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Immigration, Regional Resilience, and Local Economic Development Policy

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IMMIGRATION, REGIONAL RESILIENCE, AND LOCAL ECONOMIC DEVELOPMENT POLICY

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**IMMIGRATION, REGIONAL RESILIENCE, AND LOCAL ECONOMIC
DEVELOPMENT POLICY**

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

SUMMARY

The rapid growth of immigrants across a wide range of U.S. metropolitan areas has brought increasing attention to immigration and its impacts on regional development. Recent economic recessions have also stimulated a renewed interest in sustainable development among urban planners and scholars. This dissertation examines the role of immigrants in regional economic resilience and the effects of the rising wave of local immigrant integration policies.

Drawing on data from various sources, including the U.S. Decennial Census, the Bureau of Economic Analysis, the Bureau of Labor Statistics, and the Building Resilient Regions (BRR) database, this dissertation explores three independent but interconnected themes. The first theme focuses on resilience capacity and examines how immigrants have helped U.S. regions build resilience capacity over the period 1980-2010. With a fixed effects approach, this investigation finds that immigrants contribute to the development of the economic capacity, socio-demographic capacity, and community connectivity capacity of regional systems, though some of the effects are small.

The second theme considers regional economic resilience in the face of the recent Great Recession. Its focus is on how regions respond to and recover from the recession, different from the resilience capacity perspective that emphasizes preparedness for disturbances. To address the potential endogeneity of immigrants' residential choice, this analysis employs an instrumental variable approach to isolate the portion of immigration exogenous to the local economic conditions. It finds that high levels of immigration lead to regional resilience during and after the recession in both employment and per capita

income growth. This positive relationship is independent of other regional capacities identified in previous studies, suggesting that the resilience literature should broaden its scope and consider local immigration as a critical contributor to resilience building.

Focusing on the Global Detroit initiative as a case study, the third theme investigates whether the latest local immigrant policies have achieved their intended goals. Global Detroit is one of the earliest regional immigrant integration efforts in the country, therefore providing a long enough post-treatment period for evaluation. This analysis constructs a synthetic control group almost identical to Detroit and finds mixed evidence of the program effects on local immigration level, immigrant employment, and immigrant entrepreneurship. While the Global Detroit initiative has increased immigrants' shares in the local population and workforce, it has not increased their upward mobility as indicated by the average wage earning and self-employment rate. These findings underscore the potential of immigrant integration programs in attracting and retaining immigrants as well as the need for program improvement to address broader labor market dynamics and developmental issues.

CHAPTER 1. INTRODUCTION

The rapidly increasing immigrant population in the United States has brought significant changes to American cities and stirred much policy debate. In the past few decades, the foreign-born population has not only increased its size but also expanded its geographic reach from a few established immigrant destinations to cities that are not accustomed to receiving newcomers, changing the demographics of a large number of American communities. The immigrant population has also shifted from mostly European to mostly Latin and Asian immigrants who are overly represented in the low-skilled labor force (Martin & Midgley, 2003). These geographic and compositional changes have generated mixed local responses to immigrants and elevated concerns about national and sub-national social welfare and security systems.

On the other hand, immigrants have been increasingly recognized as an important force in economic development. High-skilled immigrants compensate for the "brain drain" in Rust Belt areas resulting from domestic out-migrants (Frey, 2005) and serve as an underlying force of regional resilience (Chapple & Lester, 2010). They contributed substantially to the founding of many engineering and technology companies (Wadhwa et al., 2007) and innovation development (Kerr & Lincoln, 2010). Immigrant workers have also helped offset the aging and decline of the native-born population in older industrial towns (Martin & Midgely, 2003). In addition, they are found to be resistant to economic downturns due to their rich ethnic networks and social capital (Zhu et al., 2013). In recognition of these immigration dividends, increasing numbers of cities have adopted

immigrant welcoming and integration policies in recent years, hoping to leverage the newcomers' human capital and financial assets for local economic development.

Discussions of immigration impact are particularly salient in a globalization era where local economies have become increasingly entwined and susceptible to external shocks (Hudson, 2010). The two economic recessions in the 2000s, especially the 2007-2009 Great Recession, have brought many U.S. regions into economic adversity, further highlighting the importance of resilience studies. It is within such a context this dissertation seeks to explore and examine the contributions of immigrants to regional economies in the face of economic challenges.

1.1   Background and Policy Debate

In 2013, the foreign-born population reached 41.3 million in the United States, constituting 13.1 percent of the total U.S. population. This represents a 10.2 million, or 32.8 percent, increase since 2000, despite a slowdown during the 2007-2009 Great Recession (Zeigler & Camarota, 2014).

With this fast growth comes changing demographic composition and settlement pattern of the immigrant population. The 1965 Immigration and Nationality Act (INA) switched admission priority from national origin to family reunification and employment-based criteria, resulting in a shift in the immigrant population from mostly European to mostly Latino and Asian immigrants. These two racial/ethnic groups constitute 61 percent and 31 percent respectively of the total immigrants who arrived since 2000. In the past few decades, the foreign-born population has increasingly settled in places with short immigration histories. Between 1990 and 2013, the number of immigrants more than doubled in 25 states with historically small immigrant populations (Migration Policy

Institute, 2015). Within metropolitan areas, immigrants have dispersed from inner-city ethnic communities toward native-majority suburban neighborhoods (Singer et al., 2008; Massey, 2008) and many new arrivals directly choose suburbs upon the first arrival in the U.S. (Alba et al., 1999).

These new trends have drawn much policy attention and spurred considerable debate. Some policymakers are concerned that the growing immigrant population would increase burdens on the local public assistance system and erode social solidarity, while proponents of immigration believe that these newcomers will infuse new energy into local labor forces (Boswell, 2007; Wells, 2004). These competing views, coupled with federal inaction on immigration, have translated into different types of immigration policies proposed and enacted at the local level. Many localities have adopted measures to prevent employers from hiring unauthorized workers, increased cooperation with the U.S. Immigration and Customs Enforcement (ICE), and tightened regulations on rental requirements, day labor markets, and other "attrition through enforcement" practices targeted at reducing illegal immigrants. Other localities, influenced by immigrant-favoring views, have adopted inclusive policies aimed to integrate new immigrant populations, ranging from "sanctuary" ordinances that shield undocumented immigrants from being unduly interrogated to establishing or funding day labor centers that protect the rights of workers (Walker, 2011; Ramakrishnan & Wong, 2010).

Concurrent with changing immigration patterns are the two recessions in the past decade. The Great Recession, in particular, has caused severe downturns to local economies. It started from the housing and financial markets in 2007 and spread into all sectors of the U.S. economy and affected most of the country. Cities and regions in

Northeast, South, Midwest, and West have all suffered job losses and economic contractions. The national unemployment rates surged from 5.0 percent at the onset of the recession to 10.0 percent in October 2009, the highest level since 1983 (U.S. Bureau of Labor Statistics, 2012). Although the recession officially ended in 2009, its effects continue to reverberate, and many metropolitan areas are still in slow recovery.

The two recessions have revived the importance of resilience as an economic development target and promoted research on the theoretical foundation, empirical evidence, and policy implication of regional resilience (Christopherson et al., 2010). While an extensive literature in economics has examines the impacts of immigrants on the local labor market and tax system (e.g., Borjas, 2003; Card, 2001; Peri, 2013), immigration and its effect on economic resilience receive much less attention in urban planning and regional studies. The few studies that examined immigration as an underlying developmental factor either reached different conclusions or failed to directly measure immigrants' effects on aggregate economic outcomes (Benner & Pastor, 2015; Chapple & Lester, 2010; Lester & Nguyen, 2015).

In the policy domain, a new type of immigrant integration policies and programs has emerged in many places across the country since the Great Recession. These local efforts differ from the previous immigration policies in that they broaden the focus of debate from undocumented immigrants to immigrants as a whole and, more importantly, immigrants as potential economic development agents. Since 2013, more than 70 municipalities have adopted policies aimed to attract, accommodate, and empower immigrants (Welcoming America, 2015). A primary motive behind these policy moves is tied to local leaders' belief or hope that immigrants can upgrade and diversify the local

labor force and reenergize the local housing market (Huang & Liu, 2017). Consequently, programs promoting economic incorporation of immigrants make up an integral component of these policies. This trend is particularly evident in the Rust Belt region where immigration is widely regarded as a feasible and economical solution to the problems of population out-migration and long-term economic decline (Strauss, 2012). In this context, examining and understanding the relationship between immigration and economic resilience is a topic of substantial significance that will shed light on the current immigration debate.

1.2   Theoretical Frameworks

The policy discourse of regional development has in recent decades shifted its focus from growth and competitiveness to sustainable development (Fitzgerald & Leigh, 2002). A central question in regional studies pertains to how regions prepare for and respond to disruptions and challenges (Christopherson et al., 2010; Clark et al., 2010). This emphasis on sustainability over economic growth marks particular significance in a time of increasing globalization. Intensified global integration has made places more susceptible to external processes and forces (Benner & Pastor, 2015; Shapiro & Varian, 1998). The recent economic recessions have culminated this perceived sense of vulnerability and heightened the need to search for economic stability or resilience (Benner & Pastor, 2015; Hill et al., 2012; Hudson, 2010; Pendall et al., 2010).

Among the factors identified to contribute to regional resilience, human capital is an important one. Chapple and Lester (2010) indicate that the regions that attract highly skilled labor exhibit greater ability to grow the middle class and increase the average wage per worker during the period of national deindustrialization. Benner and Pastor's

(2015) results show that regions with a larger proportion of the population with middle-education levels are more likely to sustain a longer growth spell. Similarly, Hill and his colleague (2012) find that low education attainment of the local workforce renders a region more susceptible to downturns. Evidence from the revitalization of New England in the 1980s also indicates that ample supply of skilled workers was necessary to reboot the region's economic growth (Flynn, 1984; Harrison, 1984). Innovation is also documented to foster a region's resilience. Chapple and Lester (2010) note that a strong knowledge-based economy boosts a region's resilience by shortening the time to attain new equilibria and/or reverse the downward growth trajectories. The works of Saxenian (1994), Storper (1997), and Clark et al. (2010) find that the metropolitan areas that have regionally-based networks and supporting institutions for small firms as well as policies that foster innovation tend to fare better during the process of economic restructurings and be more competitive in terms of employment and income growth.

Although not directly studied in the regional development literature, the role of immigration as important human capital in building regional resilience has been illuminated by research from several distinctive disciplines. The agglomeration economies literature has long contended that a diverse and competitive market structure with ample small businesses fosters innovation and economic growth (Chinitz, 1961; Glaeser et al., 1992; Glaeser & Kerr, 2009). As immigrants are more likely to form small businesses than the native-born (Fairlie, 2012) and contribute disproportionally to the knowledge-based industries (Wadhwa et al., 2007; Hart & Acs, 2011), they can act as powerful economic agents of growth and resilience. In addition, Ottaviano and Peri

(2006) document that the immigrant populations add to the cultural diversity and raise the productivity of cities.

Sociologists examine immigrants' economic performance from the perspective of socioeconomic mobility and emphasize the role of social networks in the process of assimilation. They find that although immigrants tended to concentrate in inner-city ethnic communities upon their first arrivals, social networks abundant in these ethnic enclaves connected them to potential employers, housing information, business opportunities, and social and cultural activities (Wilson & Portes, 1980). These networks not only help form ethnic solidarity but also improve immigrants' flexibility and resilience in pursuing employment opportunities (Elliot & Sims, 2001) and shield immigrants from economic blows (Zhu et al., 2013; Painter & Yu, 2014).

Similar findings can be gleaned from the disaster planning literature. Li et al. (2010) find that Vietnamese Americans had a far better experience during Hurricane Katrina than African Americans as a result of their strong social networks. Immigrant-owned small businesses, in general, are pivotal in disaster recovery and economic renewal due to their deep roots in the communities and capacity of weathering economic disturbances (U.S. Small Business Administration Office of Advocacy, 2006). Bowles and Colton (2007) document the continuous growth of immigrant-owned businesses following September 11 in New York and the riots and earthquakes in Los Angeles in the 1990s. Hesson (2012) reported that on the day Hurricane Sandy hit New York City, immigrants were still working vital jobs to keep the city running.

Some recent immigration research has examined immigration's impacts on community development and capacity building. Liu et al. (2014) provide a systematic

review on how ethnic businesses transformed communities through economic, cultural social, physical and political mechanisms. Similarly, Schuch and Wang (2015) document the positive impacts of the immigrant population on local community place-making.

Despite these various accounts of immigration's positive impacts on economic and community development, the effect of immigrants on the regional resilience of the host societies remains an open question and requires more rigorous examination. Little research has directly examined this relationship, and the few exceptions fail to reconcile their findings. Benner and Pastor (2015) find that rapid influx of immigration presented a sort of "shock" that disrupted a region's growth trajectory. To the contrary, Chapple and Lester (2010) and Lester and Nguyen (2015) document a positive relationship between a region's ability to attract and integrate immigrants and growth in the regional labor market. Furthermore, none of these studies addresses resilience in a broader sense of resilience capacity or the context of a recession.

While research on immigrants' role in regional resilience is at an embryonic stage, local governments have started to recognize the contributions of immigrants to economic growth and community building. A growing number of localities are passing more inclusive policies aimed to facilitate immigrants' economic and social integration, particularly after the Great Recession. What characterizes this latest wave of local immigration policies is the focus on the economic potential of immigrants, which deviates from its predecessors' emphasis on public safety and law enforcement. A growing number of studies have examined the forces underlying local governments' adoption of immigration policies, ranging from the local demographic and political contexts to national rhetoric and federal pressure (Brenner, 2009; Hopkins, 2010;

Ramakrishnan & Wong, 2010; Oliver & Wong, 2003; O'Neil, 2011; Walker, 2011). However, empirical research that evaluates impacts and effectiveness of immigrant integration policies is limited and much needed.

1.3   Research Questions, Study Contribution and Dissertation Organization

This study examines whether immigrants have contributed to regional resilience and how the use of immigration as a key economic development strategy has played out in post-recession American cities in three separate chapters. It extends the existing literature on immigration and regional growth research in several ways. First of all, by providing a comprehensive analysis of immigration's impact on regional resilience, it seeks to fill the gap in the current immigration impact literature, which predominantly examines the impacts on native workers' labor market outcomes such as wage and employment opportunities. This dissertation focuses more broadly on immigration's effect at an aggregate level and discusses the economic development implications of immigration research in a more direct manner.

Second, this dissertation explores different conceptualizations of resilience. Research on resilience has yet agreed on how to measure resilience (Christopherson et al., 2010; Pendall et al. 2010). Some examine resilience using an equilibrium approach while others develop an evolutionary perspective. Different from most studies that rely on one specific approach, this research seeks to understand the concept of resilience from a broader scope, examining resilience as both capacities and performance.

Third, this dissertation provides a longitudinal analysis of resilience across a large number of metropolitan regions in the U.S. over almost three decades, from 1980 to 2010. Existing research on resilience from the evolutionary perspective tends to rely on

critical case studies (Cowell et al., 2016; Dawley et al., 2010; Simmie & Martin, 2010; Martin, 2012; Treado & Giarratani, 2008). Although this analytical approach offers nuanced and localized knowledge, it provides little opportunity for cross-area analysis and systematic assessment of factors leading to regional variation in resilience. In addition, this study investigates the effect of immigration on regional resilience performance in the face of the latest recession with a rigorous identification strategy to detect causality.

Last, this dissertation engages important policy discussions about the demographic and economic impacts of the recent local immigration policies. As immigrants are more inclined to form new businesses (Fairlie, 2012), create jobs, and revitalize distressed neighborhoods (Liu et al., 2014), many Midwest and Rust Belt cities have sought or are planning to utilize immigrant attraction and integration to reverse their economic and population declines. Gauging the effects of a specific immigrant integration effort in Detroit thus provides important insights on the design and implementation of similar policies elsewhere.

This dissertation uses data from various sources, among which is a database on regional resilience developed by the Building Resilience Regions (BRR) research network that is funded by the John D. and Katherine T. MacArthur Foundation (Pastor et al., 2015). Drawing on data sources such as the U.S. Census Bureau and the Bureau of Economic Analysis (BEA), the BRR database covers a broad spectrum of economic, demographic, and social variables across all U.S. Core-Based Statistical Areas (CBSA) for three decades (1980-2010). The CBSA area boundaries have been made consistent to compile the longitudinal dataset. Other important regional demographic and economic

information comes from the U.S. Census data, the Bureau of Labor Statistics, the Bureau of Economic Analysis and others, which will be discussed in greater detail in the subsequent chapters.

The dissertation consists of five chapters and addresses three independent but interrelated research questions in Chapter 2, Chapter 3, and Chapter 4 respectively. The remaining chapters proceed as follows. Chapter 2 documents the changes in regional resilience capacities from 1980 to 2010 and tracks the immigration growth dynamics for the same period, followed by an attempt to draw a relationship between immigration and resilience using a fixed effects model. Given that resilience capacity is multi-dimensional, it also tests which aspect of the resilience capacity is mostly accounted for by immigration.

Chapter 3 examines the contribution of immigration to resilience in the context of a recession. It investigates whether the immigrant population enhances resilience to the latest Great Recession in terms of total employment and per capita income. Resilience is measured as performance, and in two ways: the nonoccurrence of a downturn during the recession (resistance to the shock) and the extent to which the local economy bounces back from a downturn (resilience after the shock). In addition to baseline ordinary least squares (OLS) regressions, this chapter uses an instrumental variable approach to deal with the endogeneity issue arising from immigrants' tendency to move into more economically vibrant areas that may also be more resilient to the 2007-2009 Great Recession.

Chapter 4 evaluates the impact of the latest local immigrant programs in three areas, namely, immigrant population, their local labor market (employment), and

immigrant-owned businesses (entrepreneurship). It focuses on the Detroit region and

Global Detroit program as an exemplary case of the recent local revitalization efforts in

the Rust Belt area. This chapter is approached with a synthetic control model to estimate

the effect of Global Detroit program.

Chapter 5 concludes this study with a summary of key findings and future

research areas, a discussion of its contribution to the theoretical debate, and policy

implications.

CHAPTER 2. DO IMMIGRANTS BUILD REGIONAL RESILIENCE?

2.1 Introduction

Economic development planning has recently shifted from a focus on growth and competitiveness to a pursuit of long-term economic development and resilience (Clark et al., 2010; Fitzgerald & Leigh, 2002). In light of the deepening globalization and its effects on local economic development, planners and urban scholars have come to realize that the length of growth spells are equally, if not more, important as the speed of growth (Benner & Pastor, 2015).

Since the late 1970s, many U.S. regions have been grappling with massive plant closures, large-scale population out-migration, and periodic economic recessions. These challenges raise the question of what makes a region thrive in a competitive and fast-changing environment (Simmie & Martin, 2010). In turn, how regions respond to such disturbances exert a formative influence on the local economic structures and future development trajectories. Addressing how regions deal with exogenous shocks can, therefore, cast light on the process of uneven regional development (Martin, 2012). Additionally, the two recessions in the 2000s have drained the financial resources of many regions across the U.S., further elevating the sense of vulnerability and motivated the search for new paths to sustained growth (Hudson, 2010).

Drawing on research in psychology, ecology, and engineering, urban planners have started to integrate resilience in their research. However, these scholars have not yet developed a clear understanding of resilience as a concept nor had a firm grasp on the

factors that affect a region's resilience in the face of sudden or long-term challenges (Pendall et al. 2010; Martin, 2012).

Concurrent with the rising awareness of regional economic vulnerability is the growing presence of immigrants in a great number and large variety of American communities. Immigrants in recent decades have increasingly bypassed traditional gateway cities such as New York and Los Angeles and made inroads into cities that received few newcomers before. They have also gradually moved away from central cities and settled in suburbs and small rural communities that used to be inhabited by mostly native-born Americans (Singer et al., 2008; Massey, 2008). These demographic changes, along with the federal inaction on immigration, have pushed localities to take immigration matters into their own hands. While several cities have adopted restrictive immigration policies for the fear that the newcomers would erode the local cultural integrity and economic health, a growing number of localities across the country perceive immigrants as a valuable resource for local economic growth and community building. They have consequently adopted initiatives aimed at recruiting, retaining, and welcoming immigrants to boost their economic standings in the post-recession times. In this context, understanding whether and how the immigrant populations have affected regions' economic resilience can help inform future policymaking.

This chapter provides a longitudinal analysis of the evolution of regional economic resilience from 1980 to 2010, with a specific focus on whether immigration plays a role in this process. Instead of measuring resilience as post-shock performance, it gauges regions' adaptive capacities. The capacity measures are adapted from the Regional Capacity Index (RCI) developed by Kathryn Foster (2012), which originally

consists of twelve indicators covering the regional economic, socio-demographic, and community connectivity aspects of a region. Given that resilience capacity is multidimensional, this analysis also tests the relative contribution of the immigrant population to different resilience aspects. Fixed effects with time-varying controls of regional characteristics are the main analytical model in this chapter.

2.2   Literature Review

2.2.1   Economic Resilience

Economic resilience has recently risen to prominence in the social sciences as global integration has increasingly placed urban and regional areas in a vulnerable state susceptible to external forces and processes, as demonstrated in the case of the recent economic crises (Hudson, 2010; Pendall et al., 2010). Many scholars have begun to identify and study the factors that influence a region's growth trajectory throughout economic booms and downturns (Benner & Pastor; 2015; Chapple & Lester, 2010; Cowell et al., 2016; Hill et al., 2012; Safford, 2004).

Despite the growing popularity, economic resilience remains a fuzzy concept in the field of urban planning and regional development (Pendall et al., 2010). Various definitions of resilience have been developed and utilized in a variety of disciplines such as ecology, psychology, engineering, and disaster planning, and they have affected how urban planners conceive economic resilience. These definitions fit into three broad categories: resilience as equilibrium outcomes, resilience as a set of capacities, and resilience as an adaptive cycle (Weir et al., 2012; Pendall et al., 2010). The equilibrium perspective is built on two concepts: "engineering resilience," which refers to instances

15

when a regional system returns from a downturn to a pre-stress equilibrium state; and "ecological resilience," which describes instances when a regional system moves from one equilibrium to another in the wake of disturbances. Both definitions regard equilibria as an ideal state of being for regional systems and focus on the immediate outcomes after a shock to evaluate resilience (Hill et al., 2012; Chapple & Lester, 2010; Simmie & Martin, 2010).

However, critics of the equilibrium approach argue that regional economies are never in a static state. As they evolve, different sets of challenges emerge. The way regions respond to the current challenges depends on what they have learned from the previous experiences and how they have modified the local resource endowments and institutional infrastructure accordingly (Dawley et al., 2010; Simmie & Martin, 2010). Focusing on the economic outcomes, therefore, provides little insight into this process of capacity building and the dynamic nature of resilience. It may also create a misleading perception that equilibrium is what regional actors care most about when, in reality, a return to normalcy is often either unfeasible or suboptimal (Pendall et al., 2010). In light of these concerns, the other two conceptualizations, the adaptive cycle and the capacity perspectives, define resilience as a process of learning and adaptations in the face of uncertainty.

The adaptive system approach incorporates the ideas of experiential learning, adaptations, and evolutionary dynamics into the "panarchy" model, which depicts a four-phase process of continual adjustment of regional systems (Simmie & Martin, 2010; Pendall et al., 2010; Swanstrom, 2008). These four phases – exploitation, conservation, release, and reorganization –are characterized by different levels of resource

accumulation and system vulnerability. But they are also tightly connected, comprising a cycle of regional adaptation. For example, a regional economy usually starts with the exploitation phase, in which local industries exploit comparative advantages and accumulate productive resources. As agglomeration economies grow, the regional system enters into the conservation phase. Local connectedness increases and the economic pattern reaches maturity during this period. But with the decrease of uncertainty also come increasing rigidity and diminishing resilience. When a shock occurs, it is likely to cause a devastating blow to the system. Firms close, jobs disappear, and residents move out. This phase is also marked by the system releasing old modes of production and resources. Resilience during this period is at the lowest level but would increase as the region starts to reorganize and reinvent itself. During the reorganization phase, new forces of development emerge, and a new round of regional growth sets forth (Dawley et al., 2010; Simmie & Martin, 2010).

Although the panarchy model is useful for developing a fine-grained understanding of a region's complex socioeconomic system and unique growth trajectory, it is nevertheless unconducive to detecting patterns across a wide range of regions and generalizing commonalities that underlie success. The panarchy model also implies that regional economic development follows an inescapable inner logic of decline-growth cycles (Dawley et al., 2010; Simmie & Martin, 2010). If an adaptive regional system always cycles through these four stages and adjusts its behaviors to the appropriate pattern over time, policy interventions and resilience planning would likely to play little role in this process (Swanstrom, 2008).

