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The diversity of North American shrinking cities

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Abstract

Demographically and economically, there is an ongoing global shift that has resulted in the uneven development and distribution of monetary, human and knowledge capital. This paper first examines and consolidates economic, social and urban theories of growth and decline and demonstrates how globalization has conceptually shifted the spatial scale and trajectory of urban change theories. The examination of the population trajectories of the 100 largest American cities from 1980 to 2010 demonstrates that the majority either grew or shrank continuously. This trend counters early cyclical models and supports the argument that globalization has altered population trajectories. Secondly, conceptualizations of urban shrinkage trajectories are reviewed and a two-dimensional trajectory typology encompassing both economic and demographic change is presented. The diversity of urban shrinkage experiences is demonstrated through the application of the typology to the 20 largest shrinking American cities. 12 of which experienced overall population loss and simultaneous economic growth.

Introduction

Traditionally, the principle role of urban planners has been to focus on managing growth and its resulting issues (Schatz, 2010). Rieniets (2009) argues that this narrow focus may translate into the constantly growing use of land, causing new challenges such as housing and social service scarcity, exhaustion of essential resources, economic instability, environmental degradation and, consequently, social strains and conflicts. However, many cities are not experiencing growth at all. Almost half of America's largest cities have declined in population in every decade since 1950 (Hollander, 2011b) and worldwide it is estimated that one in four cities with at least 100,000 people are shrinking (Oswalt and Rieniets, 2006b). Beauregard's (2009) examination of patterns of population loss in US cities from 1820 to 2000 demonstrated the complexity and persistence of urban shrinkage. Furthermore, he highlighted how the "parasitic" nature of urbanization relies upon shrinking cities to lose residents so that others can grow.

Actors in the North American urban sphere are convinced of the need for growth – population decline is generally viewed as a temporary issue, which should be as short as possible, and economic revitalization is considered a precondition for population growth (Bontje, 2004; Wiechmann and Pallagst, 2012). However, studies have shown that population growth does not necessarily lead to economic growth (Glaeser and Resseger, 2009), and cities like Leipzig have demonstrated that a loss of population can coexist with economic prosperity (Wiechmann and Pallagst, 2012). Bartholomae et al. (2016) question the supposed parallelism of demographic and economic development in shrinking cities. They argue that evaluating urban growth and decline solely based on population change could lead to less effective policy recommendations. This paper contributes to the debate by reconceptualising how we view and analyze the trajectories of economic and population change in shrinking cities. Calling upon urban change theories from the economic, social and urban literature, this paper explores how globalization has altered the evolution of urban shrinkage and demonstrates the diversity of shrinkage experiences.

Cities have been growing and shrinking since their inception and, appropriately, there has been significant research done in the area of urban change. Economist, sociologists and urban planners have all contributed important works to our understanding of urban growth and decline. Understandably, theories of urban change have evolved as the world has undergone major population shifts to urban areas and a significant global economic restructuring. The first section of this paper examines the evolution of the theoretical conceptualization of urban change and the implications for shrinking cities – paying close attention to shifts in scale and what that means for local decision-makers.

The second section of this paper concentrates on the conceptualization and classification of shrinking cities. Urban shrinkage is a complex phenomenon. Cities are shrinking all over the world from a multitude of causes with a wide range of different effects, thus it stands to reason that the term itself, "shrinking cities", has some variation depending on the context. Definitions introduced in the academic literature, including the definition recommended by the Shrinking Cities International Research Network, generally focus on two concurrent causative processes: population loss and economic decline (Wiechmann and Pallagst, 2012). Causal typologies of urban shrinkage recognize both demographic and economic change as key drivers of the phenomenon (Bernt et al., 2012; Buhnik, 2010; Cunningham-Sabot and Fol, 2009; Oswalt and Rieniets, 2006a; Wiechmann, 2008; Wu et al., 2014). However, classifications examining and comparing the trajectories of urban shrinkage focus solely on population loss. This paper expands the conceptualization of urban shrinkage trajectories by constructing a two-dimensional urban change typology, which incorporates and classifies cities by both population and economic change. The typology is used to examine the population and economic trajectories of the 100 largest U.S. cities from 1980 to 2010 to provide context regarding wider trends of American urban change. Lastly, the focus narrows to concentrate on the trajectories of the 20 largest shrinking U.S. cities in order to investigate the diversity of urban shrinkage experiences and relationship between population loss and economic change.

