. Rarely does a policy decision result only in winners—more often, there will also be losers, and calculating the trade-offs will be an important part of evaluating a policy for resilience capacity building. Characteristics that increase the resilience of one actor or a group of actors may harm the resilience of others. Foster (2010) lays out two examples of such a challenge:

By downsizing its operations and offshoring three-quarters of its workforce a firm may make itself resilient to global fiscal and economic strains. Yet these actions may diminish resilience for not only the firm's workers but also for the firm's local suppliers (who lose business), for municipal, county and state governments (whose tax revenues fall), and for the region more generally (by loss of a major employer). Likewise, actions or policies to increase the resilience of low-wage workers to economic stress—living wage policies, extended unemployment benefits, social supports—might diminish the resilience of business owners, state and federal government, and other people or organizations made less well off by the benefits provided to low-wage workers (p. 12).

Swanstrom (2008) also argues that resilience efforts can involve trade-offs, since “Market resilience or rapid innovation can undermine household resilience” (p. 22). In other cases, the trade-off may be between the length of the downturn versus its depth—for example, Duval and Vogel (2008) find evidence that “strict labour [sic] and product market regulations may dampen the initial impact of a common shock while making it more persistent” (p. 210). In cases such as these, it will be necessary for decision makers to evaluate potential winners and losers from decisions concerning resilience, as well as the overall goals of such policies.

In addition, cost is a large challenge to developing capacities for resilience, especially prior to a disruption occurring. As Rose (2009) affirms, “Post-disaster initiatives have a cost advantage because they involve targeting of resources when they are actually needed rather than probabilistically anticipated” (p. 27). Because most of the potential shocks to an economy are only possible, not likely, the funds expended to build resilience may never be recovered if the expected disruption does not occur or does not occur to the scale planned; post-trauma efforts to bounce back from a shock may cost less than preparations for the shock prior to its occurrence. Policy makers may argue that a city’s expenses for snow removal equipment, for example, may be too high, until the city is hit by record levels of snowfall and unable to clear the streets and sidewalks sufficiently for businesses to resume operations quickly, as happened in the Washington, DC-area in February 2010. Both Rose (2009) and Sheffi (2005) therefore argue that pursuing multipurpose efforts can lower potential costs of resilience—Rose considers resilience efforts directed toward multiple potential hazards, while Sheffi looks at resilience-building mechanisms that can also lower expenses for a business’s day-to-day operations.

Finally, building the resilience of a system by strengthening its capacities can also result in a moral hazard problem—if actors know the capacity to bounce back from disruptions has

been strengthened, they may be more likely to take risks knowing that they are less likely to be hurt if a disruption occurs. Insuring against disruptions (Campanella, 2006) and hardening of physical assets (Allenby & Fink, 2005; Coaffee, 2006; Jacob & Showalter, 2007) are two common capacities used to build resilience, even as both practices may increase the risk-taking behavior of the protected system. Jacob and Showalter, for example, note that asset hardening “Can give coastal residents a false sense of security” in the face of threats such as hurricanes and rising sea levels (p. 9). Jacob and Showalter also argue against insurance programs such as the National Flood Insurance Program (NFIP) because they believe “The net effect [of the NFIP] has been to subsidize development in hazardous areas, and thus to perversely increase the number of flood victims over the years” (p. 11). Limiting moral hazard while still building system resilience will continue to be a challenge as long as techniques such as insurance and asset hardening are used.

Conclusion

Across a range of fields, resilience has proven to be a useful concept when evaluating if a person or a system bounces back from a disruption or trauma. While these efforts have been useful to their own fields of study, there is also a benefit to looking across fields and bringing together diffuse strands of research. Such a joining can be especially useful when considering the capacities that can lead to greater resilience.

As compared to some other fields, economic resilience is still a developing concept, especially with regard to regional economies. Why do some regions—both central cities and their suburbs—bounce back from systemic or one-time shocks while other regions do not? Likewise, why have some regions bounced back in the past but show greater damage from recent

traumas? This paper reviewed some of the capacities that can lead to economic resilience, including the structure of the economy, flexibility, and planning and preparation for disaster. It also explored the capacities that lead to resilience in other fields; these capacities included planning and preparation for disruptions, flexibility, effective governance, collaboration, economic resources, infrastructure, and personal characteristics. Through this analysis, four public policy recommendations were presented because they may aid in increasing regional economic resilience—decision makers should develop plans and prepare for disruptions, identify and build mechanisms that create flexibility, facilitate networks, and promote a positive vision for the region.

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