A closely related perspective to the adaptive cycle approach emphasizes the set of capacities that increase a region's ability to respond to challenges (Figure 2.1). This approach views resilience as a complex system consisting of various elements working together in preparation for the arrival of exogenous shocks (Foster, 2012; Cutter et al., 2010; Esnard & Sapat, 2014). By using a generalized set of resilience capacity indicators, it expands the analytical frame from single case studies to systematic comparisons across a large number of regions. The set of diverse capacity indicators can also serve to more fully capture the pre-stress local conditions. Additionally, according to this perspective, resilience capacities as manifested in the local resource endowments and institutional infrastructure lead to higher chances of
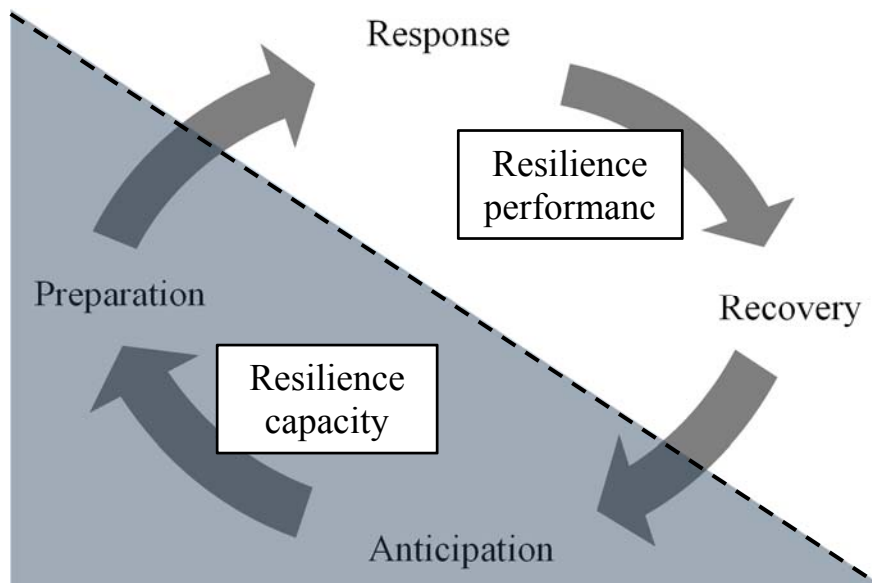
Figure 2.1 Cycle of resilience capacity and performance. Source: Foster (2012)

resilience performance in the wake of shocks or stresses (Dawley et al., 2010; Foster, 2012; Simmie & Martin, 2010). This perspective thus proposes that resilience can be intentionally fostered and developed through adjusting resource allocations, improving workforce quality, and building institutional completeness and community cohesion. Resilience performance during and after the shocks, in turn, feeds back into the capacity building process and adds to the regions' stock of experience. As the regional systems evolve through time, researchers and policymakers may take measures at multiple points in time to track the trajectories of resilience development (Foster, 2012). In this regard, the capacity approach facilitates comparison of resilience across both geography and time, serving as a bridge between the outcome perspective and the adaptive cycle perspective.

Thus, this chapter assesses resilience using a capacity approach. Scholars have identified an inventory of capacities proven to be effective buffers against shocks and stresses. Simmie and Martin (2010) define resilience capacity as "the ability of the region's industrial, technological, labor force and institutional structures to adapt to the changing competitive, technological and market pressures and opportunities that confront its firms and workforce" (p.30). Norris and his colleagues (2008) identify four sets of generalized capacities for coping with stresses: economic development capacity, social capital capacity, information and communication capacity, and community competence capacity. Pendall and his colleagues (2010) conceptualize community resilience capacity as a function of individuals' preparedness for stresses, suggesting that individual vulnerability, housing precariousness, and environmental turbulence are the three key areas where regional actors can work on to increase regional resilience. Cutter and her

colleagues (2010) identify a host of indicators that predict community resilience in the face of natural disasters. These fall into five categories: social resilience, economic resilience, institutional resilience, infrastructure resilience, and community capital resilience.

To enhance the feasibility of comparisons, Foster (2012) distill from the multitude of indicators three aspects of regional capacity germane to economic resilience. These are regional economic capacity, which pertains to a region's industrial structure and economic resources; socio-demographic capacity, which indicates the human capital endowment in the region; and community connection capacity, which refers to the social and institutional capital of the region. The three aspects make up the Resilience Capacity Index (RCI), a composite statistic measuring the region's overall capacity to cope with challenges and stresses. These works, particularly Foster's RCI, provide the foundation for the application and development of the capacity measures in this research project.

2.2.2   Immigration's Impacts on the Receiving Communities

A long-standing literature in economics has examined immigrants' impacts on the labor market, public assistance, and tax system of the receiving communities (Borjas, 2003; Camarota, 1997; Frey, 1995; Card, 2001; 2005; Card & DiNardo, 2000; Ottaviano & Peri, 2006; Peri, 2012), but immigrants' effects on regional and community resilience building have not been adequately studied. Resilience research identifies economic capacity, social capacity, and community capacity to be critical dimensions of a region's resilience capacity (Foster, 2012). Below, I will draw on different disciplines to explore the relationships between immigration and the different facets of resilience capacity (Figure 2.2).

20
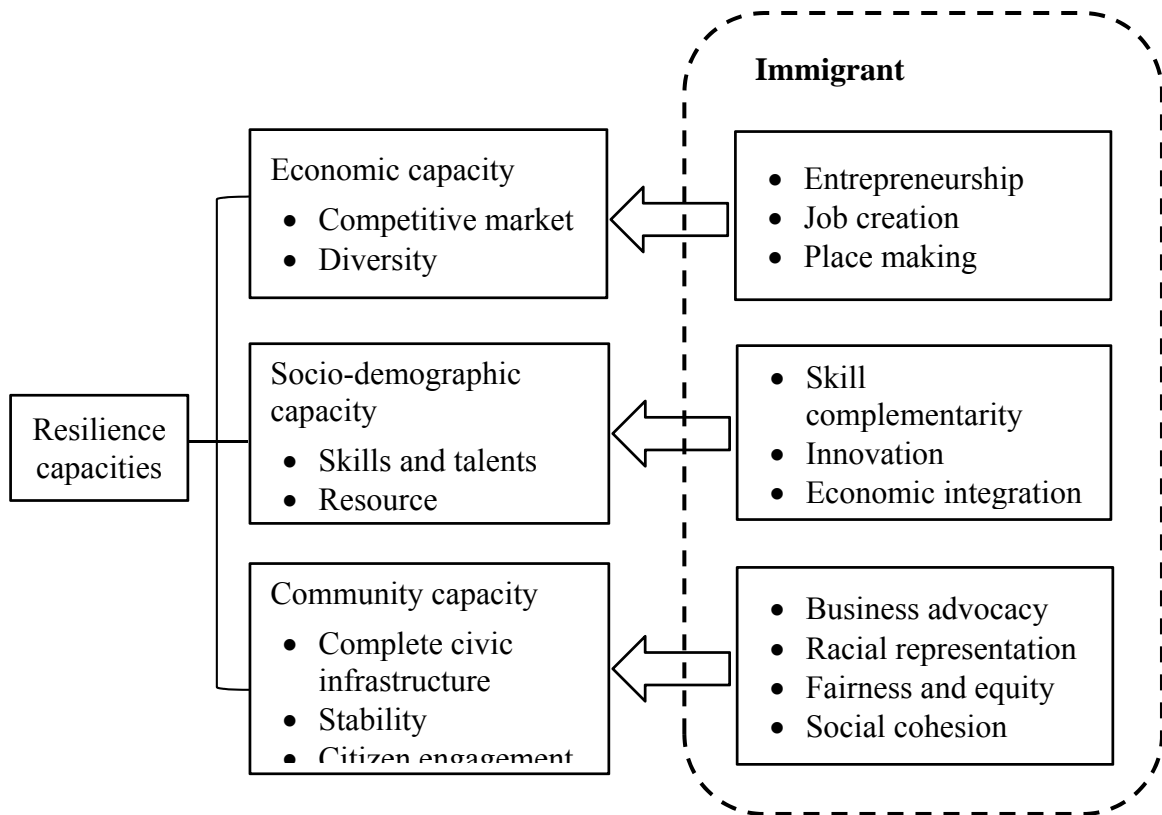
Figure 2.2 Theoretical framework

2.2.2.1 Economic capacity

Numerous studies have engaged in the investigation of what types of industrial

makeup and market structure lead to long-term economic growth (Chinitz, 1961; Glaeser

et al., 1992; Henderson, 1997; Jacobs, 1969; Marukusen, 1996; Marshall, 1920).

However, these studies provide different findings. On the one hand, some scholars

indicate that agglomeration economics stem mostly from co-location of similar firms,

especially when these firms are in the same industry (Henderson, 1997; Rosenthal &

Strange, 2003). Other scholars, on the other hand, argue that diversified urban areas, such

as New York and San Francisco, promote innovation and entrepreneurship, which

eventually lead to long-lasting urban prosperity (Glaeser et al., 1992; Chinitz, 1961; Jacobs, 1969).

While the debate on the relative importance of localization and urbanization economies persists, research tends to converge on the positive effects of small firms on urban growth (Chnitiz, 1961; Glaeser et al., 1992; Glaeser et al., 2010; Saxenian, 1994; Rosenthal & Strange, 2003). Cities with a high level of small businesses are found to have stronger urban growth not only because the local institutional culture is entrepreneurial and facilitating (Saxenian, 1994), but also because small firms make these cities more flexible and adaptive to changes. For example, Piore and Sabel (1984) observe that in the Emilia-Romagna region in Italy, the proliferation of small firms specializing in a diverse array of sectors facilitates "flexible specialization." This form of specialization enables quick responses to a change in market demands and fill market niches, an ability that regions dominated by large firms and hierarchical structure of production rarely possess. Because small businesses in Emilia-Romagna and other similar regions usually develop tight rapports within themselves and with local institutions, clusters of small firms are also frequently used to indicate a collaborative and adaptable institutional culture (Markusen, 1996; Clark et al., 2010). Another concept related to entrepreneurship is Schumpeter's (1934) "creative destruction," which denotes that constant churning of businesses will lead to reorganization of local resources and thereby contribute to the economic health of a regional system.

Immigrants are widely acknowledged as being highly entrepreneurial. A recent Fiscal Policy Institute's report (Kallick, 2012) shows that immigrants owned about 18 percent of U.S. small businesses while only constituting 13 percent of the national

population in 2007. These businesses hired about 4.7 million employees and generated $776 billion in revenue (Kallick, 2012). Many of the immigrant businesses are in the technology and engineering sectors. About a quarter of the engineering and technology companies between 1995 and 2005 were founded or co-founded by immigrants (Wadhwa et al., 2007). Immigrants are also central to technology formation and commercialization, contributing to the U.S. innovation growth (Kerr & Lincoln, 2010).

Beyond job creation, immigrant businesses foster community building and neighborhood (re)development (Zhou, 2004; Liu et al., 2014; Schuch & Wang, 2015). Because of immigrant entrepreneurs' business shrewdness and cultural background, they are able to identify untapped market niches and provide goods and services catering to ethnic communities, creating job opportunities and organizing social life in this process (Bonacich, 1973; Aldrich et al., 1985). Immigrant businesses also help build neighborhoods outside of ethnic communities, especially neighborhoods that are run down and abandoned by the mainstream economy. The evidence is abundant across the country that immigrant businesses have turned deserted streets into vibrant business communities with busy storefronts and sparked community development around multi-ethnic retail corridors (Bowles & Colton, 2007; Econsult Corporation, 2009; Liu et al., 2014; Schuch & Wang, 2015). Due to immigrant businesses' tight connections to local communities and their ability to quickly discern and respond to changes in the market demand, regions with large shares of immigrants may show stronger economic capacity than regions without them.

2.2.2.2 Socio-demographic capacity

Another key factor identified to contribute to regional resilience is human capital (Chapple & Lester, 2010; Benner & Pastor, 2015; Hill et al., 2012; Norris et al., 2008). A larger proportion of educated people is found to enhance the region's ability to recover in the wake of economic downturns (Chapple & Lester, 2010), or buffer the region from external shocks and processes like the national deindustrialization trend (Hill et al., 2012). Skilled workers provide the labor supply for a knowledge-based economy and the foundation for successful economic restructuring and revitalization in the wake of deindustrialization, as demonstrated in the case of New England in the 1980s (Flynn, 1984; Harrison, 1984). High human capital also indicates a healthy and means-rich workforce, which is flexible and adaptable in the face of economic uncertainty and turbulence (Foster, 2012). Similar reasoning applies to the proportion of people out of poverty, as it pertains how much resource and option the local population have to help them survive natural and economic shocks.

Recent economic studies show that immigrant workers are an asset rather than a liability to the local economy (Card, 2005; Card & DiNardo, 2000; Peri, 2013; Ottaviano & Peri, 2006). They find little evidence that immigrants depress the wages of native workers or crowd them out from the labor market (Card, 2005; Card & DiNardo, 2000; Peri & Sparber, 2009; Wright et al., 1997). Because immigrant and native workers within the same skill levels tend to specialize in different lines of work, immigrants complement rather than supplement the native-born workforce (Peri & Sparber, 2009; 2011). Immigrants are an important contributor of high-skilled workers. Between 1990 and 2010, the college-educated immigrant population increased by seven million, bringing their share of the total college-educated population from 10 percent in 1990 to 16 percent

in 2014 (Zong & Batalova, 2016). These high-skilled immigrants are likely to work in the engineering and technology sectors of the economy, contributing to the innovation development in many regions in the country (Wadhwa et al., 2007; Saxenian, 1994). In addition to high-tech regions such as Silicon Valley, high-skilled immigrants also concentrate in older industrial metropolitan areas in the Midwest and Northeast such as Albany, Buffalo, Cleveland, Detroit, Pittsburgh, and St. Louis (Hall et al., 2011; Frey, 2005), offsetting the "brain drain" process stemming from native out-migration (Frey, 2005). On the other hand, immigrants are also overly represented in the low-skilled labor force. However, they provide the necessary labor supply that allows firms to adjust investment and production, which in the long run lead to increased overall efficiency of the economy (Ottaviano & Peri, 2006; Peri, 2013). That said, immigrants' positive effect on productivity may not be reflected in the average skill level of the local labor force.

2.2.2.3 Community Capacity

Resilience studies also indicate that strong community capacity is critical to a region's ability to manage shocks and stresses (Cutter et al., 2010; Norris et al., 2008; Foster, 2012; Waugh & Liu, 2014). Community capacity is mostly demonstrated through civic engagement, civil society infrastructure, and social connectivity (Norris et al., 2008; Foster, 2012). The downturn effect of a natural or economic shock tends to reverberate through the entire regional system, affecting people from all walks of life, especially those from disadvantaged and low-status communities. Establishing and enhancing mechanisms through which community members and institutions share critical resources thus can significantly expand local capabilities to cope with the shock (Waugh & Liu, 2014). Strong social networks and institutions provide channels for assistance and

support in times of need, buffering and mitigating the devastating effect of shocks. Social capital and strong networks of citizen participation throughout the economic planning process would lead to better governmental performance which in turn promotes greater social and economic outcomes that prosper through time (Foster, 2012; Putnam, 1994).

Immigrants tend to settle in ethnic communities (Wilson & Portes, 1980). Sociologists identify enclave residence as a key underlying factor for immigrants' upward economic and occupational mobility. Immigrant enclaves are not only ethnically concentrated neighborhoods, but also important physical spaces for organizing the economic activities of immigrant entrepreneurs and the labor market experience of immigrant workers. They provide a stable customer base, institutional support, access to capital, and role models that can help immigrants sustain entrepreneurial activities (Aldrich et al., 1985; Bailey & Waldinger, 1991; Coleman, 1988; Light & Bonacich, 1988; Zhou, 2004). Social networks abundant in these ethnic enclaves connect immigrant workers to potential employers and landlords (Liu, 2009), enhance immigrants' flexibility and resilience in pursuing employment opportunities (Elliot & Sims, 2001), and shield immigrants from economic shocks (Zhu et al., 2013; Painter & Yu, 2014).

These social networks also play an important role in facilitating post-disaster recovery and organizing community development activities. Li et al. (2010) document that the dense social networks among Vietnamese Americans during Hurricane Katrina helped facilitate their evacuation process and post-disaster community rebuilding. In the post-Katrina period, immigrant grassroots organizations played a critical role in revamping the local school system and rekindling the entrepreneurial spirit in the disaster-torn city (The Economist, 2015). Ethnic and immigrant-owned businesses have

26

also exhibited considerable resilience in times of environmental and economic hardships as evidenced by their ability to weather economic fluctuations during and following September 11 in New York and the earthquakes and riots in Los Angeles in the early 1990s (Bowles & Colton, 2007).

At the macro level, communities with a long tradition of immigration tend to have greater institutional flexibility and adaptability in coping with demographic changes. O'Neil (2011) observe that established immigrant destinations respond more proactively to the demands of the new populations and have more adaptive and complete institutional infrastructures in place. These institutional capacities can translate into critical buffering mechanisms in the face of other economic challenges and shocks. Pastor and Mollenkopf (2012) echo this observation, arguing that a long history of immigration is associated with greater regional institutional capacities. To better serve immigrants, municipalities refine old programs, adopt new programs, increase in inter-governmental collaboration, and engaging in partnerships with local nonprofit organizations and immigrant advocacy groups. Regions that have worked to reduce political fragmentation and institutional rigidities in the face of demographic changes are likely to develop a repertoire of institutional collective actions, regional leadership, and other resources and strategies that can be drawn on when future disturbances occur (Pastor & Mollenkopf, 2012).

Despite the abundant evidence illuminating the relationship between immigration and regional economic resilience, only a few studies have considered such a relationship. These studies reach contradictory conclusions. While Benner and Pastor (2015) find that the rapid influx of immigration presented a sort of "shock" that could disrupt a region's growth, Chapple and Lester (2010) and Lester and Nguyen (2015) note that a region's

ability to attract and integrate immigrants leads to labor market resilience. Furthermore, the labor market resilience in these studies is measured as either the duration of growth spells or simple growth rate, none of which captures regional capacity or post-shock economic performance. As such, research that directly tests the effect of immigrants on resilience capacity is much in need and would very likely shed light on the current political and public discourse of immigration issues.

2.3   Data and Methodology

2.3.1   Data and Sample

Data for this chapter come from various sources, one of which is a comparative metropolitan database developed by the Building Resilience Regions research network (BRR) (Pastor et al., 2015). It contains a broad spectrum of economic, demographic, and social measures for all U.S. metropolitan areas that span from 1980 to 2007[1]. To make a three-decade long panel dataset, I also extract data from the U.S. Census Bureau historical data (Manson et al., 2017), County Business Pattern, Bureau of Labor Statistics, and Center for Economic Studies to construct 2010 statistics and key capacity measures uncovered in the BRR data (specific variables and data sources are detailed in Table 2.1). These data are then merged with the BRR data to create a panel for 359 metropolitan areas for three decades (1980-2000)[2].

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[1] To create a longitudinal dataset with consistent geographic boundaries, the BRR dataset is constructed based on census tract-level data of 1980, 1990, 2000, and 2005-2009, which is "re-shaped" to a consistent 2000 tract-level geography and then aggregated to regional level using the same techniques as with Geolytics.

[2] To standardize the geographic boundaries for this panel data that spans over three decades, I obtained data at the county level, which maintains higher consistency over the years, and then aggregate the data to the 2003 MSA geographies using the geographic cross-walk tool from the U.S. Census.

The unit of analysis in this dataset is Core-Based Statistical Area (CBSA) defined by the U.S. Office of Management and Budget (OMB) in December 2003 (Pastor et al., 2015). Each metropolitan statistical area is a geographic region with a high density of population at its core and a high degree of economic integration throughout the area, making it a suitable geography for regional studies. It is also an appropriate level to study immigrant effects on the receiving communities because finer geographies such as county or census tract level are prone to spillover effects. Additionally, immigrants can reside in one neighborhood and work in another, making employment effect and residence effect hard to tease apart. There are 361 metropolitan and 567 micropolitan statistical areas in 2003. After removing regions that contain missing data, the final sample includes 359 metropolitan statistical areas (MSAs) over three decades, making a total of 1077 observation points.

2.3.2 Model Specifications

Much of the previous resilience research has employed either a case study approach that study the unique growth trajectories of specific regions (Cowell et al., 2016; Dawley et al., 2010; Pastor & Mollenkopf, 2012; Simmie & Martin, 2010), a cross-sectional analysis that compares resilience performances across cities (Chapple & Lester, 2010; Lester & Nguyen, 2015), or an event history approach that examines differential lengths of growth or downturn spells across places (Benner & Pastor, 2015; Hill et al., 2012). These analyses either fail to make systematic assessments over a large set of regions or neglect unobserved confounding characteristics that can cause bias in the model estimates. Panel data enable us to use fixed effects estimators that exploit within-group variation over time to address the omitted variable bias to the extent that the

29

unobserved regional heterogeneity stays constant over time. Additional year fixed effects are included in the model to absorb unobserved national trends may affect resilience uniformly across all metropolitan areas. The models are of the following form:

$$Y_{it} = \alpha + \beta D_{it} + \delta X_{it} + \alpha_i + \lambda_t + \varepsilon_{it} \tag{1}$$

where i indexes MSAs and t indexes years. Y_{it} is regional resilience capacity in metropolitan area i in year t, D_{it} is the time-varying immigrant share of the local population, X_{it} is a vector of time-varying control variables, α_i represents influential time-invariant regional characteristics, λ_{it} is a set of year dummies, and ε_{it} is the error term.

As regional resilience capacity is defined in this chapter as consisting of three aspects, the dependent variable in the equation takes various forms. To test the economic capacity of a region, I rely on the measures of business environment such as the volume of business activities and the level of business churn. These indicators are frequently used in the literature to gauge the vibrancy of the market (Augustine et al., 2013). As previously discussed, the levels of small business and business churn are associated with a flexible and competitive market structure which leads to long-term economic growth (Glaeser et al., 1992; Piore & Sabel, 1984). Another indicator of economic capacity is industrial diversity of a regional economy captured by the inverse of the Herfindahl-Hirschman index, as some scholars argue that a more diverse economic structure is better able to absorb economic shocks (Martin, 2012). On the socio-demographic dimension, the key measure used is the share of the metropolitan area's population age 25 or older with at least a bachelor's degree. College-educated populations provide skills and innovation to local economies, and they are more flexible and option-rich in the face a regional stress (Foster, 2012). Based on similar reasoning, I also use the percent local

population above the federal poverty level as another measure of socio-demographic capacity. The third dimension of resilience capacity lies in community attributes such as civic engagement, civil society infrastructure, and social connectivity. The density of civic organizations is a proxy indicator for civil society infrastructure that is especially critical for low-income and vulnerable communities in coping with economic and social challenges. Homeownership measures the place attachment of the local population as home owners are more engaged in local planning and community development. Another indicator of civic engagement is voter participation. Higher voter turnouts indicate greater commitment from the local population to local political and social processes.

Finally, I also constructed a composite statistic to measure the overall resilience capacity for a region. This index is inspired by Foster's (2012) Resilience Capacity Index (RCI), which consists of 11 indicators covering the three categories of regional capacity[3]. Foster's index is built for 2007 only. My index, however, tracks regional resilience capacity from 1980 to 2010. The operationalization and data source of each index component is detailed in Table 2.1. The index is created in a way such that a high value corresponds to greater resilience capacity. Each measure is standardized into a z score. The final resilience capacity score is the average of z-scores of all the indicators with equal weights.

Since the multi-dimensional resilience capacity index already captures a broad range of regional resources and attributes, the control variables include background characteristics of metropolitan areas that may be correlated with both immigrant

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[3] Foster's resilience capacity index draws from 12 indicators. Due to data availability, the percentage of the local civilian population having health insurance is not included in my index construction.

Table 2.1 Variable descriptions and sources

Variables	Description	Source
Resilience capacity index		
Regional economic capacity		
Income equality	The ratio of a region's household income at the 20th percentile to household income at 80th percentile	BRR database; American Community Survey (ACS)
Regional affordability	The percentage of a region's households paying 35 percent or less of their income for housing	BRR database; ACS
Economic diversification	The inverse of the Herfindahl index, defined as $1-\Sigma(S_i^2)$, where S_i is the 2-digit industry i's share of the local employment	Bureau of Labor Statistics (Quarterly Census of Employment and Wages)
Business environment	A composite measure comprised of a metropolitan area's levels of entrepreneurial activity, business churn, and funding opportunities (state-level only due to data availability)	National Science Foundation; Business Dynamics Statistics; County Business Patterns
Socio-demographic capacity		
Educational attainment	The percentage of the total population 25 years old and older with a bachelor's degree or higher	BRR database; ACS
Without disability	The percentage of the civilian noninstitutionalized population that report no sensory, mobility, or cognitive disabilities	Decennial Census; ACS
Out of poverty	The inverse of poverty - the percentage of the population with income in the past 12 months above the federally defined poverty line	BRR database; ACS
Community connection capacity		
Civic infrastructure	The density of civic organizations, measured by the 3-digit NAICS code 813 ("religious, grant-making, civic, professional, and similar organizations")	Bureau of Labor Statistics (Quarterly Census of Employment and Wages)
Metropolitan stability	The percentage of the population that lived within the same metropolitan area 5 years ago (1 year ago for 2010)	Decennial Census; ACS
Homeownership	The percentage of owner-occupied housing units in the metropolitan areas	BRR database ACS
Voter participation	The percentage of the population aged 18 and above voting in general elections	Dave Leip's US Election Atlas
Independent variable		
Immigration level	The 10-year lagged foreign-born share of the local population	BRR database; ACS
Regional Controls		
Regional size	Logged total population	BRR database; ACS
Income level	Per capita income, inflation-adjusted	BRR database; ACS

Table 2.1 (continued)

Variables	Description	Source
Labor market condition	Unemployment rate, measured by the percent of labor force that is unemployed	BRR database; American Community Survey
Minority population	The percentage of the population that are non-Hispanic black	BRR database; American Community Survey
Government structure	The role of central city in regional policymaking, measured by the percentage of the population living in central city	BRR database; American Community Survey

population and resilience capacity. These variables are defined in the following ways:

- *Population and employment*: These two variables examine whether the size of a metropolitan region and the condition of local labor market matter for resilience (Chapple & Lester, 2010). Larger regions tend to produce higher levels of productivity due to agglomeration economies (Glaeser et al., 1992; Jacobs, 1969). A slack labor market characterized by large unemployment creates pressures on the regional economy and resilience capacity.