Theories of urban growth and decline

The economic, social, demographic and physical evolution of urban spaces has long been of interest to scholars. This section explores the transition of the conceptualization of urban change and shrinkage as a natural cyclical process to a manifestation of modern globalization. By comparing and contrasting urban change theories, urban shrinkage is explored within the larger context of modern urbanization.

Cyclical Models of Growth and Decline

The concept of recurrent urban change echoes the cycle theory of economics (Martinez-Fernandez et al., 2012; Pallagst et al., 2013). Schumpeter's (1934) influential publications on evolutionary economics led to the popularization of the term "creative destruction," which according to Schumpeter, is the process by which the evolution of capitalism is characterized. This process begins with innovation and the manifestation of new technologies, their propagation and their eventual decline to redundancy. Schumpeter proposed naming the economic cycles "Kondratieff waves" in recognition of the pioneering Russian economist who first brought the idea of cyclical economies to international attention (1925, re-published in English as: Kondratieff, 1984). According to Kondratieff's theory (1984), the major economic cycles consist of three phases: expansion, stagnation and recession. Similarly, the product-cycle theory described by Friedrichs (1993: 908) to explain urban decline "postulates that each industrial product undergoes a lifecycle comprised of four locationally-linked stages: 1) the innovation stage; 2) the growth or expansion stage; 3) the maturity stage; and 4) the stagnation/decline stage." Friedrichs considered these stages to be locationally-linked, for after the primary development stages the production conditions become standardized. Then the product can be manufactured at a reduced cost by relocating production, adapting the product, or developing

manufacturing innovations. Thus, regions and urban centers evolve alongside product development cycles that can quickly fluctuate from periods of swift expansion to decline.

Urban theorist Peter Hall also postulated that the growth and decline of cities followed a regular pattern that could be distinguished by development stages (Hall and Hay, 1980). Concluding that the dynamic processes of the urban system do not lead to equilibrium if left alone, Van den Berg et al. (1982) developed the four stages of the theory of metropolitan evolution: urbanization, suburbanization, de-urbanization and re-urbanization. This theory assumed a direct relationship between the development phase of a region or town and the changing structure of the urban system.

As urban growth and decline is a multi-faceted complex issue, economists and urbanists were not alone in thinking that the development cycles of cities were part of a natural process. The Chicago School of Urban Sociology hypothesized that urban change resulted from a natural lifecycle. Hoyt (1939) expanded on McKenzie's (1924) invasion succession model with a cyclical approach based on property devaluation trends resulting from an influx of low socioeconomic status residents. There was a strong research focus on local-scale urban change in America beginning in the 1930s, in part due to the U.S. Home Owner's Loan Corps (HOLC) publications on the stages of neighborhood change. The HOLC produced two models (1935, 1940), which Hoover and Vernon (1959) built upon with their five-stage lifecycle published in 1959. In 1975, the Real Estate Research Corporation (RERC) expanded even further on the stages of neighbourhood change. The initial stages of the cyclical neighbourhood change theories are generally defined by middle-class, well-planned, homogeneous populations which perpetually lead to population shrinkage, vacancies and widespread deterioration due to the exodus of the initial populations to the outer regions or suburbs. Table 1 provides a summary of select theories of cyclic change.

