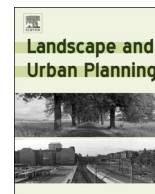




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Research Paper

## Examining shrinking city of Detroit in the context of socio-spatial inequalities

Yichun Xie<sup>a</sup>, Hongmian Gong<sup>b,\*</sup>, Hai Lan<sup>c</sup>, Shi Zeng<sup>d</sup><sup>a</sup> Institute for Geospatial Research & Education, Eastern Michigan University, 125 King Hall, Ypsilanti, MI 48197, United States<sup>b</sup> Department of Geography, Hunter College of the City University of New York, 695 Park Avenue, New York, NY 10065, United States<sup>c</sup> Department of Computer Science, New York University, New York, NY 10012, United States<sup>d</sup> Centre for Advanced Spatial Analysis, University College London, 90 Tottenham Court Road, London W1T 4TJ, United Kingdom

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## ABSTRACT

Urban sprawl and inner city decline are two common and interconnected outcomes of contemporary metropolitan development. More than 25% of large cities in the world are considered shrinking cities. Detroit is one of the most notorious examples of severe decline in North America. We examined the residential housing vacancy severity in the City of Detroit in comparison with the seventeen other cities in metropolitan Detroit. We developed a systematic and quantitative framework to investigate city shrinking from the perspectives of both causes and dynamics. The framework consists of three consequent regressions: the regional model to analyze the causes and dynamics of urban shrinking, the city models to reveal regional disparity and to identify primary inequality factors, and the regional logistic categorical model to examine the effect of primary social-spatial inequality factors on urban shrinking. Through these analyses, we found that the odds of becoming vacant were 9.01 times higher in census tracts with the highest concentration of less educated population, 7.16 times higher where a good portion of housing structures didn't have a full kitchen, 7.06 times higher in tracts with the most concentrated Black population, 5.47 times higher where a good portion of housing were multi-unit structures, and 4.76 times higher in tracts with the poorest population. We concluded that urban shrinking was often accompanied with urban sprawl; regional inequality was manifested in multiple scales and socio-spatial inequality became increasingly alarming; the causes and dynamics of urban shrinking were inevitably intertwined; and racial segregation and persistent poverty were the primary cause of long-lasting urban shrinking in Metropolitan Detroit.

## 1. Introduction

Urbanization and urban expansion have been one of the most important processes shaping global development (UN Habitat, 2007) and have resulted in core-periphery growth patterns and regional inequalities in developing countries such as China (Wei, Li, & Yue, 2017). In the United States, urbanization has evolved into post-war suburbanization, a process in which many suburbs experience parasitic urban sprawl while inner cities suffer from urban shrinkage (Beauregard, 2006; Downs, 1999; Martinez-Fernandez & Audirac, 2012). The regional inequalities between inner city and suburb are as alarming as core-periphery inequalities, as urban shrinkage has reached global scale amid globalization and deindustrialization (Friedrichs, 1993; Martinez-Fernandez et al., 2016). More than 25% of large cities in the world are considered shrinking cities (Rieniets, 2006), a topic that has been the subject of growing interest in advanced capitalist

countries such as the USA, the UK, Germany, France, Australia, Japan (Bernt et al., 2013; Großmann, Bontje, Haase, & Vlad Mykhnenko, 2013; Martinez-Fernandez et al., 2016). Moreover, research on shrinking cities not only addresses eminent problems in declining inner cities in the developed world, but also sheds light on what may happen to the fast expanding cities in developing countries.

While it is important to evaluate the economic and environmental impact of urban expansion and sprawl, it is equally, if not more, important to examine the deepening social inequality between the sprawling suburbs and inner cities. As Wei (2016) pointed out, the subject of social sustainability is particularly under-researched as compared to economic and environmental sustainability. In urban and regional studies, there is a consistent view to manage shrinking cities in regards to economic growth. This view may still be important for cities where decline is functional and structural (Haase, 2008), but what about cities where the decline is dramatic and persisting over a long

\* Corresponding author.

E-mail addresses: [yxie@emich.edu](mailto:yxie@emich.edu) (Y. Xie), [gong@hunter.cuny.edu](mailto:gong@hunter.cuny.edu) (H. Gong).<https://doi.org/10.1016/j.landurbplan.2018.03.002>Received 5 May 2017; Received in revised form 25 January 2018; Accepted 2 March 2018  
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period of time? The problem is not simply the economy anymore, but has caused the concern of social sustainability. Persistent urban shrinkage is marked by huge and connected stretches of abandoned and vacant lands in and around urban centers. Large numbers of commercial and industrial buildings, residential houses and apartments have deteriorated or are deteriorating. These declining city lots in the inner cities outrageously hurt the aesthetic appearance and economic value of the neighborhoods (Accordino & Johnson, 2000) and become centers of concentrated urban poverty with high crime rates, gradually making them socially unsustainable and not livable.

Persistent population decline and massive abandoned lots in Detroit make the city a perfect area for studying urban shrinkage in the context of socio-spatial inequality. Through a case study of Detroit city in comparison to the rest of metropolitan Detroit, this study attempts to answer the following research questions. What the causes and dynamics of urban shrinkage, in addition to the commonly recognized economic and demographic decline in these shrinking cities? How do inequalities contribute to urban shrinkage and at what scales? After this introduction, we will review the literature on urban shrinkage and identify gaps. We will then propose a multi-level statistical approach to study urban shrinkage, present the results of the multi-level analyses, and discuss the meaning of the results in terms of socio-spatial inequality.