- *Regional income level*: Per capita income is used to measure regional economic resources. Including this control variable makes sure that comparison is among regions located in similar position in the urban hierarchy.

- *Racial/ethnical characteristics*: The percentage of the population that is Hispanic is commonly used to capture the size of minority population, but it is closely correlated with immigrant population given that Hispanics make up a disproportionally large share of recent immigrant flows. Thus, I only use the percentage of non-Hispanic blacks in the metropolitan area's population.

- *The percentage of the metropolitan population living in central city*: This variable serves as a rough proxy for the role of the central city in regional policymaking (Hill et al., 2012). There has been research exploring whether local government fragmentation promotes or impedes growth, but the findings are inconclusive (Benner & Pastor, 2015; Carr & Feiock, 1999).

2.4 Results

2.4.1 Descriptive Statistics

Table 2.2 reports the descriptive statistics for the dependent variables in 2010 to provide a glimpse into these capacity measures. These variables include small business level, business churn, and industrial diversification as measures of economic capacity; the percentage of the population age 25 and above with at least a bachelor's degree and the percentage of the population out of poverty as measures of socio-demographic capacity; and civic organization density, homeownership rate, and local voter turnout rate as measures of community connectivity capacity. The resilience capacity index (RCI) measures the overall resilience capacity consisting of these three aspects. The index reports a mean of zero, with half of the regions having positive RCI scores and the other half negative scores.

To probe into the potential relationship between a region's immigration and resilience capacity, I organize these descriptive statistics by the differential changes in

Table 2.2 Descriptive statistics of key variables (2010) stratified by change in percent foreign-born (2000-2010)

Variable	Obs.	Mean	Std. Dev.	Min	Max
Full sample					
Number of small businesses per 10,000 persons	359	442.69	77.45	261.76	817.93
Establishment churn rate	359	16.08	2.48	10.61	25.90
Industrial diversification	359	0.85	0.02	0.75	0.88
Percent population with a bachelor's degree	359	25.36	7.83	11.80	57.00
Percent population without poverty	359	84.81	4.00	65.20	92.60
Number of civic org. per 10,000 persons	359	4.42	2.50	1.11	15.75
Homeownership rate	359	69.89	5.74	52.35	83.55
Voter turnout rate	359	38.79	8.01	7.97	59.18
Resilience capacity index	359	0.00	0.49	-1.54	1.24
Percent foreign-born population	359	7.38	6.54	0.85	36.59
MSAs with low increases in percent foreign-born (-2.2 ~ 0.8)					
Number of small businesses per 10,000 persons	180	435.76	73.69	261.76	817.93
Establishment churn rate	180	15.13	2.15	10.61	25.90
Industrial diversification	180	0.85	0.02	0.76	0.88
Percent population with a bachelor's degree	180	23.56	7.41	12.20	50.80
Percent population without poverty	180	84.07	4.32	65.20	92.60
Number of civic org. per 10,000 persons	180	4.68	2.79	1.11	15.75
Homeownership rate	180	70.10	6.42	52.35	83.55
Voter turnout rate	180	39.03	8.66	7.97	57.21
Resilience capacity index	180	-0.07	0.51	-1.48	1.17
MSA with high increases in percent foreign-born (0.8 ~ 4.6)					
Number of small businesses per 10,000 persons	179	449.66	80.66	267.83	773.36
Establishment churn rate	179	17.04	2.43	12.20	24.10
Industrial diversification	179	0.85	0.02	0.75	0.88
Percent population with a bachelor's degree	179	27.17	7.85	11.80	57.00
Percent population without poverty	179	85.55	3.51	71.50	92.40
Number of civic org. per 10,000 persons	179	4.16	2.15	1.14	13.20
Homeownership rate	179	69.69	4.98	53.93	82.44
Voter turnout rate	179	38.55	7.31	18.42	59.18
Resilience capacity index	179	0.08	0.46	-1.54	1.24

MSAs are defined under the OMB 2003 delineation.

metropolitan areas' foreign-born share from 2000 to 2010[4]. The second panel and third

panel of Table 2.2 show the statistics for the regions that register lower-than-median and

higher-than-median increases in the foreign-born shares respectively. In other words, the

regions included in the second panel experienced changes in the percent foreign-born

lower than the median of the 359 regions in the sample, which equals 0.8 percentage

points. These regions also show lower values on the economic and socioeconomic

measures compared to the full sample and regions with higher foreign-born share

increases, indicating they have lower capacities on these two dimensions. While this table

shows that smaller increases in the level of immigration are associated with higher values

for the community capacity measures, it is not entirely surprising because, as noted

before, local civic infrastructure is developed through a long history of receiving

immigrants rather than recent demographic changes. Overall, regions with small foreign-

born share increases receive negative RCI scores while regions with high increases

receive positive scores, suggesting a positive relationship between immigration and

resilience.

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[4] In this dissertation, the immigrant population and the foreign-born population are used
interchangeably as place of birth is the only variable in the Census data that can provide a proxy
for immigrant status.
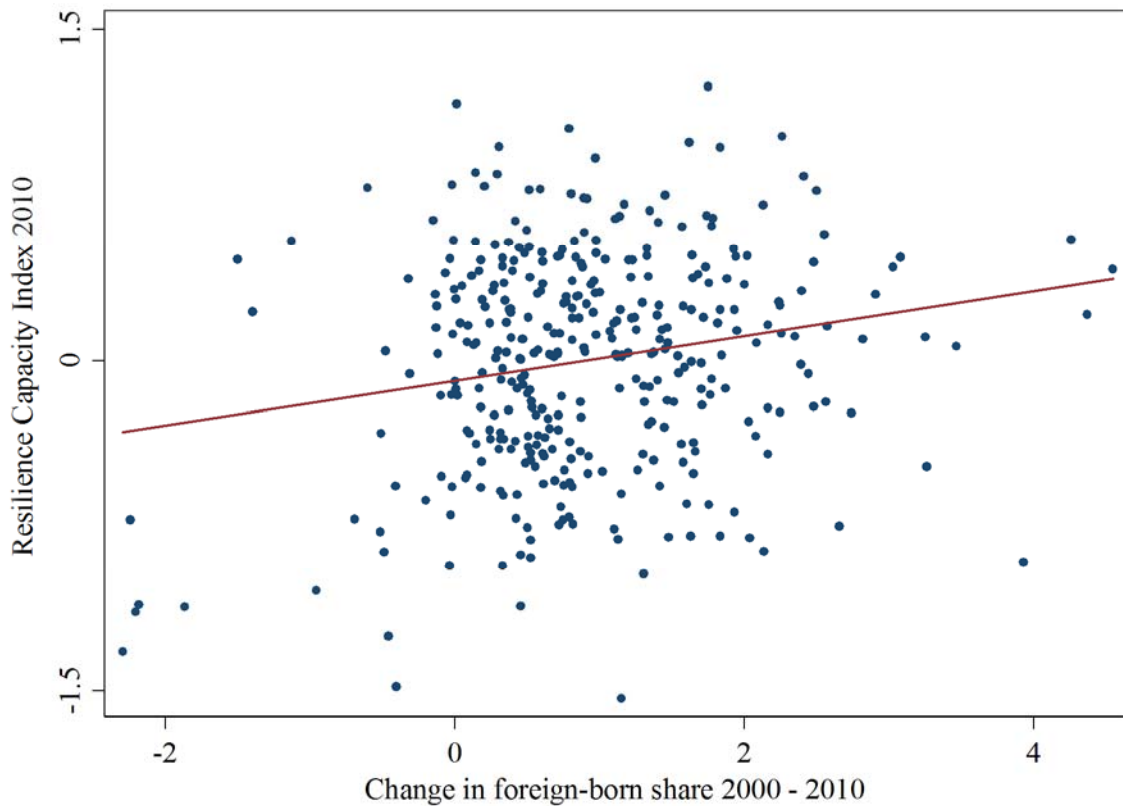
Figure 2.3 Two-way scatter plot of RCI score 2010 and change in foreign-born share 2000-2010

Figure 2.3 demonstrates the relationship between RCI score in 2010 and the change in the foreign-born share from 2000 to 2010. Most of the regions are scattered between negative one and positive one along the RCI score and between negative one and four percentage points along the change in percentage foreign-born. A majority of MSAs have seen increases in the foreign-born share. Overall, regions that experience a positive change in the foreign-born share between 2000 and 2010 score higher on RCI in 2010. The bivariate correlation has a coefficient of 0.2 (not shown in the figure), meaning that a

one-percentage point increase in the foreign-born share of the local population is associated with a 0.2-point increase in the resilience capacity score.

2.4.2   Empirical Results

The previous section demonstrates a positive correlation between immigration and most of the capacity measures. However, these binary relationships are subject to omitted variable bias, meaning that the observed relationships are contingent on some regional characteristics. For example, immigrant destinations are usually large in the population and employment sizes, and these large urban areas tend to have diversified economies and strong civic infrastructure. Through the connections from immigration to the urban size and from the urban size to resilience capacity, immigration may show to increase resilience when in fact this positive relationship is mediated through other regional characteristics. Therefore, in this section, I also regress each of the key capacity measures on a set of regional controls, including population size, unemployment rate, racial composition, and government structure (see Table 2.1 for detailed descriptions of what these variables are and how they are operationalized).

Additionally, because each region is a unique urban ecosystem that involves a complex interaction of local factors, a range of unobserved characteristics may also influence the immigration level and resilience capacities of a region. These unobserved characteristics constitute another set of omitted variables that would render cross-sectional analysis susceptible to bias. The estimation of changes in the same region over time may help reduce some of the bias to the extent that the unobserved regional characteristics are time invariant. Thus, I use a fixed effects panel estimator to estimate

the changes in a region's capacity measure as a function of the changes in the foreign-born share of the region.

Another analytical problem with identifying immigrants' effect is that immigrants are economic agents themselves, following economic opportunities across locations. Their current residential location is a function of the place's economic and social characteristics. Therefore, using the concurrent immigration level as the independent variable can introduce the bias of simultaneity or reverse causality. In light of this endogeneity, I use the ten years lagged term of percent foreign-born as the independent variable in the fixed effects model for that the immigrant level in an area ten years ago should be less correlated with the current growth level but still predictive of the current immigration level (Hu, 2014).

Table 2.3 Immigration level and economic capacity measures (1980-2010)

	Number of small businesses			Establishment churn			Industrial diversification		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Percent foreign-born	1214.96***	913.35***	877.47***	0.14***	0.09**	0.07*	-0.001***	-0.0006*	-0.0005
	(191.74)	(78.52)	(79.99)	(0.02)	(0.04)	(0.04)	(0.0002)	(0.0003)	(0.0003)
Regional controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other capacity measures	No	No	Yes	No	No	Yes	No	No	Yes
MSA fixed effects	0	359	359	0	359	359	0	359	359
Year fixed effects	3	3	3	3	3	3	3	3	3
Obs.	1077	1077	1077	1077	1077	1077	1077	1077	1077
R-squared	0.508	0.995	0.995	0.485	0.862	0.866	0.297	0.858	0.862

Notes: Standard errors in parentheses. *$p<0.10$ **$p<0.05$ ***$p<0.01$

Table 2.3, Table 2.4, Table 2.5 and Table 2.6 present the results of these models.

Each table uses a different set of capacity measures as the dependent variable. In Table

2.3, Column 1-3 show immigrants' effect on the number of small businesses in a region[5],

Column 4-6 show the effects on the regional establishment churn[6], and Column 7-9 show

the effects on regional industrial diversification. The first specification of each set

(Column 1, 4, and 7) shows the pooled cross-sectional estimates of 359 metropolitan

areas over three decades. The second specification (Column 2, 5, and 8) includes both

MSA and year fixed effects to control for unobservable time-invariant regional

characteristics and unobservable national time trend. Both specifications control for basic

regional characteristics. The last specification (Column 3, 6, and 9) adds the capacity

measures other than the one under examination as additional control variables to further

reduce omitted variable bias.

We observe that the immigrant share of the local population has a positive effect

on the number of small businesses. Controlling for the basic regional characteristics,

regions with higher foreign-born shares have significantly higher numbers of small

businesses (Column 1). This relationship is also statistically significant after the inclusion

of the MSA fixed effects and the other capacity measures. The full specification,

presented in Column 3, shows that, on average, as the immigrant share increases by one

percentage point, the number of small businesses increases by 877. This relationship

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[5] The number of small businesses in a region is used instead of the density of small businesses per
10,000 people. This is to avoid the "double standardization" of measure since the logged regional
population is included as a regional control variable. Small businesses are businesses with less
than 20 employees.
[6] The establishment churn measures the creative destruction of an economy by taking total
establishment birth and death rate, minus the absolute net employment growth rate (Davis et al.,
2008).

extends the previous evidence that immigrants are highly entrepreneurial and adds that immigrants lead to more entrepreneurial regions. Immigration is also positively associated with the level of business churning in a regional economy. This is expected because while immigrant entrepreneurs contribute disproportionally to business formation, they are also more likely to close their businesses (Fairlie & Lofstrom, 2015). It is noteworthy though that effect size is small. The full specification shows that on average, a one-percentage-point increase in the foreign-born share leads to a 0.07-point increase in the local business churn rate. Finally, the effects of the immigrant share on regional industrial diversification are negative. But in the fixed effects model, the effect sizes are too small to make the relationship statistically significant.

Table 2.4 shows the effects of immigration on the percentage of the local population age 25 and older with at least a bachelor's degree (Column 1, 2, and 3) and on the proportion of residents above the federal poverty line (Column 4, 5, and 6), respectively. While the pooled cross-sectional estimates indicate a positive relationship between the immigrant share and the college-educated share of the local population, this positive relationship becomes negative and statistically insignificant after controlling for the regional fixed effects. This is an expected result because as previously discussed, immigrants contribute both high-skilled and low-skilled labor to the local market. While immigrants as a whole are valuable human capital and can improve local economic efficiency, their positive effects on local productivity are not reflected in the average local educational attainment.

Table 2.4 Immigration level and socio-demographic capacity measures (1980-2010)

	Percent bachelor's degree holders			Percent non-poor population		
	(1)	(2)	(3)	(4)	(5)	(6)
Percent foreign-born	0.13*** (0.04)	0.02 (0.03)	-0.03 (0.03)	-0.23*** (0.02)	0.013 (0.03)	0.081*** (0.03)
Regional controls	Yes	Yes	Yes	Yes	Yes	Yes
Other capacity measures	No	No	Yes	No	No	Yes
MSA fixed effects	0	359	359	0	359	359
Year fixed effects	3	3	3	3	3	3
Observations	1077	1077	1077	1077	1077	1077
R-squared	0.543	0.987	0.988	0.693	0.965	0.978

Notes: Standard errors in parentheses. *$p<0.10$ **$p<0.05$ ***$p<0.01$

On the other hand, a higher immigration level increases the non-poverty share of the local population and this positive effect is statistically significant after controlling for the regional fixed effects and other regional capacity measures. Hall and his colleagues (2011) note that immigrants have low rates of household poverty. Higher levels of immigrants may also bring economic and employment opportunities for the local population through immigrant businesses and investments. However, this positive effect is unsurprisingly small (0.08 percentage points) as compared to the average non-poverty rate (84.8 percent in 2010) of the regions in the sample.

Table 2.5 presents immigrants' effects on regional community capacity. As expected, the local immigration level is positively associated with the number of civic

Table 2.5 Immigration level and community capacity measures (1980-2010)

	Number of civic organizations			Homeownership rate			Voter turnout		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Percent foreign-born	23.08*** (4.04)	30.45*** (3.49)	29.35*** (3.61)	-0.50*** (0.04)	0.08* (0.05)	0.04 (0.05)	-0.78*** (0.05)	0.01 (0.10)	-0.10 (0.10)
Regional controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other capacity measures	No	No	Yes	No	No	Yes	No	No	Yes
MSA fixed effects	0	359	359	0	359	359	0	359	359
Year fixed effects	3	3	3	3	3	3	3	3	3
Obs.	1077	1077	1077	1077	1077	1077	1077	1077	1077
R-squared	0.460	0.977	0.977	0.415	0.944	0.947	0.594	0.899	0.901

Notes: Standard errors in parentheses. *$p<0.10$ **$p<0.05$ ***$p<0.01$

organizations[7] in a region. This relationship is statistically significant and robust across specifications. In the full specification (Column 3), as percent foreign-born population increases by one percentage point, the number of civic organizations increases by close to 30, speaking to the hypothesized effect of immigration on the context of reception. Immigrant integration is a two-way process in which successful integration not only depends on a supportive and functioning civil society but also facilitates the development and betterment of the local civic infrastructure (Pastor & Mollenkopf, 2012). In contrast, a region's immigration level generates negligible effects on the local homeownership rate and voter turnout.

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[7] I measure the local civic infrastructure using the number, rather than the density, of civic organizations in a region for similar reasons as for the variable of small business in Table 2.3.

Table 2.6 Immigration level and RCI (1980-2010)

	Resilience Capacity Index	
	(1)	(2)
Percent foreign-born	-0.024***	0.011***
	(0.002)	(0.003)
Regional controls	Yes	Yes
MSA fixed effects	0	359
Year fixed effects	3	3
Observations	1077	1077
R-squared	0.699	0.954

Notes: Standard errors in parentheses. *p<0.10 **p<0.05 ***p<0.01

Finally, all the capacity measures figure into the calculation of a composite index

that captures the overall resilience capacity of a region[8]. Table 2.6 presents the effect

estimates of the immigrant share on this capacity index. In the pooled cross-sectional

model, regions with higher shares of immigrants score lower on the index. But after

controlling for the time-invariant unobservable factors, regions move up along the index

as their immigrant shares increase. A one-percentage-point increase in the share increases

the RCI score by 0.01. The flipping of the coefficient sign suggests that immigrants tend

to concentrate in regions with fixed characteristics associated with lower capacity scores,

which, however, are hard to identify without further data. Although the effect looks

small, it is relative to the range of the RCI scores, which for 95% chances falls between -

1 and 1 in all three decades. If a regions' immigrant share increased by ten percentage

points over the decades, its RCI scores would increase by 0.1 points, surpassing dozens

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[8] The resilience capacity index (RCI), as described in the Model Specification section, consists of
11 indicators, eight of which are empirically examined in this section. The three not individually
tested in the analysis include income equality, percent population with no disabilities, and
metropolitan stability.

of metropolitan areas if the region's original score is between -1 and 1[9]. In sum, the immigration level of a region is not only positively associated with some key capacity measures but also with the overall resilience capacity of the region.

2.5 Conclusion

Immigrants make an increasingly large part of the U.S. population. They have brought significant changes to urban areas across the country, stimulating much policy debate. While long-standing research has studied the effects of immigrants on the labor market, tax system, public assistance, and education system of the receiving community, how immigrants shape a region's resilience capacity remains unexplored. As growing numbers of municipalities, especially in the Midwest, have adopted a combination of immigrant attraction, integration, and economic development programs, immigrants' effects on regional ability to weather economic challenges and revitalize economic growth become a topic of both research and policy significance.

Several disciplines have informed the definition and conceptualization of economic resilience in the urban and regional planning literature. There are two general approaches commonly used in the literature: resilience as outcome and resilience as process or capacity (Weir et al., 2012). The resilience as outcome approach sees resilience either as a return to pre-stress state (termed "engineering resilience") or a move from one equilibrium state to another (termed "ecological resilience"). Although this result-oriented approach helps determine which is a more economically successful or "resilient" region, it is often argued by critics that it ignores the processes and multitude

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[9] Regions' RCI scores follow a normal distribution with a mean of zero and a standard deviation of 0.5.

of actors that make possible such a resilience performance (Christopherson et al., 2010).

It also ignores the fact that for many regions the pre-stress normalcy was subpar to begin

with and thereby should not be the end goal of regional development. On the other hand,

the resilience as process or capacity approach pays more attention to the pre-stress

capacity development of a region. It contends that post-stress resilience performance is a

function of the pre-stress capacities. The adaptive system perspective is more suitable for

case studies that provide fine-grained observations and place-specific knowledge. The

resilience capacity perspective enables comparisons across a larger number of regions

over a generalized set of resilience capacity indicators useful for regional planners and

policymakers regardless of the types of stresses encountered.

Immigrants previously tended to concentrate in a few large metropolitan

gateways. But they are increasingly settling in newer destinations that have little

experience of receiving newcomers. This geographic dispersal creates variation in the

level and growth rate of immigration across U.S. metropolitan areas. Meanwhile, these

regions display varying degrees of resilience and resilience capacities since the onset of

deindustrialization in the late 1970s till the post-Great Recession period. These variations

allow us to conduct a systemic examination of the relationship between immigration and

resilience capacities and observe common patterns across regions. This chapter constructs

from various sources a panel dataset that spans three decades from 1980 to 2010 for a

consistent set of 359 regions in the country. Fixed effects models with MSA and year

fixed effects are the primary choice of analysis to remove bias generated from

unobserved regional characteristics as long as they are time-invariant.

Through analyzing the resilience capacity from three aspects – economic capacity, socio-demographic capacity, and community capacity, this chapter finds positive effects of the immigrant population on resilience capacity building. As widely acknowledged, immigrants are highly entrepreneurial. They make up a larger proportion of small business owners than their proportion of the total population in the United States (Kallick, 2012). This chapter finds that their entrepreneurial spirit also casts a positive effect on the regional economy. As the percent immigrant population increases by one percentage point, the average number of small businesses in a region increases by 877. Immigrants also contribute to the level of business churn, a process that replaces obsolete, less productive businesses with new, more productive ones. This positive effect may partly be due to immigrant entrepreneurs' higher churning rate than their native-born counterparts (Fairlie & Lofstrom, 2015) and the diversity immigrants bring to the labor market that spurs firm adjustment and expansion (Peri, 2013).

Another capacity indicator positively associated with immigration is the density of civic organization. Established immigrant destinations have created and instituted various immigrant integration programs and worked with local nonprofit organizations and to provide services to these new residents (Pastor & Mollenkopf, 2012). This process instills a culture of collaboration among local civic and civil society organizations and improves the institutional adaptability in the face of a social or economic challenge. Immigrant integration is a two-way process. When immigrants' economic mobility improves, they start to establish political coalitions and business associations and voice their interests in community planning (Liu et al., 2014). Our empirical results show that

for every one-percentage-point increase in percent foreign-born population, there is an addition of 30 civic organizations.

Resilience capacities measure the ability of a region to anticipate and prepare for a disturbance (Foster, 2012). However, resilience includes both pre-stress preparation and post-stress response and recovery. Although resilience capacities can greatly increase the chances of resilience performance, there is not a single pathway from capacities to performance. Foster (2012) has shown four capacity-to-performance pathways through which regions with above-average or below-average resilience capacity can end up with either above-average or below-average resilience performance. Augustine et al. (2013) and Safford (2004) have also demonstrated the complex relationship between resilience capacity and performance. Therefore, in the next chapter, I will explore regions' resilience performance in the wake of the most recent Great Recession and examine how immigrants play a role in the post-stress response and recovery process.

It is worth noting that several regional characteristics are left out of the analysis due to limited data availability. Factors such as policy decisions, political leadership, bureaucratic performance, and governance can greatly influence a region's resilience capacity. Although fixed effects models can alleviate the omitted variable problem to the extent that these characteristics stay constant over time, failure to include them nevertheless affects the comprehensiveness and perhaps the accuracy of the resilience capacity index. Collection and maintenance of high-quality, longitudinal data capturing a fuller array of regional characteristics will go a long way in enhancing our understanding of the complex dynamics of regional development. In addition, the index in this analysis draws on Foster's index, which weights equally the various capacity aspects. While such

a weighting scheme provides a convenient and relatively quick quantification of complex urban contexts, it nevertheless makes assumptions that may not hold in certain scenarios or for different research purposes. For example, one can argue that the economic capacity should be the primary factor of resilience when shocks hit the local economies. However, when the shocks turn into slow burns, another can argue that regions with greater civic engagement and community trust will ride out the adversity better than regions with high economic capacity but weaker community connectivity and cohesion. In this regard, future research should explore the different weighting methods of the index and the respective justifications. Flexible and various weighting schemes can generate more nuanced and dynamic grasps of resilience capacity.

CHAPTER 3. DOES IMMIGRATION ENHANCE REGIONAL ECONOMIC RESILIENCE IN THE FACE OF THE GREAT RECESSION?