Table 1: Cyclical stages of product-cycle theory (Friedrichs, 1993), the theory of metropolitan evolution (Van den Berg et al., 1982) and the neighborhood lifecycle theory (HOLC 1935, 1940; Hoover and Vernon, 1959; RERC, 1975).

	Product-Cycle Theory	Theory of Metropolitan Evolution	Neighborhood Lifecycle Theory
Stage 1	*Innovation* New product, local production	*Urbanization* Spatial concentration of growth in city	*Growth* New single-family homogenous housing
Stage 2	*Expansion* Increased demand, local production expands	*Suburbanization* Dispersal of growth to area surrounding urban core	*Stability* Higher density, apartment construction, influx of minorities
Stage 3	*Maturity* Increased competition, product standardization	*De-urbanization* Decentralization and decline in the city, continued growth in suburbs	*Decline* Increased vacancies, rental housing, visible deterioration, high unemployment
Stage 4	*Decline* Offshore production, decrease demand, product discontinued	*Re-urbanization* Re-centralization of growth in city, decline in suburbs	*Renewal* Severe dilapidation, high poverty and crime, public intervention

While the Chicago School of Urban Sociology's influence was being felt in the public sector, sociologist Pitirim Sorokin (1947) also concluded, albeit from a more abstract perspective, that social change grew and declined regularly over time. However, he posited that the introduction of new factors precluded the recurrence of identical cycles, therefore rejecting the notion of cyclical change. Sorokin's recognition of the ever-fluctuating patterns of change crystalized over time as local cultures were exposed to a growing number of external forces. The increasing influence of international factors became widely recognized as "globalization", defined by Robertson (1992: 8) as a "concept that refers to both the compression of the world and the intensification of consciousness of the world as a whole." Robertson considered globalization a local phenomenon, as the worldwide fusion of culture always manifests locally. Appadurai (1996) further added that due to concurrent cultural homogenization and

heterogenization, the new global cultural economy must be thought of in terms of complexity, overlap and disorder.

Globalization

Over time, the spatial scope of economic cycles has shifted from local to global, as increased international trade in goods and financial products have contributed to global economic synchronization (Berge, 2012; Kose et al., 2003). As a result, cycles of growth and decline are increasingly disconnected from local actions and decisions. Hirst and Thompson (1996) view global economic synchronization as evidence of the beginning of a new stage in international economic, political and cultural relationships. Seminal works by Friedmann (1986) and Sassen (2001) articulate the restructuring of urban areas in response to modern economic globalization. Their work initiated a paradigm shift in how urban scholarship understood globalization and its impact on the evolution of urban areas (Mccann and Ward, 2013). The global cities literature argues that economic globalization did not diminish the importance of place, location and distance, but rather reinforced and heightened the importance of select cities in a global market. Viewed through the lens of industrial urbanism, generative and degenerative urban forces both originate from the restructuring of capitalism (Audirac et al., 2012). Soja (2000) examined the deindustrialization, de-territorialization and the respective geographic complexities of Fordist economies and their restructuralization into flexible forms of production. He concluded that city, or even national, boundaries are permeable and ill defined and that the flow of populations, goods and knowledge are now components of global economies and cultures. These processes of post-Fordist economic and cultural restructuring have led to extremely uneven development and the emergence of both global and shrinking cities. Soja (2000) argues that governmental responses to these structural shifts have also grown less influential as the nation-state is no longer the political, economic or cultural epicenter as, cognitively, territories are being redrawn and new forms of economic organizations and cultural identities are emerging at the transnational level.