## 2. Literature review

We will begin with a review on the causes and dynamics of urban shrinkage in general, followed by a review on Detroit as a shrinking city. At the end, the gaps in urban shrinkage literature are discussed in relation to literature on spatial inequalities and scales.

### 2.1. Causes and dynamics

Studies on urban shrinkage have been focused on two intermingled angles, (1) planning practices and strategies for eradicating urban vacancy, and (2) research on the causes and dynamics of shrinking cities. Blanco and her colleagues (2009) synthesized a comprehensive review of six planning strategies for salvaging urban vacancy, including density planning, land use planning, environmental mitigation, ecological restoration, infrastructure right-sizing, and social equality policy and practice. In recent years, reclaiming vacant urban blocks and re-designing urban land use structure by incorporating the concepts of ecological restoration and ecosystem service have become popular topics in urban planning (Haase et al., 2014; Nassauer & Raskin, 2014) and geographic research (Frazier & Bagchi-Sen, 2015).

The emphasis of our paper is to comprehensively examine the causes and dynamics of shrinking cities. Traditionally, scholars have regarded demographic change, suburbanization and deindustrialization as three main causes of shrinking cities (Großmann et al., 2013). It is intuitive to expect that when the population in a city decreases, its housing market will contract. The contraction of housing market will lead to lower housing prices and higher housing vacancy due to over-supply and, as a result, housing deteriorating because of vacancy (Kabisch et al., 2008). Similarly, U.S. has lost five million manufacturing jobs since 2000 (Long, 2016). When factories and industries are moved to other areas or closed, workers are forced to move along or laid off. The host cities and even the entire regions experience the outflow of population and capital resources, which speeds up the contraction of housing market and eventually shrinking (Martinez-Fernandez & Wu, 2007).

Recently, profound attention has been focused on a much broader examination of the factors leading to shrinking cities, including economic globalization, global financial flows and global distribution of production processes (Martinez-Fernandez & Audirac, 2012). If a city cannot find a niche for itself in the current competitive international economic environment, its economy will eventually become stagnant, suffer outflow of people and financial resources and witness housing

vacancy and infrastructure decaying (Audirac, 2014). In other words, globalization stimulates the mobility of people across countries and regions. People move out places that are left behind in the process of economic globalization, which results in shrinkage of their population, contraction of their housing stocks, and decaying of their infrastructures. On the contrast, in places where there are advantages in the international competitive markets, net gains in people, finance, innovation and technology are experienced (Wiechmann & Pallagst, 2012).

Meanwhile, there is an increasing call for shifting attention to the context and dynamics of urban shrinkage rather than being limited to the economic causes. Urban political economists strongly believe that urban inequality, residential segregation and gentrification are affecting the dynamics of shrinking cities (Fol, 2012). There is much evidence that residential segregation has led to fast growing concentrations of disadvantaged households in the poor neighborhoods, rapidly decreasing values of housing stock in these city blocks, and unprecedented decaying and vacancy (Grossmann et al., 2014). For example, in a case study of Amsterdam where there has been a long tradition of social democracy and strong statehood and entrepreneurial policy trends. Savini, Boterman, van Gent, and Majoor (2016) observed a changing social geography of greater ethnic diversity and an upgrading urban core in recent years, which has brought both opportunities and challenges. The urban political systems as well as national, regional, and local policies play a critical role in the dynamics of urban shrinkage. There exists “relationship between a parcel of land and the wider physical and socioeconomic spatial systems to which it belongs” (Platt, 2004: 39). As Martinez-Fernandez et al. (2016) pointed out, urban shrinkage is multidimensional. When examining current trends of urban housing and change, urban planners and researchers should take all social, economic and political conditions into consideration.

### 2.2. Detroit as shrinking city

The City of Detroit, Michigan, has lost over 60% of its population in the last 60 years and 25% in the recent 10 years (Neill, 2015). It has been increasingly abandoned with a vacancy rate 6.5% in 1990, 11.6% in 2000, and 18.1% in 2010 (NCDB, 2010). According to the report of “15 American Ghost Towns” by Frohlich, Stebbins, Sauter, and Comen (2015), six out of the fifteen are located in the Metropolitan Detroit area and they are Detroit (Vacancy Rate 18.9%, No. 4), Highland Park (No. 5), River Rouge (No. 8), Hamtramck (No. 10), Inkster (No. 11), and Ecorse (No. 13). In fact, according to the vacancy data reported over the census tracts from the Neighborhood Change Database (NCDB 1970–2010) in 2010 (NCDB, 2010), the median vacancy rate over the census tracts within the City of Detroit is 26.6%. Detroit is “the largest and most famous” ghost town according to Frohlich et al. (2015).

Although the City of Detroit and its investors have done a great deal in attempting to halt the decline, most of that effort has been focused upon the Central Business District. The neighborhoods which make up the majority of the city have been largely ignored (McGraw, 2007). Left behind are deteriorating urban structures that cannot be maintained and are often demolished because they become dangerous to the surrounding communities. Many buildings are also lost to fire and vandalism. The changes are man-made as well as from natural deterioration, illustrated by the following series of events. Political and economic choices caused people to move away from the city. Tax revenues were diminished and houses were emptied. Buildings and infrastructure deteriorated under human abuses as well as natural forces. New political and economic decisions were made to have the buildings demolished and removed. Bare and open tracts became vacant for dumping wastes or to vegetative growth. For instance, in the Brightmoor neighborhood of Detroit, 31% of the housing units were vacant and there were more than 250 abandoned lots in 2010. Among them, 166 vacant lots had become dumpsites (Ganning & Tighe, 2015). Only 18% of property were offered at auction, for \$500 per property, sold between 2002 and

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