3.1 Introduction

Extensive research has examined immigrants' impacts on the receiving communities. Recent economics studies tend to find that immigrants foster rather than hamper local economies (Bodvarsson et al., 2008; Ottaviano & Peri, 2006; Peri, 2012). Contrary to some earlier arguments that immigrants crowd out native workers and depress their wages (Borjas & Katz, 1997; Frey, 1995), these findings show that immigration provides the necessary condition for firms to adjust and expand production and increases productivity growth through skills complementarity (Peri, 2013). Sociologists suggest that immigrants are flexible and resilient when facing economic difficulties because of their residence in network-rich ethnic enclaves. Ethnic networks connect immigrants to potential economic opportunities, housing information, and social and cultural activities (Wilson & Portes, 1980; Elliot & Sims, 2001), and shield them from economic downturns (Zhu et al., 2013; Painter & Yu, 2014). Evidence from case studies also indicate that immigrants are important agents of community development (Liu et al., 2014; Schuch & Wang, 2015) and a critical force in the post-disaster recovery and economic revitalization of many regions (Li et al., 2010; Bowles & Colton, 2007).

On the other hand, regional resilience has become a prominent research agenda in urban and regional planning in the aftermath of the 2007-2009 Great Recession. Researchers find that regions that feature a large skilled workforce show greater resilience toward economic turbulences (Chapple & Lester, 2010; Benner & Pastor, 2015; Hill et al., 2012). Entrepreneurship and innovation are also documented to foster

resilience (Chapple & Lester, 2010; Clark et al., 2010). Given that immigrants are more

entrepreneurial and innovative (Kallick, 2012; Kerr & Lincoln, 2010), one would expect

that they have a positive effect on regional resilience development. However, little

research has explicitly explored this relationship and the few studies that attempted at the

task draw different conclusions. While Chapple and Lester (2010) and Lester and Nguyen

(2015) document that a large and growing immigrant population has a positive effect on

resilience, Benner and Pastor (2015) find that the rapid influx of immigration presents a

sort of "shock" that disrupts a region's growth path. Additionally, these studies measure

resilience as either the duration of growth spells, which is not linked to the context of a

recession; or the changes in employment and wage income among immigrants, which

measure only the immigrant-specific resilience performance.

This chapter links the two strands of research together by examining how

immigration affects regional resilience. It also explicitly places the question in the

context of a recession by testing whether immigrants have enhanced resilience

performance to the Great Recession. As this recession affected almost the entire country

without a clear geographic epicenter, it acts as an external shock to local economic

growth. A region's prior immigration level is unlikely to affect the occurrence of

recession. To address the endogeneity of immigrants' residential choice and local

economic conditions, this chapter adopts an instrumental variable approach using the

historical immigrant residential patterns and national immigration trends to construct a

"supply-push" immigration variable that is unrelated to the current economic conditions.

To capture the distinct regional dynamics during and after the recession, it also

distinguishes between the concepts of shock resistance and post-shock resilience and examines the two phenomena separately in different empirical models.

3.2   Literature Review

3.2.1   <u>Resilience Performance</u>

Regional studies have increasingly embraced resilience as a key characteristic of successful regions (Clark et al., 2010; Christopherson et al., 2010; Leigh & Blakely, 2013). The recent Great Recession has increased the perceived sense of vulnerability among regional actors and spurred a new search for resilient development. These new research and policy discussions define success by a region's ability to continuously adjust itself to changing environments and preserve or transform the local economy in the face of interruptions and disruptions. At least three different conceptions of resilience have been advanced – resilience as an outcome, resilience as a set of capacities, and resilience as an adaptive cycle, each of them emphasizing a different aspect of resilience. For example, the resilience as outcome approach defines resilience as equilibrium states and evaluates resilience by a region's ability to return to a pre-existing equilibrium or achieve a new equilibrium shortly after the shocks. On the other hand, the resilience as capacity and as process approaches look beyond the post-shock behaviors of the region and perceive resilience as a long-term developmental process that evolves over several decades (Pendall et al., 2010; Simmie & Martin, 2010).

The relative merits of these approaches are an open question, depending on the goal of research. While some researchers argue that the process approach better captures the evolutionary nature of a regional economy and the localized context of the place, the

outcome approach is conducive to comparing resilience performances in the aftermath of a specific shock across regions and identifying factors and capacities contributing to resilience.

Furthermore, while resilience capacities are arguably the prerequisites for resilience performance, it is an open question whether adaptive capacities can translate to resilience outcomes in times of crisis. Foster's (2012) warns that as critical as resilience capacities are, possession of these capacities does not guarantee resilience outcomes. Evidence from case studies suggests that the link between pre-shock capacity and post-shock resilience performance is not straightforward, as the different capacities can interact to create positive or negative externalities in shaping how a region responds to a shock (Foster, 2012). Augustine and her colleagues (2013) examine resilience performance during and after economic downturns across 361 metropolitan areas between 1978 and 2007 and find little evidence that capacities prior to the onset of a shock lead to resilience outcomes. In a study that compares the success in Allentown to the failure in Youngstown in adaptation to deindustrialization, Safford (2004) argues that the key factor was not the possession of local assets but how the resources were mobilized and deployed in the face of a crisis. In Allentown, the structure of civic and business relationships facilitated collective action across various societal divisions, which then fostered a resilient response to the acute industrial restructuring and decline. In Youngstown, the dense networks between local firms and agencies instilled a sense of dependency and rigidified the local economic structure, thereby impeding adaptation to the changing economic conditions. Resilience is more than the accumulation of capacities. It requires efficient activation and mobilization of critical capacities in the

event of a shock, engagement of local people and institutions in mitigation, development of collective action in recovery, and strong decision-making skills that function in the face of uncertainties (Swanstrom, 2008). Thus, research on both resilience process and resilience outcome is equally valuable.

Given that this analysis focuses on how regions react to the Great Recession, I adopt the resilience as outcome approach and examine regions' growth paths during and after the shock. This approach reveals whether a region's resilience capacities have translated into actual performance. Following previous literature, resistance to the shock and resilience after the shocks are defined and tested separately in two models. Shock resistance refers to the instances when a regional economy sustains its growth path in the face of a negative shock such as the Great Recession. Resilience after the shocks measures the growth path following the shock (Foster, 2012; Hill et al., 2012). Being shock-resistant is a more favorable outcome for a regional economy than being resilient after the shock (Hill et al., 2012). Not all regions are adversely affected by economic shocks. Those that demonstrate higher levels of resistance may recover more quickly from the shocks than regions that experienced greater disruptions.

3.2.2 Immigrants and Their Economic Development Impacts

Economists have long examined immigrants' impacts on the receiving labor market, such as native workers' wages and job opportunities. While some find that immigrants have crowded out native workers from employment and depressed their wages (Borjas, 2003; Camarota, 1997; Frey, 1995), most recent economic findings suggest otherwise. They have identified three positive effects of immigration (Card, 2001; 2005; Card & DiNardo, 2000; Ottaviano & Peri, 2006; Peri, 2012). First, many

studies show that immigrants complement the workforce. Low-skill immigrants fill vacancies at the bottom of job ladders deserted by native workers. Within the same skill groups, immigrant and native workers concentrate in distinctive occupations. Immigrants specialize in jobs that require intensive labor (for less-skilled immigrants) or analytical capacities (for high-skilled immigrants) while native workers hold occupations that demand interactive and communication skills (Peri & Sparber, 2009; 2011). Second, immigration spurs the production expansion of local firms. In response to increasing immigrant labor, local firms adjust their capital, expand production, and start new firms up to absorb immigrants and increase economic base (Peri, 2013; Bodvarsson et al., 2008). Third, immigrants promote overall efficiency of the local economy in the long run by contributing new skills and ideas, increasing the supply of low-cost services, stimulating firm creation and efficient specialization (Peri, 2013). They bring diversity to local production and consumption (Ottaviano & Peri, 2006), which have been identified in the agglomeration economies literature as an important booster for innovation and productivity (Jacobs, 1969; Fujita et al., 1999). The concentrations of high-skilled immigrant workers in major metropolitan areas, many in the Rust Belt, also bring "brain gain" to these places (Hall et al., 2011; Peri, 2013).

Beyond the labor market, immigrants in the United States are an important force in economic development and community building. They are known for establishing successful small businesses (Light, 1972). Immigrant entrepreneurs owned about 18 percent of U.S. small businesses while their share of the overall population is 13 percent (Kallick, 2012). These businesses are presented in a wide range of sectors, including transportation and warehousing, construction, manufacturing, and retail and wholesale

trade. Immigrants own 28 percent of the main street businesses, which are "the shops and services that form the backbone of neighborhoods around the country" (Kallick, 2015). In knowledge-based industries, immigrants founded about a quarter of the engineering and technology companies and hired 450,000 workers between 1995 and 2005 (Wadhwa et al., 2007). About 16 percent of the "high-impact, high-tech" companies in the U.S. had at least one immigrant entrepreneur among their owners (Hart & Acs, 2011). High-skill immigrants and their startups have contributed substantially to the growth of invention in the country, infusing innovation and creativity into local economies (Kerr & Lincoln, 2010).

Immigrant businesses not only provide goods and jobs, but they also produce social and cultural benefits to local communities. Li et al. (2010) observe that the strong social networks possessed by Vietnamese Americans helped alleviate their emotional suffering, organize evacuation process, and facilitate post-disaster community rebuilding following Hurricane Katrina. Ethnic enterprises have transformed formerly run-down areas into vibrant business communities in Boston (Bowles & Colton, 2007), fueled corridor development through encouraging ethnic consumption and social interaction in Philadelphia (Econsult Corporation, 2009), and catalyzed development of multi-ethnic retail corridors and surrounding communities in emerging immigrant gateway cities such as Atlanta (Liu et al., 2014) and Charlotte (Schuch & Wang, 2015). By renewing business vitality, they have also made these neighborhoods attractive places to live and work, increasing local spending and expanding the local tax base (Kallick, 2015).

The regional development literature has investigated the factors and processes that help regions sustain economic growth. Recent findings indicate that regions that feature a

large skilled workforce show greater resilience toward economic turbulence (Chapple & Lester, 2010; Benner & Pastor, 2015; Hill et al., 2012). Kolko and Neumark (2010) note that small locally-owned business chains and single-establishment firms buffer downward regional shocks and help insulate regions from such shocks. The works of Saxenian (1994), Storper (1997), and Clark et al. (2010) find that favorable institutional and policy environments for business start-ups and innovation lead to competitive regions. As immigrants are more entrepreneurial and active place makers, they are likely to play a critical role in building regional resilience. Furthermore, the ecological account of resilience views diversity as a desirable attribute contributing to resilience (Swanstrom, 2008; Simmie & Martin, 2010). This is supported by empirical evidence that diversified economies were less susceptible to downturns (Hill et al., 2012; Xiao & Drucker, 2013). If demographic diversity is related to economic diversity, then immigration may enhance a region's economic resilience. Additionally, cities with long immigration histories tend to have greater institutional flexibility and stronger civil society (Pastor & Mollenkopf, 2012), which are important regional characteristics conducive to resilience performance (Christopherson et al., 2010). However, little empirical research has directly tested the effect of immigrants on regional resilience, particularly in the aftermath of an economic recession. This chapter fills the gap by quantifying the influence of immigration on economic resilience to the Great Recession.

3.2.3   The 2007-2009 Great Recession

The Great Recession started from the housing and financial markets in 2007 and spread into all sectors of the U.S. economy. The national unemployment rates surged from 5.0 percent at the onset of the recession to 10.0 percent in October 2009, the highest

level since 1983 (U.S. Bureau of Labor Statistics, 2012). After the recession officially ended in 2009, many metropolitan areas are still in slow recovery, and the effects of unemployment on the local economy and personal development will reverberate in many ways for years to come (Elsby et al., 2010).

Unlike regional industry shocks and other region-specific shocks such as a natural disaster or the closure of a military base, national downturns are less likely to be a result of idiosyncratic socioeconomic processes in a particular region (Hill et al., 2012) and therefore constitute relatively exogenous shocks to local economies. In addition, this latest recession differs from its predecessors in that although its impact was spatially uneven, it affected almost the entire country without a clear geographic epicenter. Cities in Northeast, South, Midwest, and West have all suffered job losses and economic contraction, including those that had only been modestly affected by previous national economic downturns since the 1970s. Both traditional and new immigrant destinations experienced increasing unemployment rates during the recession. From traditional gateway cities such as New York and Los Angeles to new immigrant destinations such as Atlanta and Charlotte, the unemployment rate rose to 10 percent or higher in the aftermath of the recession (Ellis et al., 2014). As such, it is unlikely that the prior immigrant presence had affected the occurrence and severity of the downturn imposed by the recession. In other words, the Great Recession is not a function of the regional immigration level.

Although low-skilled immigrants are overly represented in the recession-stricken construction and manufacturing sectors, evidence from New York's economic slowdown in the 1970s and the bi-coastal recession in the 1990s indicates that immigrants have

withstood economic recessions and even frequently made employment gains despite the poor general economic conditions (Ellis et al., 2014). Zhu and his colleagues (2013) find that social networks abundant in ethnic communities help immigrants survive economic downturns. Evidence from disaster recovery research shows that the immigrant and diaspora groups are active actors in the pre-and post-disaster recovery activities and play a critical role in fostering community welfare (Esnard & Sapat, 2014). Given these findings, research examining whether immigrants can contribute to the socioeconomic resilience of their communities and regions is in order.

3.3 Data and Methodology

3.3.1 Data and Operationalization of Key Concepts

This analysis focuses on all U.S. metropolitan regions, measured by metropolitan statistical areas (MSAs) under the 2013 delineation by the U.S. Office of Management and Budget (OMB). The independent variables, which include immigrants' share of the local population and the instrumental variables, use data derived from the American Community Survey (ACS) 2007 sample and the Census data 1980, 1990, and 2000 (Manson et al., 2017). Other secondary datasets from which the outcome variables and other control variables are drawn include the Bureau of Economic Analysis (BEA), the Bureau of Labor Statistics (BLS), and the Union Member and Coverage Database assembled by Hirsch and Macpherson (2015). These datasets provide useful information for the construction of regional demographic, economic, and social indicators, which are elaborated in the following section (Table 3.1 details the data sources for each variable).

The period for this study spans from 2000 to 2014, representing the times before, during and after the Great Recession[10]. For the outcome measures of resilience, I used data from BEA's Regional Economic Accounts 2007-2014 to calculate the annual growth rates of employment and per capita income. Immigrant population and other regional controls are measured in 2007 when possible, to capture the basic regional characteristics immediately before the Great Recession started. I also constructed two instrumental variables for regional immigration level, using the immigrant residential patterns in 1980 and 1990 and the national immigration trends 1980-2007 and 1990 and 2007, respectively.

This chapter adopts an outcome definition of resilience and measures it in two parts: resistance to the shock and resilience after the shock. Operationalization of these two measures involves decisions about the performance indicators to use and the time frame against which the recovery should be assessed (Pendall et al., 2010; Foster, 2012). Researchers have measured different resilience indicators against various types of downturns within different time frames (Augustine et al., 2013; Benner & Pastor, 2015; Chapple & Lester, 2010; Clark et al., 2010; Hill et al., 2012; Lester & Nguyen, 2015; Xiao & Drucker; 2013). In this analysis, I mainly draw on the works of Hill et al. (2012) and Augustine et al. (2013) to guide the operationalization of economic shocks and resilience, as their research also focuses on regional resilience following actual economic shocks. The operationalization proceeds in the following steps.

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[10] Although the study period is 2000-2014, the main analytical period (or the period in which most variables are measured) is 2007-2014, as the analytical focus is post-recession regional behaviors. Only a few variables are measured before 2007, such as the annual growth trend of the period 2000-2008 and some regional characteristics for which 2007 data is not available.

First, I operationalize economic downturns and resistance. As Hill and his colleagues (Hill et al., 2012) note, resistance to the shock and resilience after the shock capture different types of resilience outcomes, and one is inherently better than the other. Being shock-resistant, measured by a region sustaining a stable growth path in the face of a shock, is more desirable than being resilient, gauged by the region returning to the previous state or attaining a new growth pattern in the aftermath of the shock. Following Hill et al. (2012), I define an economic downturn as a two-percentage-point drop in a region's annual growth rate over 2008-2010[11] relative to the annual growth rate for the preceding eight years 2000-2008. A region is shock-resistant if the decline in the growth rate is less than two percentage points.

Secondly, regions that experienced downturns during the Great Recession can be either resilient or non-resilient in the post-recession periods. Different from Hill et al.'s (2012) approach that examines whether a region's growth rate returns to its previous level within four years of the shock, I compare the regions' growth rates in the post-recession periods of 2010-2014, which is also the method used by Xiao and Drucker (2013) and Lester and Nguyen (2015). Two reasons lead to this choice. First, the dichotomous variable used by Hill et al. (2012) implies an engineering perspective that defines resilience as a single equilibrium state, whereas, in reality, a place can achieve multiple equilibria as it adapts to ongoing challenges. Second, the selection of four years as a cut-off point is arbitrary and ad hoc at best. In fact, no clear theory guides the selection of the time frame against which a region's resilience should be tested. In addition, the Great Recession has profoundly impacted the nation's economy, and many

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[11] I lag the official starting year and ending year of the Great Recession by one year to allow time for regional economies to react to the shock.

metropolitan areas are still in slow recovery. It is unrealistic to expect these regions to resume the previous growth rates, if they ever would, within four years after the recession hit the country.

Third, I use two indicators of economic performance for resilience outcomes: the annual growth rate of employment and the annual growth rate of per capita income. The two measures represent different aspects of a regional economy (Foster, 2012; Xiao & Drucker, 2013). Employment is a standard and widely-used outcome measure of resilience, reflecting the economy's ability to provide livelihoods to its labor force (e.g., Bruce et al., 2009; Hill et al., 2012; Xiao & Drucker, 2013). On the other hand, per capita income captures the health of an economy and the quality of economic opportunities it offers (Bruce et al., 2009; Chapple & Lester, 2010; Xiao & Drucker, 2013).

3.3.2 Model Specifications

Following the conventional "area-based" approach used in many immigration studies (e.g., Grossman, 1982; Card, 1990), this chapter exploits the regional differences in economic performance and foreign-born population in a large number of U.S. regions to estimate the effect of immigration on economic resilience. This analysis employs an ordinary least squares (OLS) estimator and tests shock resistance and post-recession resilience, the two types of resilience discussed in the previous section, in separate models. The estimation for shock resistance uses a sample of 352 metropolitan regions for which data for all variables are available. Although the outcome variable in this model is a binary variable indicating whether a region is shock-resistant, a linear

62

probability model (LPM) is chosen over a Logistic or a Probit model[12]. The estimation

for post-recession resilience, on the other hand, only uses regions that experienced

downturns during the recession. The final models take the following form:

$$Y_i = \alpha + \beta D_i + \delta X_i + \varepsilon_i \qquad (1)$$

where i indexes MSAs and Y_i represents the resilience outcome. In the "shock resistance"

models, Y_i is a binary variable that scores one if the 2008-2010 annual growth rate

(separately for employment and per capita income) experienced no drop or a drop of less

than 2.0 percentage points compared to the previous eight-year annual growth rate and

zero otherwise. In the second model of post-recession resilience, Y_i simply denotes the

annual post-recession growth rate. D_i is the level of immigration in 2007, captured by the

foreign-born share of residents in an MSA. X_i includes a vector of control variables

capturing regional characteristics that are related to shock resistance and post-recession

resilience. ε_{it} is the error term.

    The control variables X_i include regional resilience capacities found to be

instrumental in weathering and recovering from external shocks (see Table 3.1). They

include the local economic structure, socio-demographic characteristics, and institutional

and cultural capacities (Benner & Pastor, 2015; Chapple & Lester, 2010; Foster, 2012;

Lester & Nguyen, 2015; Martin, 2012). As demonstrated in the previous chapter, a

region's immigration level is positively associated with its entrepreneurial level, business

churning, human capital endowment, and civic organization density. As such, these

capacities may act as mechanisms through which immigrants improve regional resilience

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[12] The LPM has been increasingly used in recent years as an alternative to the Logit or Probit
model for its easy interpretation and close approximation of Logit or Probit estimates (Angrist &
Pischke, 2008).

performance. Consequently, the coefficient β in Equation (1) captures the immigration effect after accounting for these potential mechanisms. In other words, this analysis also provides a test on whether immigrants play an independent role during the Great Recession and whether this effect is mediated through other recognized resilience capacities. If the effect estimate for immigration decreases after the capacity measures are included, then part of the immigration effect goes through these capacities. If the estimate otherwise stays relatively consistent and retains its statistical significance, then immigration constitutes an independent resilience capacity, or it affects resilience through other unobserved mechanisms; either case requires more attention from regional studies. Besides these capacity measures, vector X_i also includes the following control variables:

- *Demographics characteristics:* I use the percentage of non-Hispanic black to reflect a region's demographic makeup. The Hispanic share of the population is also commonly used to capture minority population, but it is highly correlated with immigrant population given that Hispanics make up a disproportionally large share of the recent immigrant population.

- *Labor market institution:* Following Benner & Pastor (2015), I use the proportion of the workforce covered by unions to reflect the local economic institution. Greater unionization prevents firms from adjusting to new market conditions and slows the recovery process of local economies (Duval et al., 2007; Hill et al., 2012). This market rigidity then leads to less resilience. Some studies use the state-level right-to-work law to measure labor market flexibility (Hill et al., 2012; Augustine et al., 2013). But this variable's inability to capture metropolitan-level variation in economic institutions or time-varying characteristic makes it unsuitable for this study.

Table 3.1 Variable descriptions and sources

Variables	Description	Source
Resilience outcomes		
Regional employment	Annual growth rate of total employment in a metropolitan area during recession (2008-2010) and after recessions (4 periods: 2010-2011, 2010-2012, 2010-2013, 2010-2014)	BEA's Regional Economic Account
Per capita personal income	Annual growth rate of per capita personal income in a metropolitan area during recession and after recessions (same periods as above)	BEA's Regional Economic Account
Independent variable		
Immigration level	The foreign-born share of the local population in 2007	ACS 2007 one-year sample
Instrumented immigration level	Immigrants from each country of origin in a metropolitan area in 1990 interacted with their national growth rate between 1990 and 2007	Census data 1980 and 1990
Mechanisms		
Business activity	The level of entrepreneurial activity The level of local business churn	Business Dynamics Statistics County Business Patterns
Industrial diversification	The inverse of Herfindahl index, defined as $1-\Sigma(S_i^2)$, where S_i is the 2-digit industry i's share of the local employment	BLS's Quarterly Census of Employment and Wages
Human capital	The percentage of the total population 25 years and older with a bachelor's degree or higher	ACS 2007 one-year sample
Civic Infrastructure	The density of civic organizations in a region, measured by the 3-digit NAICS codes 813 ("religious, grant-making, civic, professional and similar organizations")	BLS's Quarterly Census of Employment and Wages
Resilience capacity index	A composite statistic to measure the overall resilience capacity of a region	Author's calculations of data from various sources
Regional controls		
Demographic characteristics	The percentage of non-Hispanic blacks in the population	ACS 2007 one-year sample
Labor market flexibility	The proportion of the workforce covered by unions, which serves as a proxy for economic institutions	The Union Membership and Coverage Database
Government density	The number of governments per square mile in a metropolitan area	Missouri Data Census (Mable/Geocorr: Geographic Correspondence Engine)
Regional size	Logged total population in 2007	U.S. Census Bureau
Prior growth rate	Eight-year growth rate prior to the downturn	BEA

- *Regional governance:* I calculate government density to depict regional government structure. It is measured by the number of governments (proxied by the number of census places) per square mile within an MSA (Chapple & Lester, 2010). A large literature has explored the effect of local government fragmentation on regional growth, and the evidence has been mixed (Benner & Pastor, 2015; Carr & Feiock, 1999; Hamilton et al., 2004).

- *Regional Characteristics:* The size of a region may also affect a region's resilience performance (Hill et al., 2012). I include a logged population variable as a proxy for metropolitan size (Chapple & Lester, 2010; Hill et al., 2012).

- *Prior growth rate:* Finally, I also include the annual growth rate (separate for employment and per capita income) for the period 2000-2008 to control for the effect of previous growth trend on a region's resilience outcomes and to account for the possibility that a region's post-shock growth is a manifestation of regression to the mean.

One major shortcoming of the "area-based" approach of the immigration research is its inability to address the endogenous problem of immigrants' residential choice and local economic condition. Immigrants are responsive to economic opportunities and thus may move to economically vibrant areas (Borjas, 2001) that may also display greater resilience in weathering economic shocks. A positive correlation between immigration and resilience can indicate either immigrants' impact on regional economic performance or immigrant's residential preferences for faster growing and more resilient places. To address this issue, this chapter adopts an instrumental variable (IV) approach developed by Altonji & Card (1991).