In the past, cyclical models of innovation, expansion, propagation and eventual decline may have explained local demographic and economic change. However, advances in economic, urban and social theory have demonstrated that local cultures and economies are increasingly linked to global trends. Many of the cyclical models of urban change and decline were products of the Fordist industrialization era. As such, Bontje (2004) argues that these theories born of a period of mass standardized production and mass industrial employment are far less relevant in the post-industrial age. The presumption that stages of growth follow decline no longer holds at the local level. The trajectory of a city's economy, or population, is increasingly impacted by the contemporary restructuring of production and consumption, and as such, is increasingly difficult to generalize. Some cities are able to adapt and flourish, while others are confronted with difficult adjustments (Newman and Thornley, 2011). Regardless of the success or failure of cities, it is clear that generalized cyclical models of growth and decline are no longer applicable to the majority of cities. Martinez-Fernandez et al. (2012) contend that, in the modern context, shrinking cities are arguably not simply at a temporary stage in a cyclical process, but rather reflect a more permanent spatial symptom of an emerging global progression.

The increasingly global structure of economic and social cycles have diminished the autonomy of local action and compelled a reconceptualization of the evolution of urban shrinkage. However, less attention has been given to how the processes contributing to urban shrinkage evolve without the structure of local cyclical growth and decline. The classical models of urban growth and decline paired economic and demographic trends within a cyclical structure. Yet, the notion that the trends run in parallel in a modern shrinking city is doubtful considering the global scale of economic and social change and the complexity and diversity of how the changes manifest at the local level. But if not cyclical, how do economic and demographic processes evolve in shrinking cities? The following section explores how shrinking cities trajectories have been conceptualized in the academic literature and presents a two-dimensional trajectory typology for urban change.

Trajectory typologies of urban shrinkage

Urban shrinkage trajectory typologies classify cities that have experienced population loss by the path of their population change over time (for causal typologies see Bernt et al., 2012; Buhnik, 2010; Cunningham-Sabot and Fol, 2009; Oswalt and Rieniets, 2006a; Wiechmann, 2008; Wu et al., 2014). Such classifications provide a framework to understand and compare the temporal transformations of cities. Rather than focus exclusively on delineating the trajectories of cities experiencing continual shrinkage over time, this paper concentrates on typologies that incorporate the potential for cities to stabilize or recover following a period of shrinkage. The inclusion of resilience is critical, as it does not limit cities experiencing population loss to a perpetual decline cycle.

Turok and Mykhnenko's (2007) examination of the population trajectories of 310 European cities revealed that one quarter of the cities had lost population since 1980 and almost 40% had declined since 1990. Based on their findings, Turok and Mykhnenko outlined nine distinct population trajectories of European cities. These trajectories were adapted by Martinez-Fernandez and Weyman (2015) to classify patterns of growth and shrinkage in Australia. From their findings, Martinez-Fernandez and Weyman identified four universal population trajectories: shrinkage, stabilized shrinkage, growth, and relapsing-remitting. Similarly, Wiechmann and Wolf's (2013) examination of 7035 cities in 37 European countries concluded that cities follow one of four shrinkage trajectories: continuous, episodic, temporary or no shrinkage.

Turok and Mykhnenko (2007), Wiechmann and Wolf (2013), and Martinez-Fernandez and Weyman (2015) all provided fundamental empirical evidence of the pervasiveness of population decline in their respective geographic foci. Furthermore, all three population-trajectory typologies contributed to the methodological advancement of the urban shrinkage literature. However, urban shrinkage is not only defined by demographic trends. Although population decline is the principle indicator, Rink et al. (2009) stress that it alone does not represent the phenomenon of urban shrinkage.

Definitions of urban shrinkage, including the definition proposed by the Shrinking Cities International Research Network, emphasize population loss and economic transformations as the two central processes (Buhnik, 2010; Pallagst et al., 2009; Rink et al., 2011; Wiechmann, 2008; Zakirova, 2010).