A valid instrument should predict the current level of immigration in a region, but not the resilience outcomes through any mechanism other than the current immigration. Several studies have employed a "supply-pushed" instrumental variable that takes advantage of the fact that immigrants tend to move to cities with high concentrations of immigrants from the same countries of origin (Altonji & Card, 1991; Card, 2001; Ottaviano & Peri, 2006; Smith, 2012). Following this strategy, I construct an instrumental variable by interacting the level of immigration in a metropolitan area in 1990 with the national growth rate of immigrants from each country of origin between 1990 and 2007[13]. This constructed immigration level represents the portion of the current immigration that is independent of any city-specific shock during the observed period and thus "exogenous" to the current regional economic conditions. The instrumental variable is expressed by the following equation:

$$M_{i,2007} = \sum_{k=0}^{n} M_{i,k,1990} \times (1 + \Delta M_{k,2007,1990}/M_{k,1990}) \qquad (2)$$

where M_i denotes the immigration level in metropolitan area i and k denotes the country of origin for immigrants. Immigrants from country k in region i in 1990 (expressed as $M_{i,k,1990}$) is multiplied by one plus the growth rate of immigrant group k in the entire country between 2000 and 2007 (expressed as $\Delta M_{k,2007,1990}/M_{k,1990}$). This product represents the "predicted" size of immigrant group k in region i in 2007 and the summation of this product through all countries of origin ($k=1, 2, ... n$) yields the "attributed" total immigrant level in region i in 2007. A "constructed" foreign-born share of the local

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[13] I have also constructed an instrumental variable based on immigration level in 1980 and the national immigration trend between 1980 and 2007 for each metropolitan area as a robustness check.

population for each region in 2007 is consequently calculated. Immigrants are broken down to 17 immigrant groups based on their regions of birth and cultures ($n =17$).[14]

The IV approach uses a two-stage least square (2SLS) estimator, which regresses the endogenous regressor on exogenous variables in the first stage and uses the predicted value of the regressor in the second stage. The 2SLS model assumes the following forms:

$$D_i = \alpha_0 + \alpha_1 Z_i + \alpha_2 X_i + \mu_i \qquad (3)$$

$$Y_i = \beta_0 + \beta_1 \widehat{D}_i + \beta_2 X_i + \varepsilon_i \qquad (4)$$

where Z_i is the instrumental variable, which is $M_{i,2007}$ from Equation (2), the "constructed" immigration level in 2007 in each region i based on its historical immigration level and the supply-pushed immigration flows, D_i represents the actual immigration level, and X_i is a vector of the control variables discussed earlier. In Equation (4), $\widehat{D}_i$ is the predicted value of the current immigration level from Equation (3), which isolates the exogenous variation in the immigrant population that is uncorrelated with regional economic conditions.

3.4   Results

3.4.1   Descriptive Statistics

Table 3.2 presents the basic statistics for the key variables in this chapter. The two resilience indicators exhibit similar trends. On average, the regional annual employment growth rate and the annual per capita income growth rate both experienced declines

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[14] These groups include "other North America," "Mexico," "Central America," "Caribbean and South America," "Northern Europe," "Western Europe," "Southern Europe," "Central/Eastern Europe," "Russia," "China," "Rest of East Asia," "Southeast Asia," "Indian," "Rest of Southwest Asia," "Middle East/Asia Minor and rest of Asia," "Africa," and "Oceania".

during the recession (the recession period is lagged by one year) and have bounced back with positive annual growth rates in the post-recession years, regardless of how long the post-recession period is. The key independent variable is the foreign-born share of residents in a region. In 2007, the average foreign-born share of the 352 MSAs in the sample was 7.53 percent, lower than the national average of 12.5 percent. However, after applying the population weights, the average rises to 14 percent, almost the same as the national figure. The difference between the unweighted and weighted averages indicates that immigrants still concentrate in larger metropolitan areas, despite the increasing dispersal to newer destinations. We also notice a substantial variation in the immigration level, with the lowest value being 0.9 percent and the highest value 36.6 percent. The predicted immigration levels using the 1980 and 1990 data, on average, approximate the actual immigration level in 2007, only that they capture those immigrants drawn into a region for its coethnic concentrations rather than economic opportunities. Regarding the regional controls, non-Hispanic blacks make up about an average of ten percent of the local population. The share of the local workforce covered by labor unions ranges from 0 to 47 percent, with a mean of 12.7 percent. There is 0.02 government per square mile in the average U.S. urban area. Finally, both employment and per capita income, on average, experienced positive annual growth rates in the eight years leading to the Great Recession.

Figure 3.1 and 3.2 present the trends of the average MSA employment and per capita personal income in the past 14 years. The average employment for the 352 regions rose from 398,915 in 2000 to 436,623 in 2007. As a result of the recession, these regions

Table 3.2 Descriptive statistics of key MSA variables (*N*=352)

	Variable	Mean	Std. Dev.	Min	Max
Resilience outcomes	Annual employment growth (2008-10)	-1.90	1.27	-5.61	2.97
	Annual employment growth (2010-11)	1.48	1.34	-2.73	9.56
	Annual employment growth (2010-12)	1.33	1.20	-2.38	8.52
	Annual employment growth (2010-13)	1.34	1.14	-1.57	7.42
	Annual employment growth (2010-14)	1.41	1.09	-1.78	7.11
	Annual per capita income growth (2008-10)	-1.06	1.67	-7.80	3.98
	Annual per capita income growth (2010-11)	1.57	2.11	-4.18	20.26
	Annual per capita income growth (2010-12)	1.63	1.79	-2.83	16.08
	Annual per capita income growth (2010-13)	0.80	1.26	-3.53	9.49
	Annual per capita income growth (2010-14)	1.08	1.03	-2.10	8.40
Key independent variable	Percent foreign-born (2007)	7.53	6.69	0.90	36.55
	Predicted percent foreign-born with 1990 data	6.96	8.96	0.50	61.86
	Predicted percent foreign-born with 1980 data	7.32	9.75	0.82	72.16
Regional characteristics	Percent non-Hispanic black (2007)	10.43	10.69	0.12	49.55
	Percent workers covered by unions (2007)	12.69	7.58	0.00	47.40
	Government density	0.021	0.018	0.001	0.104
	Total population (2007)	717,321	1,616,164	55,262	19,581,380
	Annual employment growth (2000-08)	1.09	1.13	-2.03	5.95
	Annual per capita income growth (2000-08)	1.03	1.01	-1.48	7.18

MSAs are defined under the OMB 2013 delineation.

underwent an employment downturn for the period 2008 – 2010. Since 2010, although with a lower starting point than the preceding four years, the average MSA employment has been on the rise again and reached 454,113 in 2014. The average per capita personal income, adjusted for inflation, displays a similar, albeit less smooth, trend. The real per capita income rose from $43,852 in 2000 to $47,424 in 2007 and took a dip between 2007 and 2009. After the recession, it picked up the growth and surpassed the pre-recession level by 2014.
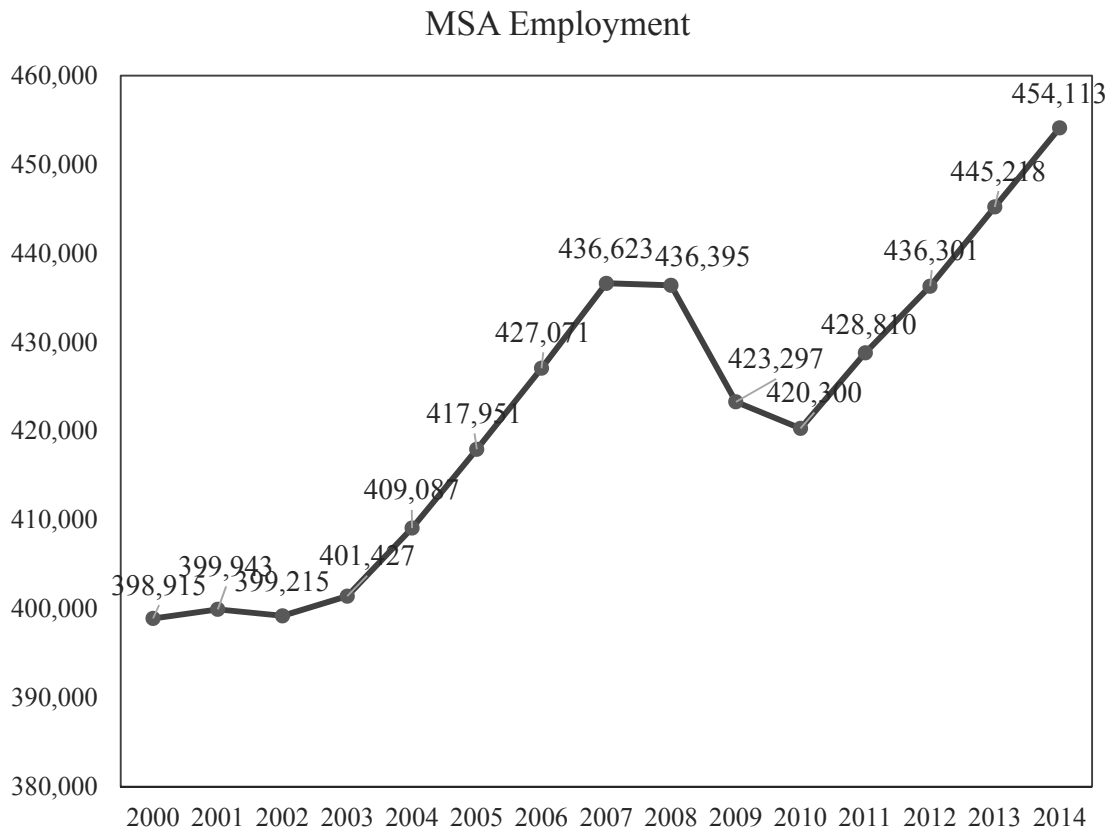
Figure 3.1 Trend of average total MSA employment from 2000 to 2014
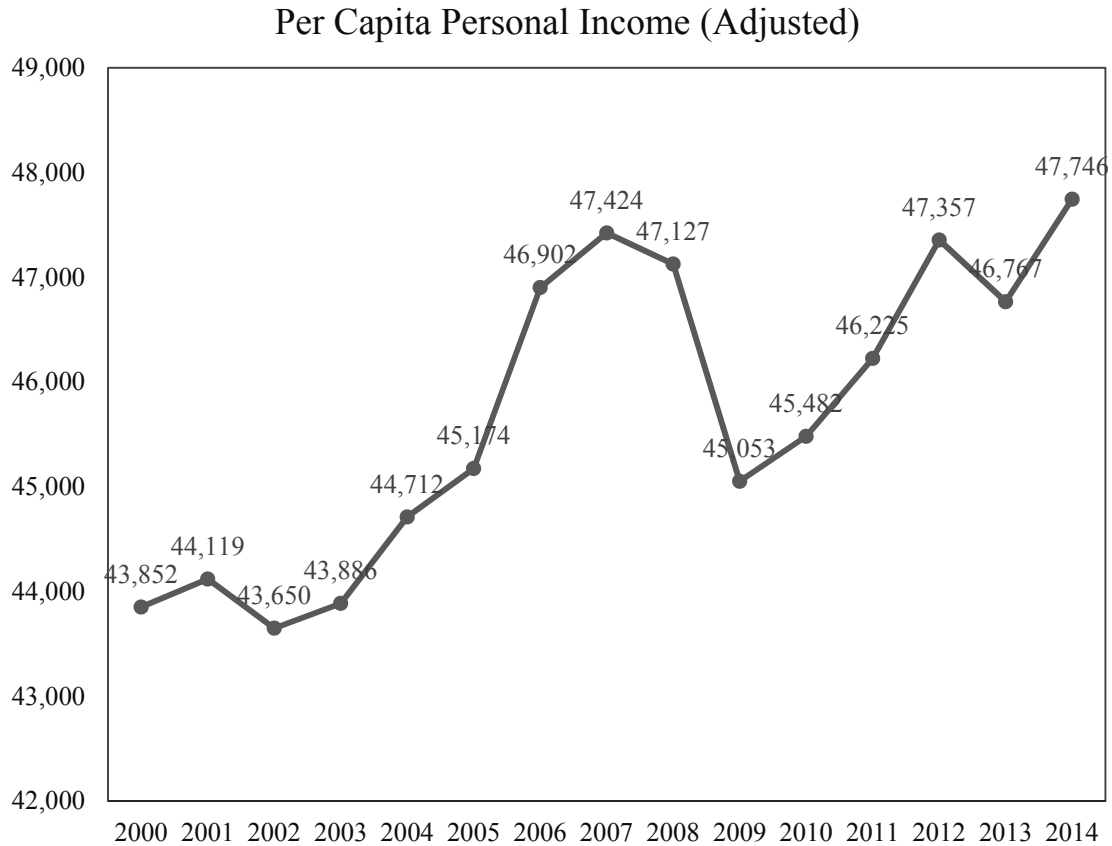
Figure 3.2 Trend of average per capita personal income from 2000 to 2014

Table 3.3 breaks the annual growth rates down by regions' immigration levels.

Each column presents the average growth rates for metropolitan areas whose percent

immigrants fall within certain ranks. During the recession, the top 20 regions with the

highest immigration levels demonstrate slower declines in both employment and per

capita income than other places. After the recession, immigration level also appears to be

associated with a faster economic recovery. In general, metropolitan areas with higher

immigrant shares have higher rates of annual employment and annual per capita income

Table 3.3 Annual growth of employment and per capita income in top 80 immigrant destinations

	First 20 MSAs	21st-40th MSAs	41st-60th MSAs	61st-80th MSAs
Annual employment growth (2008-10)	-1.52	-1.75	-2.31	-1.86
Annual employment growth (2010-11)	2.45	1.52	1.34	1.83
Annual employment growth (2010-12)	2.49	1.81	1.35	1.84
Annual employment growth (2010-13)	2.54	2.04	1.62	1.97
Annual employment growth (2010-14)	2.53	2.09	1.79	2.08
Annual per capita income growth (2008-10)	-1.28	-1.53	-2.42	-1.80
Annual per capita income growth (2010-11)	1.82	1.81	1.54	1.55
Annual per capita income growth (2010-12)	2.10	2.29	1.49	1.64
Annual per capita income growth (2010-13)	1.47	1.30	0.74	0.82
Annual per capita income growth (2010-14)	1.57	1.56	1.11	1.21

Author's calculation of BEA data.
The MSA rankings are determined by their immigration level in 2007.

growth. This immigration advantage became less pronounced over time but remained substantial.

Figure 3.3 shows the correlation scatter plots for the relationships between MSAs' foreign-born shares and the annual growth rates broken into two periods. The left panel presents the relationships between the foreign-born share and annual employment growth; the right panel presents the relationships between the foreign-born share and the annual per capita income growth. The top panel is for the recession period (2008-2010) and the bottom for the post-recession period (2010-2014). We observe that only the relationship between immigration and the annual per capita income during the recession is downward sloping. All other relationships are positive. The distinctive dynamic between the annual per capita income growth and immigration during the recession, although unexpected, speaks to the fact that employment and income capture different aspects of an economy (Xiao & Drucker, 2013).
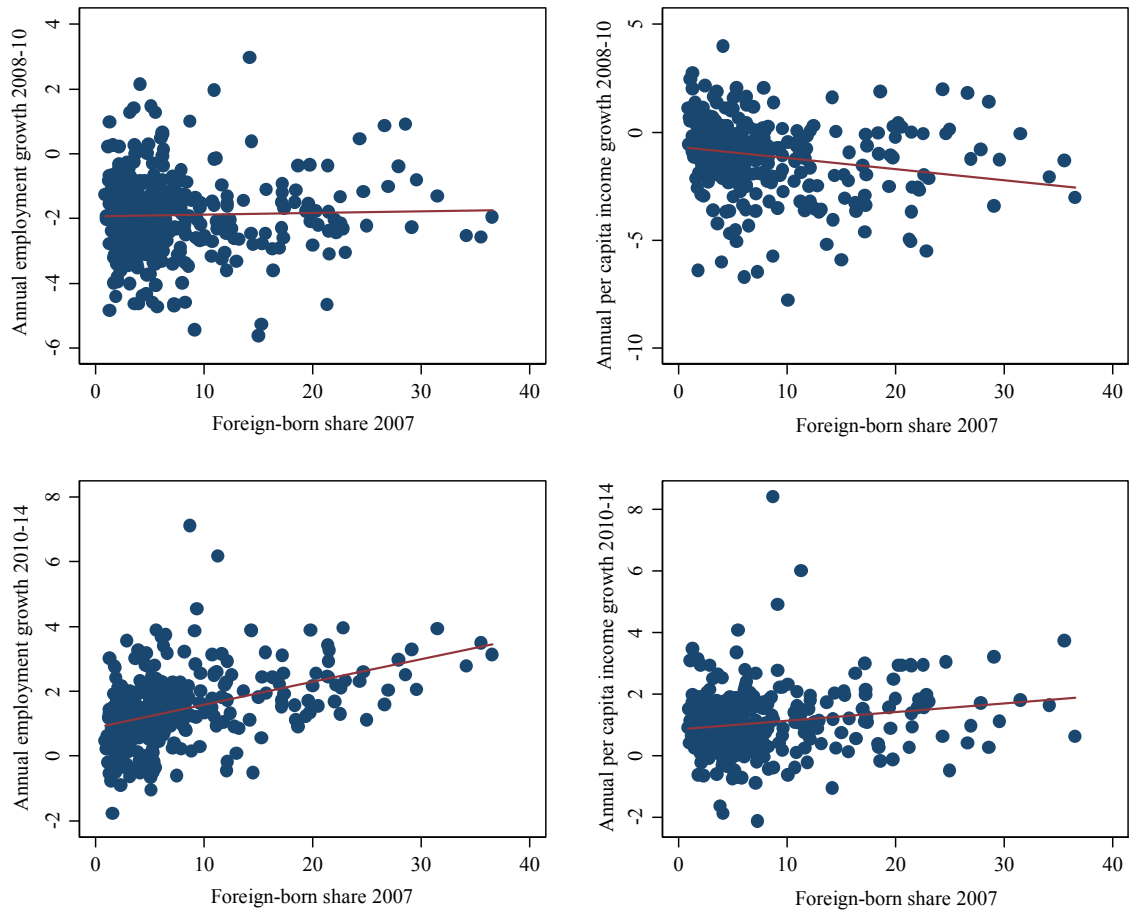
Figure 3.3 Two-way scatter plots of the relationships between foreign-born share and resilience outcomes during recession and post-recession

3.4.2 Empirical Statistics

The descriptive statistics shown in the previous section suggest a positive relationship between immigration and resilience performance during and after the recession for U.S metropolitan areas. However, without a more rigorous analysis, we are uncertain whether this relationship is driven by other regional characteristics such as population size, racial composition, or the pre-recession growth, to name a few. To account for these regional confounders, I regress the annual growth rate (separate for

employment and per capita income) on immigration and a set of controls that capture

basic regional characteristics. Additionally, to overcome the endogeneity problem

stemming from immigrants' tendency to settle in economically vibrant and resilient

regions, I employ an instrumental variable approach that uses the exogenous portion of

immigration as the independent variable.

Table 3.4 presents the results for annual employment growth. Column 1 and 2

show the results from the "resistance to the shock" models, and Column 3-10 show the

results from the "resilience after the shock" models, in which resilience is measured by

one-, two-, three-, and four-year mean annual employment growth rates respectively. The

first specification in each set (Column 1, 3, 5, 7, 9) uses an Ordinary Least Squares (OLS)

estimator[15] with basic regional controls. The second specification (Column 2, 4, 6, 8, 10)

employs the Two-Stage Least Squares (2SLS) IV estimator, also with basic regional

controls. The OLS model estimates a positive coefficient for percent foreign-born during

the period 2008-2010, indicating better shock resistance. However, this coefficient is

statistically insignificant. On the other hand, the OLS estimates of the coefficient for

percent foreign-born are positive and statistically significant at the 0.01 level for the three

post-recession periods 2010-2012, 2010-2013, 2010-2014, showing a positive

relationship between immigration and post-recession employment recovery for regions

(N=264) that experienced an employment downturn during the recession.

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[15] For the sake of easy interpretation and the ease to convert into the 2SLS estimator, I used
Linear Probability Model instead of Probit to estimate the effect of immigration on the binary
shock-resistance outcome. For insurance, I also estimated the effect using a Probit model and
obtained immigration's average partial effect (APE). The two models yield substantially similar
estimates.

Table 3.4 Immigration level and annual employment growth rate during (2008-2010) and after (2010-2014) the Great Recession

	Resistance to the shock		Resilience after the shock							
	2008-2010		2010-2011		2010-2012		2010-2013		2010-2014	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Percent foreign-born	0.005 (0.004)		0.011 (0.014)		0.035*** (0.012)		0.038*** (0.011)		0.033*** (0.011)	
Predicted percent foreign-born		0.009** (0.004)		0.017 (0.015)		0.044*** (0.014)		0.041*** (0.012)		0.033*** (0.012)
Regional Controls										
Percent non-Hispanic black	0.001 (0.002)	0.002 (0.002)	-0.007 (0.008)	-0.007 (0.008)	-0.012 (0.007)	-0.011 (0.007)	-0.013** (0.007)	-0.013* (0.007)	-0.013** (0.006)	-0.013** (0.006)
Percent workers covered by unions	-0.004 (0.004)	-0.005 (0.004)	-0.035*** (0.012)	-0.036*** (0.012)	-0.020** (0.010)	-0.023** (0.010)	-0.015 (0.009)	-0.016 (0.009)	-0.010 (0.009)	-0.010 (0.009)
Government density	-1.616 (1.318)	-1.544 (1.304)	-1.606 (4.198)	-1.627 (4.127)	-4.977 (3.660)	-5.006 (3.601)	-6.320* (3.355)	-6.331* (3.297)	-7.022** (3.190)	-7.021** (3.135)
Total population	-0.076*** (0.027)	-0.091*** (0.027)	0.324*** (0.089)	0.304*** (0.090)	0.234*** (0.077)	0.207*** (0.078)	0.251*** (0.071)	0.241*** (0.072)	0.225*** (0.067)	0.226*** (0.068)
Prior growth rate (2000-2008)	-0.171*** (0.026)	-0.182*** (0.026)	0.167* (0.093)	0.149 (0.093)	0.227*** (0.081)	0.202** (0.081)	0.310*** (0.074)	0.301*** (0.074)	0.336*** (0.070)	0.337*** (0.071)
Constant	0.419 (0.334)	0.593* (0.337)	-2.411** (1.133)	-2.172* (1.143)	-1.679* (0.988)	-1.345 (0.998)	-2.002** (0.905)	-1.874** (0.913)	-1.594* (0.861)	-1.609* (0.868)
Observations	352	352	264	264	264	264	264	264	264	264
R-squared	0.199	0.195	0.190	0.188	0.266	0.264	0.361	0.361	0.368	0.368

Notes: Standard errors in parentheses. *$p<0.10$ **$p<0.05$ ***$p<0.01$

76

The estimates from the 2SLS models are substantially similar to the OLS estimates. They also reveal that immigrants help with post-recession employment growth for regions. For every one-percentage-point increase in the foreign-born share, the 2010-2014 annual employment growth rate increases by 0.033 points. Additionally, the coefficient estimate for the shock resistance model gains statistical significance in the 2SLS estimation. As the immigration level in an MSA increases by 1.0 percentage point, the chance of the MSA resisting a downturn employment shock during the recession increases by 0.9 percentage points. The current instrumental variable is constructed using the 1990 data. I also used the immigration level in 1980 and the national immigration trend 1980-2007 to predict the current immigration level for each metropolitan area. This robustness check yields substantially similar results as the ones presented in this table.

Among the regional controls, we observe that the proportion of the local labor force covered by unions and government density are both negatively associated with post-recession employment growth, indicating that labor market rigidity and regional government fragmentation hinder the post-stress employment growth. We also observe that larger regions and regions with higher pre-recession employment growth on average demonstrate higher post-recession employment growth.

Table 3.5 presents the results for annual per capita income growth. It follows the same structure as the one of Table 3.4. The coefficient estimates for percent foreign-born show similar signs and magnitudes as those reported in Table 3.4, albeit with less statistical significance. However, if we look beyond three years after the Great Recession ended, the 2SLS effect estimates for percent foreign-born become statistically significant. For example, for the period 2010-2013, each 1.0-percentage-point increase in the.

Table 3.5 Immigration level and annual per capita income (adjusted) growth rate during (2008-2010) and after (2010-2014) the Great Recession

	Resistance to the shock		Resilience after the shock							
	2008-2010		2010-2011		2010-2012		2010-2013		2010-2014	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Percent foreign-born	-0.007 (0.005)		0.019 (0.032)		0.020 (0.026)		0.022 (0.018)		0.019 (0.014)	
Predicted percent foreign-born		0.002 (0.005)		0.036 (0.036)		0.024 (0.029)		0.035* (0.020)		0.027* (0.016)
Regional Controls										
Percent non-Hispanic black	0.002 (0.003)	0.003 (0.003)	-0.066*** (0.022)	-0.062*** (0.021)	-0.071*** (0.018)	-0.070*** (0.017)	-0.051*** (0.012)	-0.050*** (0.012)	-0.042*** (0.010)	-0.041*** (0.010)
Percent workers covered by unions	0.003 (0.004)	0.002 (0.004)	-0.063* (0.034)	-0.065** (0.033)	-0.056** (0.028)	-0.057** (0.027)	-0.024 (0.019)	-0.025 (0.018)	-0.016 (0.015)	-0.017 (0.015)
Government density	2.908* (1.616)	3.251** (1.608)	19.961 (13.405)	19.978 (13.033)	12.387 (10.808)	12.392 (10.497)	3.498 (7.365)	3.507 (7.160)	3.532 (5.972)	3.538 (5.803)
Total population	-0.100*** (0.034)	-0.133*** (0.035)	-0.015 (0.221)	-0.075 (0.224)	0.297* (0.178)	0.280 (0.180)	0.091 (0.122)	0.060 (0.123)	0.059 (0.099)	0.040 (0.100)
Prior growth rate (2000-2008)	-0.177*** (0.031)	-0.186*** (0.031)	1.181*** (0.210)	1.174*** (0.204)	0.995*** (0.169)	0.993*** (0.165)	0.529*** (0.115)	0.526*** (0.112)	0.416*** (0.094)	0.414*** (0.091)
Constant	0.923** (0.421)	1.271*** (0.427)	1.448 (2.800)	2.069 (2.797)	-2.214 (2.258)	-2.038 (2.253)	-0.306 (1.539)	0.009 (1.536)	0.345 (1.248)	0.543 (1.245)
Observations	352	352	158	158	158	158	158	158	158	158
R-squared	0.189	0.176	0.294	0.292	0.323	0.323	0.275	0.273	0.300	0.269

Notes: Standard errors in parentheses. *$p<0.10$ **$p<0.05$ ***$p<0.01$

immigration level is associated with a 0.035-point increase in the annual per capita income growth rate. For the period 2010-2014, the effect size decreases to 0.027 but remains statistically significant

As Figure 3.2 indicates, the mean per capita income of the MSAs in the sample plummeted during the period 2007-2009 but bounced back after 2009. To more accurately capture this income growth trajectory, I reran the same set of analyses using the unlagged period 2007-2009 to denote the recession. I redefined resistance to per capita income downturns as a drop of less than 2.0 percentage points in the annual growth rate between 2007 and 2009 from the annual growth rate over the period 2000-2007 and recalculated the one-year to five-year post-recession growth rates. The effect estimates for the immigration level obtained from these new models (see Table 3.6) are similar to those in Table 3.5 but of larger magnitudes and statistical significance. The OLS estimates of the coefficient for percent foreign-born are statistically significant at the 0.05 level in the last two periods 2009-2013 and 2009-2014 (whereas in Table 3.5, they are insignificant). The 2SLS estimates are statistically significant for every post-recession period (in Table 3.5, only the two post-recession periods show statistical significance), showing a roughly 0.06-point increase in per capita income growth for a 1.0-percentage-point increase in immigration.

Table 3.4 and 3.5 show that immigrants have helped regions respond to and recover from the Great Recession, even after basic regional characteristics such as population size and the prior economic growth are controlled for. Chapter 2 in this dissertation establishes a positive relationship between immigration and a region's economic, socio-demographic, and community capacities that the literature finds are

Table 3.6 Immigration level and annual per capita income (adjusted) growth rate during (2007-2009) and after (2009-2014) the Great Recession

| | Resistance to the shock | | Resilience after the shock | | | | | | | | | |
| | 2007-2009 | | 2009-2010 | | 2009-2011 | | 2009-2012 | | 2009-2013 | | 2009-2014 | |
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Percent foreign-born	-0.007 (0.005)		0.043 (0.028)		0.031 (0.024)		0.035 (0.023)		0.035** (0.017)		0.029** (0.014)	
Predicted percent foreign-born		0.003 (0.005)		0.067** (0.032)		0.059** (0.027)		0.056** (0.025)		0.056*** (0.019)		0.047*** (0.016)
Regional Controls												
Percent black	0.002 (0.003)	0.002 (0.003)	0.017 (0.018)	0.022 (0.018)	-0.023 (0.016)	-0.016 (0.016)	-0.035** (0.015)	-0.031** (0.015)	-0.033*** (0.011)	-0.029*** (0.011)	-0.029*** (0.009)	-0.025*** (0.009)
Percent unionized workers	0.005 (0.004)	0.004 (0.004)	-0.017 (0.027)	-0.023 (0.027)	-0.038 (0.023)	-0.045* (0.023)	-0.032 (0.022)	-0.038* (0.021)	-0.003 (0.016)	-0.008 (0.016)	-0.002 (0.014)	-0.006 (0.013)
Government density	3.349** (1.542)	3.689** (1.537)	8.991 (11.343)	10.249 (11.134)	7.055 (9.679)	8.515 (9.520)	0.671 (8.998)	1.781 (8.837)	-3.386 (6.721)	-2.331 (6.613)	-1.056 (5.667)	-0.129 (5.578)
Total population	-0.173*** (0.032)	-0.208*** (0.033)	-0.238 (0.200)	-0.326 (0.204)	-0.076 (0.171)	-0.178 (0.174)	0.110 (0.159)	0.033 (0.162)	-0.006 (0.119)	-0.080 (0.121)	-0.031 (0.100)	-0.095 (0.102)
Prior growth (2000-2008)	-0.114*** (0.032)	-0.132*** (0.032)	0.332* (0.186)	0.304* (0.183)	0.418*** (0.158)	0.385** (0.156)	0.405*** (0.147)	0.380*** (0.145)	0.269** (0.110)	0.245** (0.109)	0.200** (1.254)	0.179** (0.092)
Constant	1.705** (0.401)	2.088*** (0.410)	3.033 (2.511)	3.980 (2.530)	1.957 (2.143)	3.055 (2.164)	-0.057 (1.992)	0.778 (2.009)	0.785 (1.488)	1.578 (1.503)	1.375 (1.254)	2.073 (1.268)
Observations	352	352	151	151	151	151	151	151	151	151	151	151
R-squared	0.237	0.224	0.053	0.048	0.095	0.087	0.129	0.124	0.169	0.161	0.164	0.155

Notes: Standard errors in parentheses. *$p<0.10$ **$p<0.05$ ***$p<0.01$

essential for resilience performance. In light of this, I add these capacity measures in the model to account for the potential mediating effects these variables have on the positive relationship between immigration and regional economic resilience. These variables include small business density, establishment churn, industrial diversification, percent college educated, and the number of civic organizations per 10,000 residents. Table 3.6 and 3.7 present the estimates from these new analyses. I only include the period 2010-2014 in the estimation of resilience after the shock to save space and more importantly, because long-term economic development is of greater importance to regions.

The results in Table 3.7 and Table 3.8 are almost identical to those reported in Table 3.4 and Table 3.5 respectively, with only slight increases in the magnitude of the coefficients. The inclusion of the capacity measures does not reduce the estimated effect of percent foreign-born on either employment growth or per capita income growth. In the specifications of employment shock resistance and per capita income resilience after the shock, including these variables even increases the significance level of the effect estimates. From these tables, we observe that the positive relationships between immigration and regional resilience are independent of the observed resilience capacities, and therefore may go through other unobserved mechanisms. Previous studies indicate that immigrants complement and diversify the native-born workforce, bring innovation and creativity, increase entrepreneurial spirit, and revitalize deserted neighborhoods (Ottaviano & Peri, 2006; Peri, 2013; Liu et al., 2014). These positive immigration effects on regional economies, although mostly observed during economically stable times, seem to persist through the national economic recession.

Table 3.7 Immigration level and annual employment growth rate with capacity measures added

	Resistance to the shock		Resilience after the shock	
	2008-2010		2010-2014	
	(1)	(2)	(3)	(4)
Percent foreign-born	0.007		0.036***	
	(0.004)		(0.011)	
Predicted percent foreign-born		0.012***		0.036***
		(0.005)		(0.012)
Number of small businesses per 10,000 persons	-0.001	-0.001	0.001	0.001
	(0.000)	(0.000)	(0.001)	(0.001)
Establishment churn	-0.007	-0.001	0.025	-0.025
	(0.007)	(0.007)	(0.021)	(0.020)
Industrial diversification	1.733	2.081	6.780*	6.721*
	(1.315)	(1.294)	(3.534)	(3.451)
Percent Bachelor's degree holders	0.006	0.005	0.001	0.001
	(0.004)	(0.003)	(0.010)	(0.010)
Civic organization density per 10,000 persons	0.017	0.019	-0.042	-0.042
	(0.013)	(0.012)	(0.032)	(0.031)
Regional Controls	Yes	Yes	Yes	Yes
Constant	-0.571	-0.605	-6.877***	-6.868***
	(0.996)	(0.976)	(2.620)	(2.542)
Observations	352	352	264	264
R-squared	0.226	0.221	0.392	0.392

Notes: Standard errors in parentheses. *$p<0.10$ **$p<0.05$ ***$p<0.01$

Table 3.8 Immigration level and annual per capita income growth rate with capacity measures

	Resistance to the shock		Resilience after the shock	
	2008-2010		**2010-2014**	
	(1)	**(2)**	**(3)**	**(4)**
Percent foreign-born	0.002		0.026*	
	(0.005)		(0.015)	
Predicted percent foreign-born		-0.004		0.027*
		(0.005)		(0.016)
Number of small businesses per 10,000 persons	0.001	0.001	0.001	0.001
	(0.000)	(0.000)	(0.002)	(0.002)
Establishment churn	0.029***	0.031***	-0.045*	-0.045**
	(0.009)	(0.009)	(0.023)	(0.022)
Industrial diversification	-0.551	-1.027	11.846**	11.947**
	(1.577)	(1.554)	(5.422)	(5.227)
Percent Bachelor's degree holders	0.012***	0.012***	0.010	0.010
	(0.004)	(0.004)	(0.015)	(0.014)
Civic organization density per 10,000 persons	0.006	0.003	-0.106**	-0.106**
	(0.015)	(0.015)	(0.049)	(0.047)
Regional Controls	Yes	Yes	Yes	Yes
Constant	-1.159	-1.106	-7.905*	-7.932**
	(1.191)	(1.168)	(4.017)	(3.823)
Observations	352	352	158	158
R-squared	0.273	0.267	0.354	0.354

Notes: Standard errors in parentheses. *$p<0.10$ **$p<0.05$ ***$p<0.01$

3.5 Conclusion

This chapter examines the effect of immigration on resilience to an actual downturn shock, the Great Recession. It uses an instrumental variable approach to address the endogeneity of immigrant residential choice and regional economic

development. Resilience is defined by an outcome-oriented perspective, separated into the period during and the period after the recession. Two outcome measures, employment and per capita, are included to capture the different aspects of the local economies.

The empirical results of this chapter indicate that, on average, immigration increases the chance of resilience performance in both regional employment and per capita growth. After controlling for regional characteristics and accounting for endogeneity, metropolitan areas with higher shares of immigrants are more likely to resist employment downturns during the recession and show faster recoveries after the recession. While immigration does not have a discernable effect on how likely a region resists a per capita income downturn during the recession, it is nevertheless associated with higher post-recession income growth in the long run (the last two post-recession periods). These coefficient estimates are consistent across different analytical approaches (e.g., Linear Probability model vs. Probit model), specifications of the recession period (i.e., lagged 2008-2010 period vs. unlagged 2007-2009 period), and constructions of the instrumental variable (i.e., predicted current immigration with 1980 data vs. predicted immigration with 1990 data).

Because resilience capacity prepares regions for a disturbance and potentially mediates the effect of immigration on regional economic performance, this chapter also includes several measures to account for the capacity in its estimations; these measures include small business activity, industrial structure, and civic infrastructure. The coefficients for immigration remain broadly unchanged after these mechanisms are added. In one specification, the coefficient even gains statistical significance. Immigration's positive association to employment and per capita income resilience is

observed both during and after the recession (for per capita, only after the recession) and stays robust to the inclusion of various mechanism measures.

These findings are in concurrence with findings of previous research in economics, sociology, and disaster planning that immigration in general casts a positive effect on the local economies and communities. But the unabated effects of immigration after resilience capacities are included are an addition to the urban planning literature. Immigration by itself is a critical force in resilience building. This demographic capacity is independent of the regional capacities that have been identified in the resilience literature. It affects regional economic performance through other unobserved mechanisms.

Previous literature suggests several possible mechanisms. First, immigrants fill important gaps at both the top and bottom of the local labor market (Peri & Sparber, 2009; 2011) and provide the necessary labor for firms to adjust specialization and invest in new productions (Peri, 2013). Second, they establish both main street businesses that provide essential services to urban residents (Kallick, 2015) and high-tech firms that contribute to regional innovation development (Wadhwa et al., 2007). Third, the ethnic networks rich in immigrant communities channel immigrants to work opportunities and social activities (Wilson & Portes, 1980; Elliot & Sims, 2001), which become particularly important during and after an economic recession (Zhu et al., 2013) or a natural disaster (Li et al., 2010). Lastly, there is also anecdotal evidence that immigrants often engage in place-making activities (Liu et al., 2014; Schuch & Wang, 2015) and are critical actors in the post-stress recovery and economic revitalization of a community (Bowles & Colton, 2007; Li et al., 2010).

These studies highlight not only the positive effects of immigration on local economies during normal times but also the resilience immigrants demonstrate and extend in the face of a challenge. Immigrants are flexible, supported by ethnic networks, and have a sense of belonging to the local communities. But more importantly, their proven ability to activate and mobilize these resources and capacities is what matters during an actual economic shock. Thus, if a greater proportion of the local population assumes such characteristics, then this region may display higher resilience in economic hard times.

The empirical results of this study, however, should be interpreted with caution. The estimated effects of immigration on resilience outcomes are indicative of associations but not causal relationships, as immigrants make residential location choices based on the economic condition of places, causing an endogeneity problem. Although I use an instrumental variable approach to get around this problem, the validity of the instrumental variables itself often raises concerns due to the unfulfilled exclusion restriction. The exclusion restriction stipulates that our instrumental immigration variables should predict the current local economic condition only through its connection to the current immigration level. To provide a partial look at whether this assumption holds, I have conducted an auxiliary test that regresses the instrumental immigration level on the current economic condition, controlling for the current immigration level. The results show a positive and statistically significant effect of economic conditions on the instrumental immigration variables, contrary to our assumption that the predicted immigration level should be a function of previous coethnic residential patterns rather than a function of local economic conditions. However, it is a known fact that the

exclusion restriction can only be conceptually argued but not empirically tested because regardless of whether the exclusion restriction is valid, the instrumental variable and dependent variable will always be associated when conditioning on the independent variable (Morgan & Winship, 2015). Therefore, although we are unable to completely rule out the possibility of violation of the exclusion restriction, the use of the instrumental variable moves the results one step toward robustness.

While more empirical research is needed to establish the relationship between immigration and economic resilience, practitioners have moved more rapidly. A growing number of municipalities have embraced and sought to attract immigrants as part of a broader strategy to repopulate and revitalize their communities. This trend is particularly profound in the Rust Belt region where many cities have met with long-term demographic and economic declines. They have instituted an array of programs that help increase immigrant presence, improve their economic integration, and enable immigrant entrepreneurship. Before these programs can show any effect on broader economic development of these places, we need to understand whether they have achieved their immediate goal—immigrant attraction and integration. Therefore, in the next chapter, I empirically test the effects of a specific local immigrant integration effort, Global Detroit, on the immigrant population in the local community.

CHAPTER 4. DO LOCAL IMMIGRANT INTEGRATION EFFORTS INCREASE IMMIGRANTS' ECONOMIC OUTCOMES IN AMERICA'S RUST BELT: DETROIT AND ITS IMMIGRANT POPULATION?

4.1 Introduction

The last few decades have seen increasing immigration dispersion and local policy activities on immigration issues (Walker & Leitner, 2011). As immigrants are making inroads into American cities with short immigration histories, immigration policy has increasingly taken place at a subnational level. Some local policymakers are concerned that the growing immigrant population would generate increasing burdens on the national social welfare system and erode social solidarity, while others believe that these newcomers will infuse new energy into local labor forces (Boswell, 2007; Wells, 2004). These competing views, coupled with federal inaction on immigration, have translated into different types of immigration policies proposed and enacted at the local level. Many localities have adopted measures to prevent employers from hiring unauthorized workers, increased cooperation with the U.S. Immigration and Customs Enforcement (ICE), and tightened regulations on rental requirements, day labor markets, and other "attrition through enforcement" practices targeted at reducing illegal immigrants. Other localities, influenced by pro-immigrant views, have adopted inclusive policies aimed at protecting the rights of both documented and undocumented immigrants, ranging from "sanctuary" ordinances that shield undocumented immigrants from being unduly interrogated to establishing or funding day labor centers (Walker, 2011; Ramakrishnan & Wong, 2010).

And yet, a growing number of localities are adopting a nexus of immigrant welcoming, integration, and economic development initiatives. These programs have shifted the focus of debate from the fiscal and social burdens that undocumented immigration imposes on communities to the economic contributions that immigrants can bring regardless of their legal status. Among these cities, Detroit launched the Global Detroit initiative, a regional effort that encompasses a range of initiatives that leverage immigrants' talent, innovation, and entrepreneurial spirit for job growth and community revitalization in 2011. Global Detroit reflects a new wave of local economic development strategies in America's Rust Belt cities that tap into immigrants' potential for community revitalization (Filomeno, 2017; McDaniel, 2014). Typical Rust Belt cities such as Baltimore, Cleveland, St. Louis, Pittsburgh, and Philadelphia have also followed suit and adopted policies to attract immigrants in the hope of reversing the decline in the economy, population, and quality of life in their communities.

Much of the local immigration policy research has focused on the bureaucratic incorporation of immigrants in responses to professional norms (e.g., Lewis & Ramakrishnan, 2007; Jones-Correa, 2008) or the motivation pattern of local responses to immigrants, particularly the restrictive ones (e.g., Hopkins, 2010; Ramakrishnan & Wong, 2010). What is lacking is empirical research investigating the demographic and economic impacts of local immigrant integration efforts and initiatives. Recent research has paid more attention to the inclusive policies, but the focus is on the various natures and strategies of these policies and the forces behind the policymaking process (Brenner, 2009; Filomeno, 2017; Steil & Vasi, 2014). There is still a paucity of research on how these local immigration policies affect migration and other regional outcomes (Varsanyi,

2010). As cities and regions are increasingly seeking to leverage immigration to grow local economies, filling this gap in the literature will help policymakers gain a better understanding of the efficacy of these policies and guide their future policy design.

This study intends to examine the impacts of Global Detroit on the local demographic and economic outcomes. However, before we evaluate whether the initiative has achieved its long-term goal of revitalizing the local economy, we would need first to examine whether it has attracted immigrants and improved their economic opportunities, as these are its immediate goals. This chapter thus focuses on Global Detroit's impacts on the immigrant community in three areas: the size of the foreign-born population, their labor market outcomes, and business activity. I employ the synthetic control method developed by Abadie, Diamond, and Hainmueller (2010) to select a group of "untreated" metropolitan regions (or in the language of the synthetic control method, the donor pool) from which a synthetic control that closely matches the Detroit metropolitan area is constructed. Several models are run to minimize interpolation biases and assess the robustness of the results. As the Global Detroit initiative was founded in 2010, I use the pre-treatment trends of the various outcome measures from 2000 to 2010 to create the synthetic control and the trends from 2011 to 2014 for the post-treatment trends. The difference in the outcome trends between Detroit and the synthetic control reveals the impact of Global Detroit program.

4.2 Literature Review

4.2.1 Local Immigrant Integration Efforts

Over the past decade, there has been an unprecedented level of local immigration policymaking and enforcement. Since 2005, nearly 370 local governments have drafted or adopted immigration-related policies, ranging from restrictive policies that exclude immigrants from local communities to inclusive policies that provide a "sanctuary" for undocumented immigrants (Walker & Leitner, 2011). This rising local immigration policymaking reflects the devolution of immigration policy responsibilities to local levels and the diffusion of immigration from traditional immigrant destinations toward new metropolitan areas and suburban neighborhoods (Ellis, 2006; Varsanyi, 2008; O'Neil, 2011; Walker & Leitner, 2011). Between 1990 and 2013, the immigrant population more than doubled its size in 25 states that historically saw little immigration (Migration Policy Institute, 2015). Within metropolitan areas, immigrants have also dispersed from inner-city ethnic neighborhoods toward native-majority suburban neighborhoods (Singer et al., 2008). In 2010, more immigrants lived in the suburbs than in the central cities (Wilson & Singer, 2011). The rapid demographic changes in these new immigrant-receiving communities pushed municipal governments to respond to and act on immigrant issues.

The 2007-2009 Great Recession slowed the rapid immigrant inflow to the country. The flows of both legal immigrants and unauthorized immigrants are now stabilized (Passel et al., 2014; Migration Policy Institute, 2015). The Great Recession has also brought increasing attention to regional competitiveness and long-term economic development (Christopherson et al., 2010). The majority of recent economic research shows that immigrants, regardless of skill level, contribute to the receiving economy by promoting efficient specialization, infusing ideas and stimulating innovation (Peri, 2010; 2013). Meanwhile, empirical evidence indicates that previous anti-immigration measures

have failed to produce the anticipated effects on immigrant populations, employment, or public safety (O'Neil, 2011; Parrado, 2012).

A new wave of local government responses to immigration has emerged within these contexts. Different from previous pro-immigrant policies that focus on the legal status and rights of immigrants, these new policies are mostly programs and initiatives aimed at accommodating and integrating existing immigrants into local economic, social and civic life (Brenner, 2009; Williamson, 2014) and leveraging their contributions for local economic development (McDaniel, 2014; Strauss, 2012). Welcoming cities and counties within the Welcoming America network are a notable example. In 2013, the Welcoming America organization launched the Welcoming Cities and Counties initiative to provide a venue for immigrant-welcoming cities to share resources and exchange best practices. As of May 2017, over 70 municipalities have joined the network. Member cities are committed to adopting a set of immigrant-welcoming values, developing and implementing concrete program plans, and engaging local business, civic, religious and immigrant leaders in building a welcoming climate (Welcoming America, 2015).

The current scholarship of the municipal responses to immigration proceeds along two primary fronts. The first one includes case studies of bureaucratic incorporation of immigrants that highlight the role of professional norms in guiding such practices (e.g., Lewis & Ramakrishnan, 2007; Jones-Correa, 2008). Taking advantage of cross-area variation, the second one investigates when and why localities consider and pass immigration ordinances, with a focus on the "attrition through enforcement" practices (e.g., Hopkins, 2010; Ramakrishnan & Wong, 2010). The potential effect of local immigration policies on local demographic trends and economic outcomes has instead

received much less attention (Varsanyi, 2010). The studies that do examine policy impact, however, often focus on the restrictive immigration regulations at the national level (Parrado, 2012) or in selected states (Bohn et al., 2014). No study has looked at the impact of the current local immigrant integration programs and initiatives. As immigrants are increasingly perceived and framed as an important force for community development and job growth, a better understanding of how these integration programs affect the residential location of immigrant populations and their economic endeavors can contribute to the discussions on the efficacy of economic development strategies broadly and the effects of local immigration policies on framing the living experience of immigrants specifically.

4.2.2   Immigration as Economic Development Targets in the U.S. Rust Belt

Economic development strategies in American cities are traditionally characterized by the attraction and retention of businesses through a series of subsidized infrastructure provisions and direct financial tools such as tax abatements. Such "smokestack chasing" or "firm chasing" strategies have often degenerated into a "race to the bottom" that results in a "zero-sum game" for the national economy because such practices only shift resources around and rarely create new economic activities (Markusen, 2007).

In recognition of the critical role that entrepreneurship plays in building and sustaining local economic growth (Chinitz, 1961; Glaeser et al., 1992; Acs & Armington, 2004), policymakers have increasingly turned their attention to small business development (Fitzgerald & Leigh, 2002). Strategies targeted at entrepreneurship development include direct government grants, income tax credits for angel investors,

public venture capital funds, business incubator facilities, job training, as well as enhanced support for university research and technological transfer from universities (Clarke & Gaile, 1992).

In recent years, the entrepreneurship development emphasis has shifted from building knowledge and technological infrastructure to enhancing human capital and quality of life. This is based on a long-established notion that human capital is the key autonomous growth factor (Romer, 1986; 1990) and the accumulation of knowledge creates positive productivity externality. Human capital and skilled workers attract high-paying service sector jobs in knowledge-intensive industries that rely heavily on creativity and innovative ability (Florida, 2002; Glaeser & Resseger, 2009).

Immigrants are increasingly viewed by local governments as valued economic development resources due to their entrepreneurial spirit (Fairlie, 2012) and central roles in neighborhood revitalization (Liu et al., 2014; Kallick, 2015; Schuch & Wang, 2015). Immigrants are more entrepreneurial than their native-born counterparts (Fairlie, 2012). They owned about 18 percent of the total small businesses in the U.S. (Kallick, 2012), 28 percent of Main Street businesses (Kallick, 2015), and founded about 25 percent of engineering and technology companies (Wadhwa et al., 2007) and 16 percent of the "high-impact, high-tech" companies (Hart & Acs, 2011). They have helped counterbalance deindustrialization and urban decline by expanding the workforce, increasing home values and filling in the gaps within certain niches deserted by native-born entrepreneurs (Lin, 1998; Kallick, 2015; Wilson & Singer, 2011). They have helped stabilize residential neighborhoods and transform distressed areas into vibrant business communities and busy storefronts (Hwang, 2015; Liu et al., 2014; Schuch & Wang,

2015). Furthermore, immigration is found to be positively related to the regional

economic growth in the top 25 largest metropolitan areas in the U.S. (Kallick, 2009).