The focus on both demographic and economic change within the definitions of urban shrinkage is absent from the trajectory typologies - which exclusively concentrate on population change. Wiechmann and Pallagst's (2012) matrix of urban growth and shrinkage presents a useful conceptualization of the relationship between economic and demographic change. Their objective was to identify city types, not to analyze trajectories. But by differentiating economic and demographic growth and shrinkage processes and placing them on separate axes, they acknowledge the multiplicity of shrinking city attributes. This same perspective can be applied to the trajectory typologies, thereby allowing for more complex urban development trends to be considered. Combining the strengths of the classification systems developed by Turok and Mykhnenko (2007) and Martinez-Fernandez and Weyman (2015) with Wiechmann and Pallagst's (2012) matrix conceptualization of shrinkage, a two-dimensional trajectory typology that encompasses both central components of urban shrinkage is presented.

Two-dimensional trajectory typology

Based on the aforementioned typologies, six different trajectories are considered: (1) shrinkage (continuous shrinkage throughout time period), (2) stabilized shrinkage (shrinkage followed by stabilization and growth with overall net loss), (3) cyclic shrinkage (cycles of shrinkage and growth with overall net loss), (4) cyclic growth (cycles of shrinkage and growth with overall net gain), (5) recovery (shrinkage followed by stabilization and growth with overall net gain), and (6) growth (continuous growth throughout time period). The six classifications of the typology are considered for both population and economic change allowing for a more representative trajectory analysis of urban

change. The two-dimensional trajectory typology classifies 36 different types of urban change trajectories (Table 3).

Using the two-dimensional typology, the trajectories of 100 American cities are examined over 30 years from 1980 to 2010. The start date of the analysis follows Sassen's (2001, 2012) work on global cities, which identifies pronounced changes in the geography, structure and institutional framework of the world economy beginning in the late 1970s and early 1980s. Data was collected at the beginning of each decade (1980, 1990, 2000, 2010) at the city level from the U.S. Decennial Census and American Community Surveys (5-year estimates). Per capita income was used as a proxy for economic change (all values adjusted to 2010 dollars). Although gross domestic product (GDP) or gross value added (GVA) may better reflect local economic activity, data are not consistently available at the city-level. Therefore, per capita income was selected as it captures the change in prosperity of people and the migratory movement of the second demographic transition (characterized by more educated, higher earners having fewer children) within an area (Glaeser and Redlick, 2008; van de Kaa, 2002). Table 2 provides descriptive statistics for population and per capita income for each study time period.

Table 2: Population and per capita income descriptive statistics for 100 largest US cities, 1980-2010.

	Population				Per Capita Income[a]			
Variable	**Mean**	**SD**	**Min**	**Max**	**Mean**	**SD**	**Min**	**Max**
1980	488,103	807,329	156,804	7,071,639	20,370	3,051	12,665	31,737
1990	513,510	837,253	140,761	7,322,564	23,081	4,262	15,718	39,898
2000	556,031	911,165	124,943	8,008,278	26,149	5,074	15,901	45,218
2010	581,255	929,595	102,231	8,184,899	23,968	5,505	12,893	44,079

Note: (a) all values adjusted to 2010 dollars

Table 3 illustrates the urban change experiences of the 100 largest U.S. cities. Although the population trajectories of the 100 cities are relatively diverse, it is clear that there is a dominant theme of growth as 55 of the cities experienced continuous growth from 1980 to 2010. While the majority of cities did grow, over 30% lost population over the study period and 19 of the cities lost population in

every decade. The distribution of the population trajectories shows a heavy skew towards continuous trends – whether negative or positive. Only 11 cities had cyclical (positive or negative) population trends. The tendency for cities to either grow or shrink continuously supports the theory that globalization has altered local population trajectories and that population cycles are no longer cyclical.

Table 3: Distribution of 100 U.S. city trajectories using two-dimensional trajectory typology

		Economic						
		Shrink	Stable	Cyclic -	Cyclic +	Recover	Grow	**Total**
Population	Shrink	0	0	10	8	0	1	**19**
	Stable	0	1	0	4	2	1	**8**
	Cyclic -	0	0	1	3	0	0	**4**
	Cyclic +	1	0	1	4	0	1	**7**
	Recover	0	0	0	7	0	0	**7**
	Grow	0	1	5	41	4	4	**55**
	Total	**1**	**2**	**17**	**67**	**6**	**7**	**100**

In stark contrast, 84 of the cities experienced cyclical economic trends over the same time period. The majority of cities did show absolute per capita income growth over the time period but only seven cities increased every decade. The high proportion of positive cyclic economic trajectories is due to the widespread economic decline following the 2008 recession. 91 of the 100 cities experienced a decline in per capita income between 2000 and 2010. It is important to note that these results could be partially attributed to the choice of economic indicator or the impact of high cost-of-living in certain urban areas. However, they can also be seen to reflect the general success of modern cities. Much has been written about the correlation between urbanity, productivity and agglomeration economies (Glaeser, 2011) and, as will be discussed in more detail below, these results suggest that even cities losing population may be able to grow economically.

Two-dimensional trajectories of 20 American shrinking cities

Turning to urban shrinkage, the 20 largest American cities to lose population between 1980-1990 are examined to investigate the differences and similarities between their population and

economic trajectories[1]. Table 4 shows that 11 of the cities lost population in every decade and that 16 of the 20 cities had net population shrinkage over the total time period. Only Memphis, Denver, Kansas and Minneapolis surpassed their 1980 population mark. 18 of the cities experienced cyclic income growth and only two cities' incomes increased every decade. Four cities, Detroit, Milwaukee, Cleveland and Toledo, had lower income levels in 2010 than in 1980.

Geographically, the population trajectories echo shrinkage trends established in the literature. All but two of the 10 cities located in the "rust belt" region around the great lakes lost population every decade. Only Chicago did not shrink continuously, although it did experience cyclical shrinkage. Of the four cities located on the east coast (Philadelphia, Washington, Baltimore and Newark), all but Baltimore stabilized their population loss. Both cities located towards the center of the country (Denver and Kansas City) recovered and surpassed their 1980 population levels.

Table 4: Population and economic trajectories of 20 shrinking U.S. cities (U.S. Census Bureau, 2013)

City	Population	Economic
Detroit, MI	Shrink	Cyclic -
Milwaukee, WI	Shrink	Cyclic -
Cleveland, OH	Shrink	Cyclic -
Toledo, OH	Shrink	Cyclic -
Baltimore, MD	Shrink	Cyclic +
St. Louis, MO	Shrink	Cyclic +
Pittsburgh, PA	Shrink	Cyclic +
Cincinnati, OH	Shrink	Cyclic +
Buffalo, NY	Shrink	Cyclic +
Birmingham, AL	Shrink	Cyclic +
New Orleans, LA	Shrink	Grow
Philadelphia, PA	Stable	Cyclic +
Newark, NJ	Stable	Cyclic +
Atlanta, GA	Stable	Cyclic +
Washington, DC	Stable	Grow
Chicago, IL	Cyclic -	Cyclic +
Memphis, TN	Cyclic +	Cyclic +
Denver, CO	Recover	Cyclic +
Kansas City, MO	Recover	Cyclic +
Minneapolis, MN	Recover	Cyclic +

[1] Louisville, Kentucky was the 20th largest city in America to lose population between 1980 and 1990 but was not included due to a city-county merger in 2003.

Comparing the trajectories, only Memphis experienced the same trend in both population and income (cyclic growth). 12 of the cities experienced contradictory trends – having a total loss of population with a total gain in per capita income over the time period. The most common trajectory combination was population shrinkage with cyclic per capita income growth – experienced by six of the cities. New Orleans was the lone city to have completely opposing trends with population shrinkage and per capita income growth in every decade.