An increasing number of cities are pursuing a combination of immigrant

welcoming, integration and economic development initiatives (McDaniel, 2014). This

trend is particularly pronounced in Rust Belt cities where decades of population losses

and economic declines have led the city officials and policymakers to rethink how to

reinvigorate their communities (Strauss, 2012; Global Detroit, 2010). St. Louis created

the Mosaic Project in response to the city's slow economic development (Strauss, 2012).

Its programs include mentoring and connecting international students with potential

employers, advising hiring companies on legal issues, and formalizing immigrant

professional and social networks (St. Louis Mosaic Project, 2015). In Cleveland,

immigration was incorporated into the local economic development efforts in 2001 under

Mayor Jane Campbell's leadership as the backbone of building local growth (Civic Task

Force on International Cleveland, 2003). In 2011, Global Cleveland was created to lead

the efforts at attracting and retaining international talent and businesses and fostering an

inclusive and welcoming community (Global Cleveland, 2015). The city of Dayton

recently institutionalized the Welcome Dayton initiative that encourages business and

entrepreneurship development, increases access to government and social services, and

promotes cultural awareness and friendliness in the city (Welcome Dayton, 2015). In

Baltimore, several technical and financing assistance programs are put in place to harness

the entrepreneurial spirit of immigrants. These programs include connecting immigrant

entrepreneurs to resources in the Small Business Enterprise Program, streamlining

government regulatory process, creating a web-based one-stop center for entrepreneurs,

and providing the BaltimoreMICRO Revolving Loan Fund Program to immigrant business owners (New Americans Task Force, 2014).

4.2.3   The Case of Detroit

The Detroit region, defined by the Detroit-Warren-Dearborn Metropolitan Statistical Area according to the Office of Management and Budget (OMB) delineation in 2013, is the largest metropolitan area in Michigan and second-largest in the Midwest, behind Chicago, with a population of 4.3 million in 2014. It was traditionally a manufacturing powerhouse with the "Big Three" automakers (Ford, General Motors, and Chrysler) and their suppliers as the leading employers in the region. Like most industrial towns, Detroit underwent deindustrialization as a result of increasing global and domestic competitions from lower-cost areas. From 1970 to 2000, the region experienced periodic economic downturns and rebounds, which corresponded to the national economic cycles. The region, however, was particularly hard hit by the downturn in the early 2000s and the 2007-2009 Great Recession. Between 2000 and 2009, the region lost 338,000 jobs (13.1 percent) overall and 35,000 jobs (14.6 percent) in the automobile industry. It also experienced depopulation over this period. The population fell from 4,455,503 in 2000 to 4,291,176 in 2010, amounting to a loss of 164,327 people.

In response to the economic and demographic declines, regional leaders have proposed to reorient economic development strategies to diversifying the economy and building the human capital (Hill et al., 2012). The region's past efforts to diversify from the dependence on the automobile industry were never followed through because the industry had bounced back from each downturn shock until the 2000s. The big three automakers dominated the business community and led some regional collaborative

efforts to a focus on reducing business costs. Other business and political players also created organizations and coalitions, but mostly to promote their economic interests or to contest for power and resources; a reflection of the region's deep white-black and city-suburb divisions (Pastor & Benner, 2008). A regional coalition focusing on bringing new forces in economic growth had never been formed until recently. The hard hit of the Great Recession has pushed some regional economic strategies to the forefront, one of which focuses on leveraging the innovation capacity of the region's research institutions such as Wayne State University and the University of Michigan to promote commercialization and high-tech business development (Hill et al., 2012). Other strategies include the expansion of automobile production technologies and facilities into other related industries such as defense production and improving its medical research clusters. However, these strategies are either at the very beginning of the implementation stage or are merely proposals under development, and none have shown immediate economic results.

In this context, the Global Detroit initiative was founded in 2010 as a major economic development effort with the focus on immigration, entrepreneurship, and innovation (Global Detroit, 2010; McDaniel, 2014). It seeks to revitalize the region's economy by strengthening its connections to the global economy and increasing its appeal to immigrants, global talent, and foreign investment and trade (Global Detroit, 2015). Some anecdotal evidence within the city has shown the promise of the immigrants-led economy. For example, southwest Detroit, which is dubbed the "Mexicantown," increased its population between 2000 and 2010 due to the immigrant influx, while the city lost more than 200,000 people during the same time. Small business

there has also flourished, making the immigrant neighborhood one of the only few areas in town that came through the Great Recession unscathed (Wainer, 2013).

This initiative is in concurrence with, and in part seeded, the rising awareness of leveraging immigrant contributions within the state of Michigan. In 2014, the Michigan Office for New Americans was created to welcome immigrants with its first four essential function areas being talent recruitment, international investment, agriculture immigration, and fostering a welcoming culture (Michigan Office for New Americans, 2016). Focusing on talent acquisition, Michigan Governor Rick Snyder has called for the U.S. government to set aside 50,000 employment-based visas for skilled immigrants with advanced degrees in STEM field, most of which would go to the City of Detroit to help reboot its economy (Office of Governor Rick Snyder, 2017).

Global Detroit has implemented and spearheaded several specific programs to attain its goals. First, it offers programs to attract and retain international talent. These include mentoring international students and channeling them to potential employers, advising companies on how to hire international talent, and formalizing immigrant professional and social networks. Second, it promotes immigrant entrepreneurship by connecting immigrant communities and potential business owners to services that help entrepreneurs capitalize on their business ideas. Two programs, ProsperUS and ACCESS, provide microfinancing, entrepreneurship training, and free to low-cost technical assistance to immigrant entrepreneurs. Third, it strives to cultivate a welcoming environment for immigrants and refugees. Global Detroit has helped assemble an online database cataloging the region's social service providers of ELS programs, citizenship courses, immigrant legal services, refugee support and the like, to help immigrants

integrate into the local life and social fabric of their adopted hometowns. The Welcome Mat program encourages collaboration between these service providers in providing services to immigrants. The Cultural Ambassador program helped better welcome immigrant workers and investors, and immigrant communities through a professional connector program and a volunteer program.

Global Detroit also emphasizes the values of immigrants in community building (Global Detroit, 2015). It encourages immigrant and ethnic community leaders to participate in regional leadership dialogues and training programs. Several neighborhood-based efforts are underway in Hamtramck, Banglatown, and Southwest Detroit that capitalize on the economic opportunities immigrants bring to the neighborhoods and long-term residents. In addition, the city seeks to revitalize distressed urban areas through foreign capital investment by lowering the investment threshold and identifying key investment opportunities suitable for EB-5 investors in those neighborhoods (Global Detroit, 2015).

Global Detroit exemplifies a new commitment to leveraging immigrant resources for economic development that is now taking root in many Rust Belt cities. Although the initiative is one of the earliest and most comprehensive local efforts in this direction, it is nevertheless in its early stage with immediate goals of attracting and integrating immigrants. In light of this, this analysis focuses on the program effects on the immigrant population in Detroit, pertinent to three aspects which include the level of immigrants, their labor market outcomes, and their entrepreneurial activities. Understanding these effects provides a first but critical step toward evaluating the programs' longer-term

effects and replicating effective program elements in many more Midwest jurisdictions eager to find alternative economic development strategies.

4.3   Data and Methodology

To assess the impact of Global Detroit on the foreign-born population in Greater Detroit and their economic outcomes, I draw data from the Public Use Microdata Samples (PUMS) of Decennial Census 2000 and American Community Survey (ACS) one-year samples from 2005 to 2014 (Ruggles et al., 2015). The sample is limited to 158 metropolitan regions that had a population of at least 200,000 persons in 2000. I calculate the proportion of the region's population which is foreign born in a region to measure the immigration level. Regarding the labor market outcomes of immigrants, I examine the employment rates and average wage earnings of the immigrant populations. For local business activities, I use the self-employment rate of immigrants as a proxy for immigrant entrepreneurship.

Table 4.1 describes the trends in these three aspects for the period 2000-2014. Recall that Global Detroit was launched in 2010. The last four years thus constitute the post-treatment periods. The foreign-born population had a jump from 315,509 people (9.5 percent of the total population) to 374,540 people (11.0 percent) in the early 2000s but experienced gradual declines from 2005 to 2010. Since 2011, the foreign-born population has been on an upward trend again (with the year of 2012 being a small exception) and reached 396,778 people (12.0 percent) in 2014, the highest level since 2000. The foreign-born employment exhibits a similar trend. It declined from 207,095 in 2005 to 191,253 in 2010 and picked up the growth again in 2012 (for the foreign-born employment share of

the total employment, the turning point is 2011). In 2014, foreign-born employment reached 225,462, higher than in any of the preceding years.

The trends for the average wage earnings for foreign-born workers are also similar. We observe a decline of $2606 from $28,285 in 2005 to $25,679 in 2011 but then an increase of $4346 within three years after 2011. Taking the inflation and the regional economic condition into account, the relative wage earnings for foreign-born workers as compared to that for the overall population (the foreign-born average wage income relative to the average wage income for all) also show an upward trend since 2011. In terms of the self-employment rate among the foreign-born, it does not show a clear

Table 4.1 Trends in the immigrant population, their employment and wage, and self-employment in Detroit, 2000-2014

	2000	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Foreign-born population	315509	374540	374398	382870	366855	367671	351386	374026	366908	394164	396778
Foreign-born percentage	9.50	11.00	11.00	11.20	10.80	10.80	10.50	11.20	11.10	11.90	12.00
Foreign-born employment	172830	207095	216529	216963	214446	194451	191253	186674	198939	222897	225462
Foreign-born share of emp. (ratio)	9.40	10.30	10.80	11.00	10.70	10.60	10.70	11.00	11.00	11.90	11.90
Foreign-born average wage (real)	24589	28285	28746	28499	28852	25833	26545	25679	27435	29698	30025
Foreign-born average wage relative to overall (ratio)	0.96	1.07	1.07	1.06	1.08	1.05	1.10	1.06	1.10	1.12	1.10
Foreign-born self-emp. rate	5.30	6.10	5.30	5.90	5.30	6.70	4.80	6.10	5.80	5.70	4.80
Foreign-born self-emp. rate relative to overall (ratio)	0.71	0.69	0.65	0.69	0.66	0.81	0.65	0.77	0.73	0.73	0.63

Author's calculation of Census 2000 and annual ACS 2005-2014 iPUMS

pattern of periodic downturns. The rate fell from 6.1 in 2005 to 5.3 in 2008 and then from 6.7 in 2009 to 4.8 in 2010. It bounced back in 2011 to 6.1 percent, then followed by another downturn between 2011 and 2014. The relative self-employment rate of foreign-born population as compared to the total population corroborates such periodic nature. To assess whether the observed changes in the three regional outcomes are driven by the Global Detroit effort or by other regional characteristics, a comparison state or states that constitute the counterfactual case for Detroit are required. Traditional regression-based approaches are less useful in situations where there is only one treated unit because the small number of units precludes the use of standard inferential techniques. Abadie, Diamond, and Hainmueller (2010) proposed the synthetic control method to estimate the effect of unique interventions at the aggregate, regional level. This approach takes advantage of the fact that a weighted combination of control units may provide a close counterfactual of the treated unit (Abadie et al., 2010). It possesses several advantages over the traditional regression approaches. First, it employs a data-driven search for a comparison group that best approximates the pre-treatment treated group. The data-driven procedures reduce discretion in the choice of comparison units and make transparent the relative contribution of each untreated unit to the estimate of the counterfactual outcomes. Second, by producing a synthetic control group that is sufficiently close to the treated unit in terms of pre-treatment outcomes and other predictors of post-treatment outcomes, it reduces the reliance on the functional form to estimate the outcome trends. Third, it requires the control and treated groups to be matched on pre-treatment data, which safeguards against extrapolating the relationship between pre-treatment covariates and post-treatment outcomes beyond the convex hull of

102

the data. Fourth, the synthetic control approach employs an exact inferential technique, which is built on the idea of placebo test and permutation inference, and solves the problem that large-sample inferential techniques are not well suited to studies with a small number of units.

Using synthetic control method, I construct the counterfactual outcome trajectory that Detroit would have experienced in the absence of the Global Detroit initiative. Specifically, suppose that we observe several regions $j = 1, ..., J + 1$ at several time periods $t = 1, ..., T$, and the region $j = 1$ represents Detroit and the other regions $j = 2, ..., J + 1$ are candidate contributors to the donor pool. Define X_1 as a $(k \times 1)$ vector of baseline covariates predictive of immigrant demographic and economic outcomes plus some set of linear combinations of the outcome values for Detroit from 2000 through 2011, and X_0 as a $(k \times j)$ matrix of the collection of comparable data vectors for each of the J regions in the donor pool.

The identification strategy is to create a composite of the J states in the donor pool that best approximates Detroit on pre-treatment values. It does so by assigning a $(J \times 1)$ vector of weights $W = (w_2, ..., w_{J+1})'$ to the untreated regions in the donor pool such that $w_j \geq 0$ for $j = 2, ..., J + 1$ and $w_2 + \cdots + w_{J+1} = 1$. Each possible vector of W represents a weighted average of the available control region, or in the language of synthetic control method, a potential synthetic Detroit. The method essentially chooses a value for the weighting vector, W^*, that minimizes the distance between the pre-treatment vector for the treated (X_1) and that for the synthetic control (X_0W). That is,

$$W^* = \arg\min ||X_1 - X_0W||_V = \sqrt{(X_1 - X_0W)'V(X_1 - X_0W)V}$$
$$s.t.$$
$$w_j \geq 0, \ w_2 + \cdots + w_{J+1} = 1 \text{ for } j = 2, ..., J + 1$$

where V is a $(k \times k)$ symmetric, positive semi-definite matrix that is chosen to minimize the mean squared prediction error (MSPE) of the synthetic control estimator during the pre-intervention periods, although other choices of V are also possible (Abadie et al., 2010). After an optimal weighting vector W^* is chosen, the post-treatment outcomes of the synthetic control indicated by the weighted average $\sum_{j=2}^{J+1} w_j^* Y_{jt}$ will provide credible estimates of the counterfactual post-treatment outcomes for Detroit. Such matching procedures also ensure that the treated unit and the synthetic control unit are matched on unobserved cofounders which can be either fixed or time-varying (Abadie et al., 2010), thereby alleviating the endogeneity problem associated with unobserved regional characteristics that are attractive to immigrants. The constraints that the weight for each untreated region is non-negative and that all the weights sum to one also provide a safeguard against extrapolation (Abadie et al., 2010; Bifulco et al., 2015).

As traditional large-sample inferential techniques are not applicable in studies with small numbers of observations and particularly the treated units, I apply the exact inferential technique suggested by Abadie et al. (2010) to test the significance of any observed outcome of Global Detroit. This technique is built on the idea of placebo test and permutation inference. Specifically, I apply the synthetic control method to every other region in the donor pool that did not receive a similar policy intervention during the study period and derive a distribution of the estimated effects. This technique allows us to compare the effect estimated for Detroit to the effects estimated for regions chosen at random. If it is unusually large compared to the distribution of the effects of the placebo interventions, then this analysis provides sufficient evidence for significant effects of Global Detroit.

I include in X_1 and X_0 all the pre-treatment values of the dependent variables
(2000, 2005-2010 yearly), and the values of predictors of the immigration level and
immigrants' economic outcomes. The predictors include the proportion of the workforce
in each of the 5 broad industries (construction, manufacturing, trade, producer service,
and social service), the educational attainment of the local population, and the
unemployment rate. These covariates are averaged over the pre-treatment periods of 2000
and 2005-2010.

4.4   Results

Figure 4.1 depicts the growth trends of the foreign-born share of the local
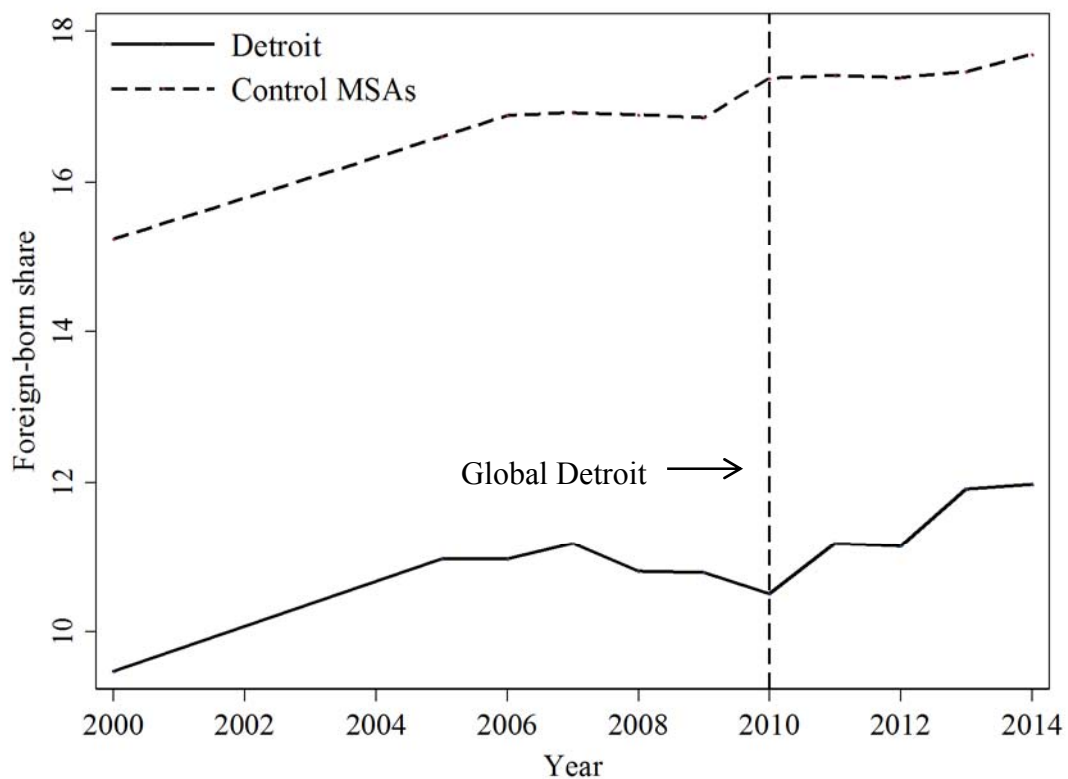

Figure 4.1 Trends in the foreign-born share of the local population between Detroit and the rest of
the MSAs in the donor pool

population for Detroit and the population-weighted average of the 157 regions in the donor pool. This figure shows that the two trends are considerably different. Detroit's immigrant shares were much lower than the average immigrant shares in the other 157 regions throughout the entire study period of 2000 to 2015. In addition, immigration in Detroit experienced a decline between 2008 and 2010, while the average immigrant share in the other metropolitan regions stayed stable and even experienced growth during this time. In 2011, the year after the Global Detroit was launched, the immigrant level in Detroit started to increase, but still lagging far behind the other 157 regions. The dissimilar trends suggest that the average of the 157 regions do not serve as a suitable control group for Detroit.

A synthetic Detroit is therefore constructed, which is a weighted combination of the 157 regions in the donor pool that best resembles Detroit on pre-treatment values. Table 4.2 compares these pre-treatment values of the Detroit region with those of the synthetic Detroit, as well as with the population-weighted averages of the 157 regions in the donor pool. Compared to the average of the other regions in the donor pool, Detroit's workforce is more concentrated in the manufacturing industries (18.9% versus 10.5%) and less concentrated in all other industries. Its population is more concentrated in the categories of high school graduate and some college education and less concentrated toward the high and low educational groups. The unemployment rate prior to 2011 was substantially higher in Detroit than in the average of the other regions, which is indicative of more severe economic adversity Detroit experienced in the first decade of the century. To the contrary, the synthetic Detroit reproduces most of the values of the pre-treatment characteristics that are observed in Detroit. While the values on construction share,

106

manufacturing share, and the unemployment rate do not closely match those of the real

Detroit, the diagonal elements of *V* associated with these variables are very small,

indicating that they are insignificant predictors of immigrant shares before the launch of

Global Detroit.

Table 4.2 Pre-treatment characteristics of Detroit and the 157 control metropolitan regions, 2000-2010

	Variable Construction	Detroit		Averages of 157 regions
		Real	**Synthetic**	
Construction share	Proportion of labor force in construction	5.4	6.7	7.2
Manufacturing share	Proportion of labor force in manufacturing	18.9	16.0	10.5
Trade share	Proportion of labor force in wholesale and retail trade	14.3	14.6	14.8
Producer service share	Proportion of labor force in FIRE, professionals and management	17.0	17.0	18.9
Social Service share	Proportion of labor force in education, social service, art and recreation, and personal service	32.8	32.9	34.0
Less than high school	Proportion of residents that have less than high school education	14.7	14.8	16.0
High school graduate	Proportion of residents that are high school graduates	38.4	38.1	35.1
Some college	Proportion of residents that have some college education	23.3	23.3	21.8
College and more	Proportion of residents that are college graduates or above	23.6	23.9	27.1
Unemployment rate	Percentage of labor force that is unemployed	11.4	7.8	7.3

Author's calculation of data from the Census 2000 and annual ACS 2005-2014 iPUMS. The sample includes 157 MSAs defined under the OMB 2013 delineation with at least 200,000 persons in 2000.

Figure 4.2 presents the growth trends in the foreign-born shares of the local population for Detroit and its synthetic counterpart during the period 2000-2015. In contrast to the substantially different trends shown in Figure 4.1, the pre-treatment immigration trend for the synthetic group very closely matches the corresponding trend in Detroit. Together with the high degree of balance on the predictors of immigration level, this suggests that the synthetic Detroit provides a credible counterfactual trajectory of post-treatment immigration in Detroit in the absence of Global Detroit.

Immediately after the launch of Global Detroit, the immigration trends in Detroit and the synthetic Detroit started to diverge. While immigration in the synthetic Detroit
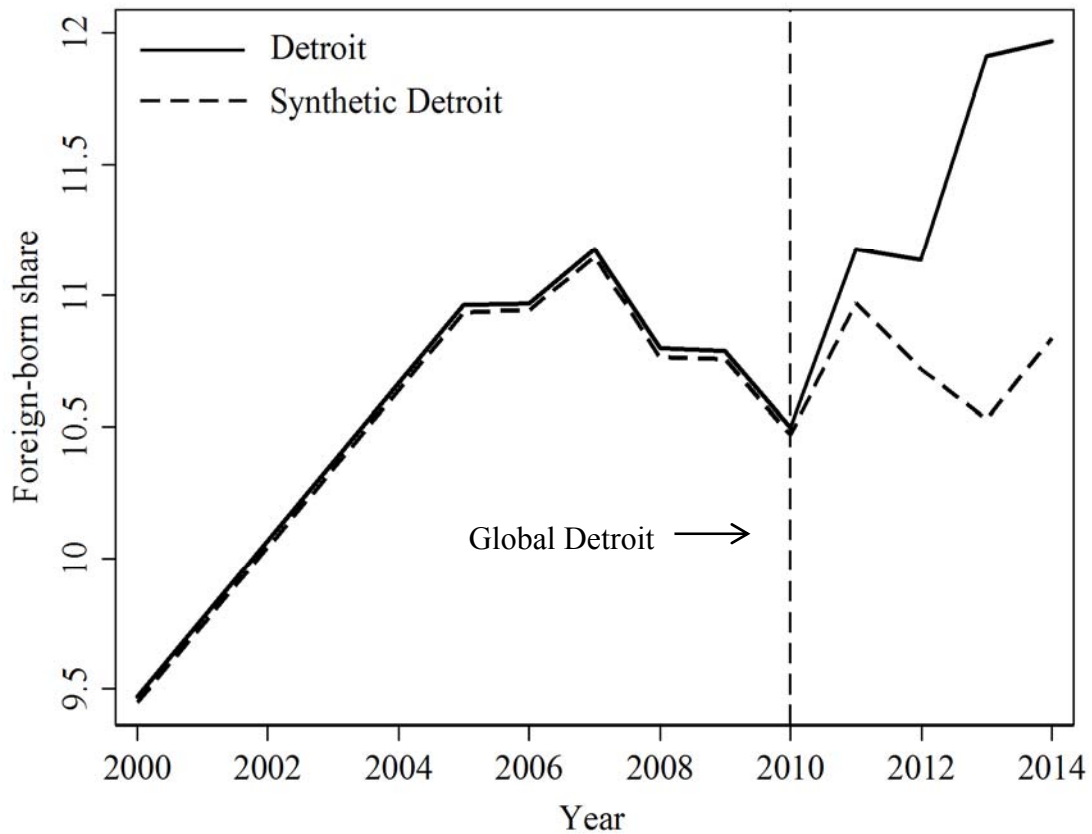

Figure 4.2 Trends in the foreign-born share of the local population between Detroit and synthetic Detroit

experienced a modest increase since 2011, the real Detroit experienced two large jumps despite a small regress in the post-treatment period. The gap between the two lines suggests a sizeable positive effect of Global Detroit on the total immigration in the region. Table 4.3 reports the year-by-year effect estimate of Global Detroit on immigration in Detroit. In 2011, the immigrant share of the population was around 0.2 percentage points higher in Detroit than in the synthetic Detroit, and this gap increased to 1.38 percentage points in 2013 and 1.10 percentage points in 2014.