Discussion

In the growth-oriented culture of North America, population decline is regarded as a consequence of economic decline, and as a result economic revitalization is considered a necessary precondition for population growth (Hollander et al., 2009; Wiechmann and Pallagst, 2012). However, Glaeser and Resseger (2009) have shown that population growth does not necessarily produce economic growth. Furthermore, population decline is not inextricably linked to a decline in quality of life (Hollander, 2011a). So although economic decline may often be a precursor to population decline, it is possible that economic growth does not require population growth. The results from this paper further indicate that many cities that experience population loss do not simultaneously experience economic decline. 12 of the 20 cities examined had divergent economic and population trajectories. New Orleans exemplified the potential disconnect between economic and population trajectories with per capita income growth and population loss in every decade. The stark divergence in New Orleans also demonstrates the need for context-specific analysis. Population loss and economic transformation may be central processes of urban shrinkage but they alone cannot capture the complexity of an individual city's development. A wide variety of quantitative and qualitative analysis would be needed to understand the intricacies of a vibrant city like New Orleans. The analysis in this study simply questions the interdependence of demographic and economic change, and demonstrates the diverse ways in which the two processes evolve.

These findings combined with the potential permanence of urban shrinkage give credence to Pallagst's (2010) call to rethink planning in shrinking cities, investigate the principles upon which planning has traditionally been based and to move away from the necessity of population growth as a precondition for prosperity. Local decision-makers in shrinking cities may need to prepare for the possibility that their population may never surpass or even return to historic highpoints. Popper and Popper (2002), as well as other proponents of smart decline (Hollander and Németh, 2011; Schilling and Logan, 2008), recommend shrinking cities adopt strategies to adapt infrastructure and services for a smaller population. Modern economic globalization has transformed urban development (Sassen, 2001) and in doing so has diminished the ability of local decision-makers in shrinking cities to shape and guide their economic and demographic trajectories (Castells, 2004). While broadening the scope of local strategies to include planned shrinkage is advisable, decision-makers may also need to recognize their position within larger shifting economic systems (Hartt, 2016). By acting in concert with other cities within an economic region, a shrinking city can amplify its presence within the global economic market. Multi-level initiatives have been shown to play a pivotal role in the stabilization of urban shrinkage (Rink et al., 2012). Additional cooperation and communication between cities and higher-levels of government could be instrumental in stabilizing declining economies especially considering that many cities shrink within a larger context of growth (the metropolitan areas of 14 of the 20 shrinking cities examined in this paper experienced growth between 2000 and 2010).

Research has also indicated that the makeup of the population may play a greater role than the quantity in achieving a stable or growing economy. Florida's (2002) work on the "creative class" has highlighted the benefits of attracting and retaining a well-educated urban population. Although criticized for both requiring and perpetuating socioeconomic inequalities (Pallagst et al., 2009), elements of the creative class theory may help explain the seemingly counterintuitive trend of simultaneous population decline and income growth. The divergence could potentially be explained by agglomeration economies – cities with relative increases in education and skill, but shrinking

populations. In growing cities an increase in skill has been shown to lead to increased incomes (Glaeser and Resseger, 2009), perhaps it is true amid certain shrinking cities as well.

Limitations and Future Directions

The typology presented in this paper makes a conceptual contribution to the literature and provides a good framework for more rigorous analysis. The six trajectory types across two dimensions help shed light on the diversity of shrinkage experiences. However, diversity within categories still exists. Future research could further advance our understanding of shrinkage by examining trends within trajectory-specific categories. Beauregard's (2009) indicators of shrinkage (prevalence, severity and persistence) could help provide a more nuanced understanding of cyclical, stable and recovering cities.

The variables used and data collected in this study could be refined to more fully capture the processes of economic and demographic change. Simultaneous investigation at different spatial levels and temporal intervals could help uncover commonalities and singularities between short and long term shrinkage, and local and regional shifts. The temporal frequency of the data in this study was limited to 10-year intervals due to the availability of consistent, comparable and accessible city-level income data. Although using decennial data can help filter incidental fluctuations, examining shorter intervals would add depth to the analysis and potentially expose more nuanced temporal trends. In addition to comparing shrinkage processes at multiple time intervals, future research could also incorporate multiple spatial levels to capture changes in regional development. The typology presented in this study could be expanded to include a third spatial dimension in order to examine neighborhood, city and regional change across both demographic and economic dimensions.