Table 4.3 also presents estimates obtained from several robustness checks with different specifications of the donor pool. In the second model, I discard from the donor pool 9 MSAs that have implemented large-scale immigrant integration programs during

Table 4.3 Estimated Global Detroit effects on the foreign-born share

Models	Year 1	Year 2	Year 3	Year 4	*p*-value	*N*
Full sample	0.19	0.45	1.38	1.10	0.032	158
Less MSAs with similar policies	0.21	0.53	1.38	1.11	0.180	148
Less MSAs with high-level, high-growth prior immigration	0.34	0.57	1.25	0.98	0.073	42
Less MSAs that border Mexico	0.21	0.33	1.19	0.90	0.083	37
Less major refugee destinations	0.21	0.33	1.19	0.90	0.032	32

Notes: (1) Full sample includes all 158 MSAs that have at least 20,000 persons in 2000. The second model discards the MSAs that implemented similar immigrant-welcoming and integration programs during the study period. The third model further drops the MSAs that had an immigrant share of over 20% in 2000 or those that experienced a more than 43% increase in immigrant population over 2000-2010. The fourth model also drops MSAs in states that share a border with Mexico, such as Texas, New Mexico, Arizona, and California. On top of all the previous models, the last one also drops the MSAs where refugees contribute to the majority of the immigration growth between 2000 and 2010. These MSAs include Akron, OH, Binghamton, NY, Erie, PA, Fort Wayne, IN, and Syracuse, NY.
(2) Year 1-4 corresponds to post-intervention year 2011, 2012, 2013, and 2014, respectively.
(3) *p*-value corresponds to the likelihood of observing a post/pre-treatment RMSPE ratio as large as that obtained for Detroit if the treatment is assigned at random.
(4) The pre-treatment period includes years 2000, 2005 to 2010.

the study period[16]. This is to ensure that the metropolitan regions used for constructing

the synthetic Detroit are not subject to programs similar to Global Detroit. As the extent

and scale of immigrant integration programs are difficult to quantify, this list by no

means contains all the metropolitan regions that have implemented programs aimed at

promoting immigrant integration.[17] However, the inclusion of these places in the donor

pool should if anything attenuate the treatment effect estimated for Detroit since they

should also expect a positive effect of the programs on immigration level. Interpolation

bias can arise when members of the donor pool that receive considerable weights in

computing the synthetic controls are very different from the treated unit (Abadie et al.,

2010). For this reason, I further restrict the donor pool to the regions that exhibit a similar

immigrant profile as Detroit. Specifically, in the third model, I also discard those MSAs

that had an immigrant population that accounts for more than 20% of the local population

in 2000 or the ones that experienced a more than 43% increase (the population-weighted

average of the 158 regions) between 2000 and 2010. Because immigrant flows from

Mexico are likely to be unresponsive to local immigrant integration programs in the

states that border Mexico since they are the first ports of entry for these immigrants, the

fourth model also excludes MSAs in neighboring states of Mexico, including Texas, New

Mexico, Arizona, and California. In addition, certain metropolitan areas receive more

refugees than economically driven immigrants in the past decade. On top of all the

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[16] These MSAs include Boston, Chicago, Cleveland, Dayton, Los Angeles, New York, San Francisco, St. Louis, and Washington, D.C.

[17] Depending on the restrictiveness of the definition of large-scale immigrant integration programs, different sets of welcoming MSAs have been constructed and excluded from the donor pool. Results stay relatively robust to these variations.

previous models, the last one also excludes the MSAs where refugees contribute to the majority of the immigration growth between 2000 and 2010[18].

The effect estimates stay relatively consistent across these different specifications. In 2011, the differentials between Detroit and the synthetic Detroit range from 0.19 percentage points to 0.34 percentage points. The differentials widen to 1.19 to 1.38 percentage points three years after the launch of the program and hover around 0.9 to 1.1 percentage points in Year 4.

Recall that the significance of the effect estimate is obtained through random permutations of the assignments of the regions in the donor pool into treatment and control groups. Specifically, I apply the synthetic control method to every other region in the donor pool as if one of the regions would have adopted a large-scale immigrant integration program such as Global Detroit in 2010, instead of Detroit. The resulting distribution of effect estimates enables us to assess the likelihood of observing an effect estimate as large as that obtained for the treated unit for a placebo test that presumably has a true treatment effect of zero.

Figure 4.3 displays the results from the placebo test applied to the most restricted donor pool (last model in Table 3, *N*=32). In Panel A, the gray lines represent the effects estimated for the 31 regions, and the thick black line denotes the effects estimated for Detroit. As the figure shows, the estimated difference in the immigrant share of Detroit outsizes most of the estimated gaps in the donor pool. Although a few regions have larger estimated effects in certain post-treatment years, these effects are quite volatile and can plummet from large positive numbers to below zero in a year or two.

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[18] These MSAs include Akron, OH, Binghamton, NY, Erie, PA, Fort Wayne, IN, and Syracuse, NY. Data on refuges settlements are obtained from the Refugees Processing Center.
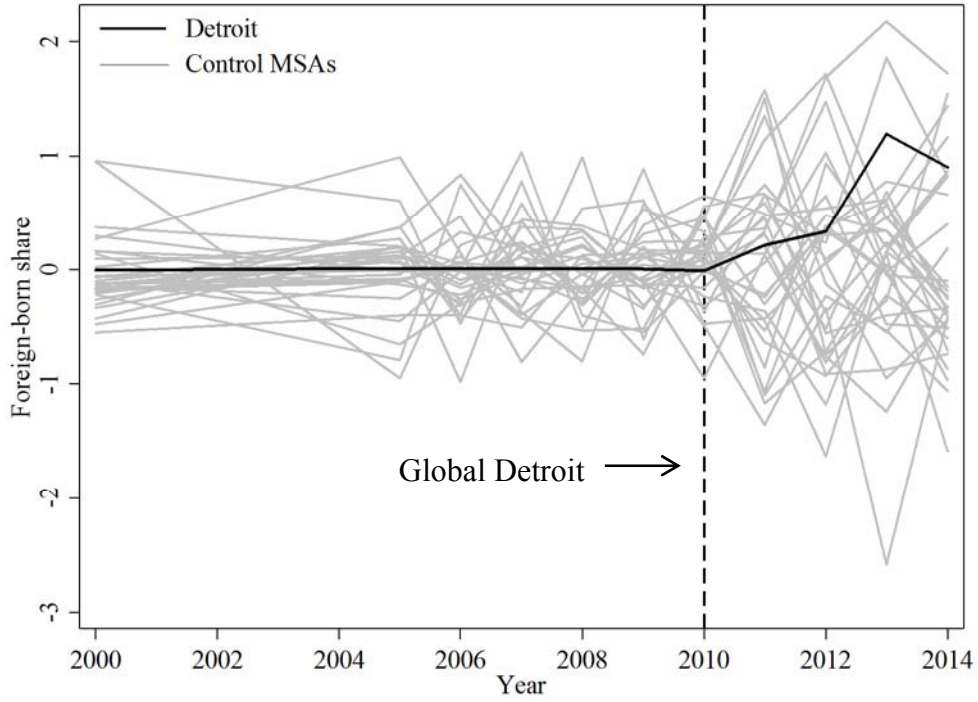
A
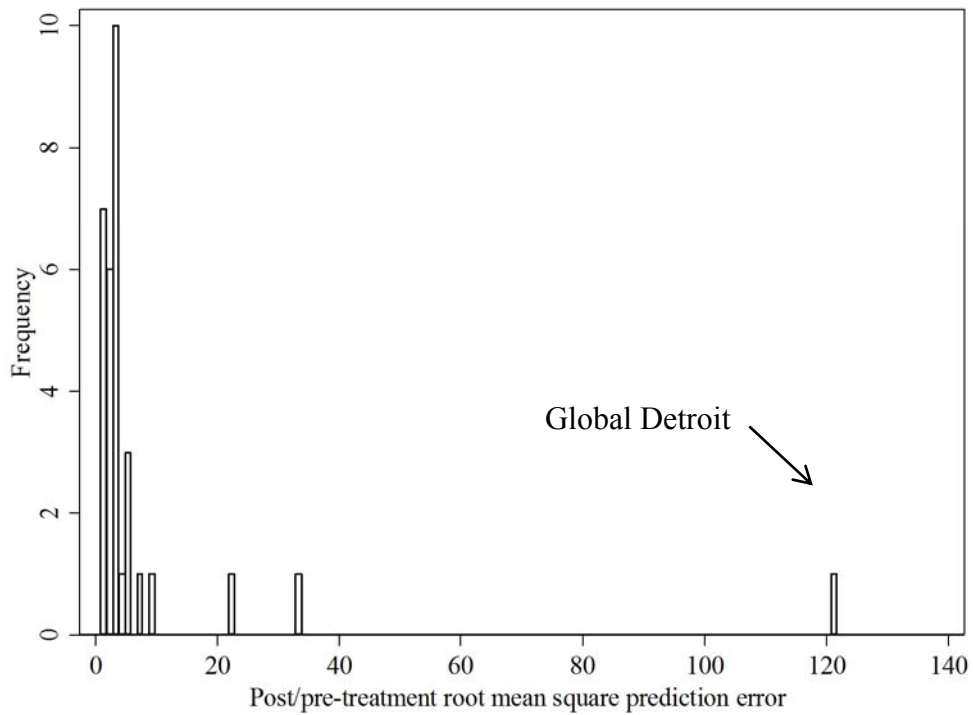
B

Figure 4.3 Effect estimates of Detroit and placebo runs (Panel A) and pre/post-treatment RMSPE distribution (Panel B)

In addition, these regions seem to differ quite substantially in the pre-treatment outcome measure from their respective synthetic controls, implying that the placebo runs produce poor fits for these regions prior to the treatment. When a synthetic control fails to reproduce a close match to a particular region in the donor pool, we should attribute the large gaps in the post-treatment outcome measures to the lack of fit, rather than the effect of the treatment. In this case, the placebo runs with poor fit may not provide credential information to measure the chances of observing an effect estimate as large as that obtained for Detroit if the true treatment effect were zero. For this reason, I measure the ratio of the post-treatment root mean square prediction error (RMSPE) to the pre-treatment RMSPE obtained from all the placebo runs, and assess the relative position of the ratio for Detroit in the distribution of all these ratios. The prediction error for each year in this test denotes the difference in the foreign-born share between Detroit and the synthetic Detroit.

Panel B presents the distribution of the post/pre-treatment RMSPE ratios for Detroit and the 31 control regions. The ratio for Detroit is located at the far right of the distribution with a value of 121.2, meaning that the post-treatment RMSPE is about 121 times the RMSPE for the pre-treatment period. The probability that one obtains a post/pre-treatment RMSPE ratio as large as Detroit's is $1/31 = 0.032$. This probability is reported in Table 4.3 as the p-value. Although it is not calculated in the traditional way for the p-value statistic, it nevertheless provides an approach to measuring the significance of a sample statistic.

As Table 4.3 shows, the estimated effects of Global Detroit are significant in all specifications but one. Only in the second model where 9 MSAs with large-scale

immigrant integration programs are excluded from the donor pool, the post/pre-treatment

RMSPE ratio for Detroit falls out of the top 10% range of the distribution. However, if

we look at the one-tail *p*-value, the probability of obtaining a post/pre-treatment RMSPE

as large as that obtained for Detroit is still less than 10 percent.

4.4.1   Effect Estimates on Alternative Labor Market Outcomes for Immigrants

Global Detroit has implemented several initiatives and projects aimed at attracting

and retaining immigrant talent as well as capitalizing on immigrants' tendency to start

small businesses. For example, it offers mentoring services to international students on

the job market and assists in their job placements. It advises companies looking to hire

international workers on legal issues and paperwork. It also provides microfinance,

entrepreneurship training and free to low-cost technical support to aspiring immigrant

entrepreneurs, and helps them navigate the regulatory system and local services.

Therefore, we expect to see the program effects go beyond affecting the size of the total

immigrant population and reach certain subgroups of the foreign-born population and

Table 4.4 Estimated Global Detroit effects on alternative outcomes for immigrants

Models	Year 1	Year 2	Year 3	Year 4	*p*-value
High-skilled foreign-born share	-0.12	-0.28	0.23	0.23	0.028
Foreign-born employment share	-0.08	-0.18	0.72	0.59	0.028
Foreign-born average wage (adjusted)	1677.94	1210.27	2994.74	1689.97	0.861
Foreign-born self-employment rate	-0.45	1.22	1.27	-0.12	0.220

Notes: (1) All four effects are estimated on a sample of 37 regions that are equivalent to the fourth sample in Table 4.3.
(2) Year 1-4 corresponds to post-intervention year 2011, 2012, 2013, and 2014, respectively.
(3) *p*-value corresponds to the likelihood of observing a post/pre-treatment RMSPE ratio as large as that obtained for Detroit among positive placebo effects.
(4) The pre-treatment period includes years 2000, 2005 to 2010.

alternative labor market outcomes for the groups. I estimate the program effects on four

other outcome measures: the high-skilled immigrants' (measured as immigrants with at

least a bachelor's degree) share of the local population, the ratio of the immigrant

employment to the local employment, immigrants' average wage earnings, and their self-

employment rate. These additional outcome measures are estimated on a sample of 37

regions that is equivalent to the sample used in the fourth specification in Table 3.[19]

Table 4.4 reports the estimates obtained on these outcome measures across several

post-treatment years. The estimated program effect on the high-skilled immigrant share is

negative in the first two years (-0.12 and -0.28 percentage points respectively) after the

program begins but took a positive turn in the third year and then stayed the same in the

fourth year. The program effect on the foreign-born employment exhibits a similar

pattern. The program reduced the immigrant share of the total employment by 0.08 and

0.18 percentage points in the first two post-treatment years but increased the share by

0.72 and 0.59 percentage points in the latter two years. The *p*-values described in the

previous section indicate that the chances of observing a post/pre-treatment RMSPE as

large as those obtained for Detroit, if the true effect of the program were zero, are less

than 5 percent.

To the contrary, the program effects on immigrants' average wage earnings and

self-employment rate in Detroit are muted. Although the differences in the post-treatment

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[19] The sample excludes regions that had a population smaller than 200,000 persons in 2000, have implemented large-scale immigrant integration programs during the study periods, had a large (greater than 20% of the local population in 2000) and fast-growing (more than 43% increase between 2000 and 2010) immigrant population, and are located in states sharing a border with Mexico. Regions that have received disproportionally large refugee populations remain in the sample because the program also includes refugees in its serving population and seeks to improve refugees' economic well-being.

average wage of immigrants between Detroit and its synthetic counterpart range from $1210 to $2995 depending on the length of the post-treatment period, the effects are not significant as they lie well within the distribution of placebo estimates. The post/pre-treatment RMPSE for Detroit exceeds only 5 of the 36 placebo test statistics, yielding a p-value of 0.861. Similarly, the program produces an undiscernible effect on immigrants' self-employment rate.

4.5   Conclusion

This study provides a direct test of Global Detroit's impacts on the local immigrant community in terms of the foreign-born share of the local population, the level of the high-skilled immigrant, and immigrants' labor market outcomes in the wage and self-employment sectors. It is the first paper that employs the synthetic control method to study the potential effects of an immigrant integration program, and it provides mixed evidence on these outcome measures.

In recognition of the potential benefits immigrants can bring to local communities, many local governments, especially in the Midwest, have adopted various immigrant welcoming and integration programs and initiatives in recent years. These programs have sought to not only accommodate and integrate existing immigrants into local life (Brenner, 2009; Williamson, 2014), but also leverage the immigrant resources for local economic development (McDaniel, 2014; Strauss, 2012). Global Detroit is among the first few large-scale immigrant integration programs in the country, which is also intended as an economic development effort to revitalize the region's economy by attracting immigrants, global talent, and foreign investment and trade.

The majority of the current research on local immigration policies examines why and how local governments respond positively or negatively to rapid recent immigration in their communities (Hopkins, 2010; Ramakrishnan & Wong, 2010). Little research has explored the potential impacts of local immigrant integration programs. Part of the reason is due to the small number of regions that have implemented such programs, which makes it a challenge to employ traditional inferential statistics and choose valid control groups for evaluation research. In this paper, I adopt the synthetic control method advanced by Abadie and his colleagues (2010) to examine the effect of a unique program, Global Detroit, by constructing a synthetic Detroit that closely matches the Detroit in the pre-treatment characteristics and employing an exact inferential technique that is akin to permutation inference.

The results obtained from the synthetic control estimator suggest that the effects of Global Detroit are confined to the areas of the total immigration level and the high-skilled subgroup of the immigrant population. After the launch of Global Detroit, the foreign-born share of the local population in Detroit increased by at least 0.2 percentage points more than in the synthetic comparison group in the first year and by up to 1.38 percentage points more two years later. These estimated effects stand out relative to the distribution of placebo estimates for the remainder of the regions in the donor pool. The effects on the high-skilled immigrant population took more time to realize. The program effects on other outcome measures, such as average wage earnings and self-employment, are not evident in the study. These results are not surprising given that the program is relatively new and still in expansion. Also, labor market dynamics are usually influenced by a host of factors including regional economy, local human capital endowment,

117

economic and political institutions, and other labor market policies more directly addressing issues such as minimum wage, right to work, and small business lending. In this sense, concerted efforts from local political, civic and business communities are required for expanding the program effects into areas related to labor market dynamics.

While the matching techniques of the synthetic control estimator safeguard against the bias of omitted variables and minimize the extrapolation of the relationship between outcomes and predictors beyond the convex hull of the data, estimates obtained from this method should nevertheless be interpreted with caution. Bias can still creep in when some contemporaneous government programs that affect the foreign-born population are unobserved in the data. In addition, the current study period only spans four years after the launch of the program, which may not provide enough time for many program effects to emerge. Also, the positive effects of the program observed so far may diminish over time. Therefore, future work should focus on examining the long-term effects of this program and whether the program effects currently observed can carry into the future.

CHAPTER 5. CONCLUSIONS AND FUTURE RESEARCH

The rapid increase and dispersal of the immigrant populations across U.S. metropolitan areas have attracted much attention from both the academic and policy arenas. While some local actors view immigrants as a burden on their tax and public assistance systems, more municipalities receive them with open arms (Williamson, 2017). Additionally, an increasing number of places are actively seeking and recruiting immigrants as part of a larger economic development strategy (Huang & Liu, 2017). At the same time, the increasing global integration has made urban areas not only more connected than ever, but also more vulnerable to external forces and processes. The pervasive economic downturns following the most recent Great Recession highlighted this fragile state of most urban economies and triggered a renewed interest in sustainability development. While some regions respond to the challenges of deindustrialization and economic downturn with high-tech/biomedical development strategies, others attempt to complement industrial diversification with population diversification.

Situated in these two broad contexts, this dissertation examines the role of immigrants in resilience development and performance. It adopts and explores two conceptualizations of resilience – resilience as a set of capacities and resilience as an outcome, as the literature indicates that they represent different stages of the resilience process (Foster, 2012). The first two chapters each focus on one perspective. The first analysis examines how immigration may have helped regions build resilience capacity. The second analysis examines whether the immigrant population in an area positively

influences the region's chances of achieving resilience during and after the most recent Great Recession and whether the positive relationship is channeled through increased resilience capacities. This dissertation also evaluates the impact of the latest local immigrant policies on the immigrant populations with a focus on the Global Detroit initiative, one of the earliest regional immigrant integration efforts in the country.

This study draws upon research from different disciplines that concern two substantive topics: immigration and resilience planning. Immigration studies in various fields have argued that immigrants contribute not only economically but also socially, politically, and physically to their receiving communities (e.g., Kallick, 2015; Liu et al., 2014; Peri, 2013; Schuch & Wang, 2015; Wilson & Portes, 1980; Zhou, 2004). The urban and regional planning literature, on the other hand, indicates that regions with greater economic and demographic diversity and community cohesion are more resilient to economic challenges and stresses of other forms (Foster, 2012; Hill et al., 2012; Xiao & Drucker, 2013). While the immigrant population has many of the qualities stressed in the resilience literature to be critical for resilience, no study has directly examined immigrants' role in the broader resilience development process. This study seeks to fill this gap. It examines whether immigrants contribute to the development of three critical aspects of regional resilience capacity: economic capacity, socio-demographic capacity, and community connectivity capacity. It further tests whether immigration leads to greater resilience to the Great Recession through its positive effects on these capacities.

Since detailed findings are discussed at the end of each chapter, I highlight here the major themes emerging from these studies and point to the possible directions of future research along the way.

First of all, the immigrant populations in U.S. metropolitan areas are positively associated with regional entrepreneurship level, human capital, civic infrastructure, and overall regional resilience capacity. Immigrants are highly entrepreneurial, and through their businesses activities, they contribute to the overall vitality of the business environment. When immigrants become more economically integrated, they start to form business associations and coalition groups to advocate for their rights and benefits. Also, because local governments need to work with local nonprofit organizations to serve the newcomers and improve community cohesion, places with a long tradition of receiving immigrants possess higher infrastructure adaptability. However, one may still be doubtful of immigration's effects on regional resilience, especially when considering the large scale of a regional system and the complex interaction of the socioeconomic processes and actors involved in the system. In contrast, immigration may have a more visible and profound relationship to resilience at smaller geographic levels. Ethnic networks concentrate their activities and influences within ethnic communities. The social capital that helps business owners secure customers and labor is often bounded by coethnicity and location. The intangible benefits of ethnic institutions are also disproportionally distributed along ethnic lines and in-group out-group divisions (Zhou, 2004). Besides, comparing communities with different immigration levels within the same metropolitan areas can control away unobserved but potentially important processes leading to resilience. These unobserved factors can be related to regional decision-making and political contexts that change over time, thereby not controlled by the fixed effects models used in this analysis.

Second, while the findings of the relationship between immigration and different aspects of resilience capacity shed light on the planning literature and immigration policy debate, more work is needed to explore the linkages at the household or even individual levels. Community resilience is in some sense an aggregate of individuals' ability to weather stresses (Pendall et al., 2010). Individuals' resources and social capital not only prepare them for unpredictable shocks but also collectively determine the resource level of a community and what and how many options it has in times of crisis. In light of this, researchers can focus on the relationship between individual-level resilience and community-level resilience in the context of immigration. Influxes of immigrants bring immediate impacts on native-born residents, redistributing and changing the endowments and resources within the community. Immigrants may collaborate with certain demographic groups but counteract other demographic groups in the process of community building and resilience development. This line of research thus can bring insights into the nonlinear and dynamic interactions among residents, contributing to on-the-ground community planning.

Third, several regional characteristics are left out of the analysis that could potentially undermine the validity of the findings. Factors such as policy decisions, political leadership, bureaucratic systems, and governance can affect a regions' resilience. Using fixed effects models, this study reduces bias to the extent that the unobserved characteristics are time-invariant. However, failure to examine these governance-related attributes leaves a void in understanding resilience. A potential solution is to complement the panel study with case studies of selected regions. These case studies should also take a historical perspective and analyze the adaptive resilience

process of a set of comparable but distinct regions over several decades. By documenting what efforts these regions have adopted and how local governments have activated and mobilized their institutional endowments and civic capital can help us develop a deeper understanding of the dynamics and complexity of regional resilience.

Fourth, immigration has a direct effect on resilience performance during and after the Great Recession. This effect is independent of all other capacities identified so far, suggesting that the resilience literature should broaden its scope and consider the local immigration level as a potential contributor to resilience building. It may also be the case that immigration affects regional economic performance through other mechanisms unobserved in the study. Some possible mechanisms include cross-skill complementarity, labor market diversification, ethnic capital, and immigrant networks. Future research is needed to test these explanations. Some studies have investigated the effects of skill complementarity between immigrants and native workers on the labor market outcomes (Peri, 2013) and the regional GDP level (Hu, 2014). Other studies have also probed into the benefits of cultural and occupational diversity for labor market productivity (Lester & Nguyen, 2015; Ottaviano & Peri, 2006). Incorporation of these research inquiries and their measures of skill complementarity and occupational diversity into the studies of regional resilience can thus be a viable roadmap for future research.

Finally, the Global Detroit initiative has generated positive effects for immigrants regarding their shares in the local population and the labor force. It has also increased the presence of high-skilled immigrant groups in Detroit, although this effect took a longer time to realize. On the other hand, the program effects on other outcomes such as average wage earnings and self-employment rate are unobserved in the study. The mixed results

123

are somewhat expected given the short history of the initiative and the limited power of immigrant integration in influencing the local labor market. However, policymakers and local actors need to be mindful that immigrant integration is not only about how many immigrants have been attracted to the local communities but also about whether these newcomers have achieved upward mobility in the labor market and political arena. An equally important question is whether these programs have improved the economic standing and opportunities of the existing residents. Also, since the ultimate goal of the initiative is to improve economic growth, future research is called for to keep track of the development of Global Detroit in specific and immigrant integration programs in general and examine long-term effects of these programs on the broader labor market dynamics and developmental issues. Fiscal indicators and development measures such as GDP, per capita income, housing values, and tax revenues, can be meaningful independent variables in these research projects.

In conclusion, this dissertation contributes to the immigration and urban planning literature in three ways. First, it examines regional economic outcomes not just during economically normal times but also during times of turbulence. Second, it explores different conceptualizations of economic resilience. It provides a longitudinal analysis of resilience capacities across a large number of metropolitan areas in the first essay and a snapshot of regional resilience performance during the Great Recession in the second chapter. Third, this dissertation engages policy discussions on the efficacy of the most recent local immigration policies. Gauging the effects of a specific immigrant integration effort in Detroit can provide important insights into future policymaking.

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