There are limitations with selecting any single variable as a proxy for economic change. Per capita income is a useful economic measure for social development and quality of life, however it does not necessarily capture the economic activity of a place. Adopting gross value added (GVA) or gross

domestic product (GDP) as economic change variables would allow for a more robust place-based, rather than people-based, analysis. Unfortunately, the availability of both GVA and GDP at the city level is limited and therefore could not be used in this study. Future research examining shrinkage processes at the metropolitan level (where GDP data is available) should incorporate GDP, or GVA if available, as a proxy for economic development. Furthermore, future studies could include employment trends and GDP per economic sector to capture structural changes in the local economy.

Conclusion

Population and economic decline are not new processes. Many researchers in the English language literature have concluded that urban change can be viewed as a natural cyclical process (Hall, 1988; Hoover and Vernon, 1959; Hoyt, 1939; McKenzie, 1924). This conception of an urban lifecycle process has been principally identified by urban sociologists but also echoes the cycle theory of economics (Martinez-Fernandez et al., 2012). During the Fordist industrialization era, the cyclical trends of economic, social and urban growth and decline were largely manifestations of the local economy and local decision-makers (Bontje, 2004). However, globalization has altered the spatial scale at which economic and social changes occur and their manifestation at the local level (Berge, 2012; Robertson, 1992; Soja, 2000). Economic, social and urban theories have all reflected the distinct evolution and impact of globalization (Appadurai, 1996; Friedmann, 1986; Hirst and Thompson, 1996; Kose et al., 2003; Robertson, 1992; Sassen, 2001). Consequently, contemporary urban shrinkage is no longer considered a temporary stage of a cyclical process, but an enduring spatial symptom of globalization (Martinez-Fernandez et al., 2012). Considering the potential permanence of urban shrinkage, an increasing number of academics have called for planners and decision-makers in shrinking cities to "accept" their demographic reality and expand the scope of local strategies to include the possibility of planned shrinkage (Hollander et al., 2009; Pallagst et al., 2009; Rieniets, 2009). Some shrinking cities may prove to be resilient and "bounce back" from economic and

demographic decline, however, considering the dependence of shrinking cities' fate on wider economic trends, it may be imprudent for decision-makers to solely pursue growth strategies.

Urban shrinkage is consistently defined in the academic literature as both a demographic and economic process. Typologies focusing only on the population change of a city fail to capture the full extent of the phenomenon and miss an opportunity to demonstrate the diversity of the shrinking experience. In order to shift the preconceived notion that a shrinking city can only be prosperous through demographic growth, our discussions, depictions and classifications of shrinkage need to include both causal processes. By separating demographic and economic trends in two-dimensional trajectory typology, this paper offers a framework to capture the complexity and multiplicity of urban shrinkage experiences. This distinction advances a more nuanced understanding of shrinkage, a better structure for city comparisons and an improved baseline for planning and policy decisions.

The examination of the trajectories of the 100 largest American cities from 1980 to 2010 demonstrates the propensity of continuous population trends. Contrary to the hypotheses of the early cyclical models, the majority of the cities either grew or shrank continuously. This trend supports the theory that globalization has altered population trajectories. However, the economic trajectory of almost all of the cities (84) was cyclical. This demonstrates the impact of the Great Recession and the potential disconnect between economic and demographic trends. In the 20 shrinking cities examined, the diversity of economic and demographic trajectory combinations was even clearer, as 12 of the cities experienced overall population decline while per capita income simultaneously grew. These results demonstrate the value of a two-dimensional trajectory typology and, hopefully, will incite further research examining the economic and demographic change of shrinking cities with more robust variables.

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