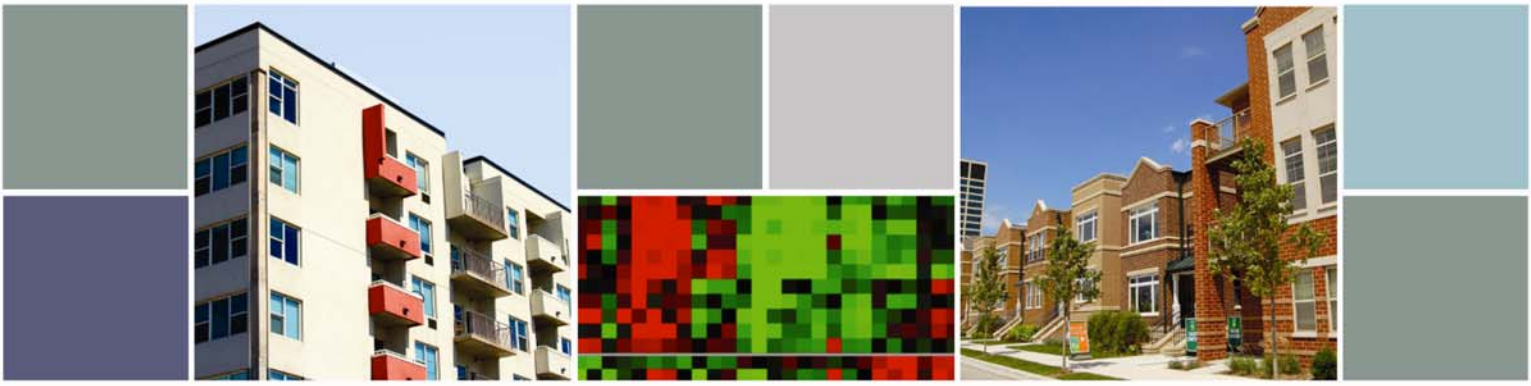

# Dynamic Neighborhoods

## New Tools for Community and Economic Development

A project of

LivingCities
THE NATIONAL COMMUNITY DEVELOPMENT INITIATIVE

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The project would not have been possible without the advice and collaboration of close to 100 partners and advisors, who provided key contributions to the work, ranging from sharing data to reviewing interim outputs, to advising on analytical issues at critical stages. These busy people and organizations unstintingly volunteered their time, insights and resources as requested at key junctures in the project. Their contributions are too numerous and valuable to be properly acknowledged here. A complete list of partners and advisors is provided in Appendix A.

The most important partners, of course, were the leadership in the four participating cities, who provided data, advice, logistical support, and valuable feedback throughout the project.

Finally, as the project neared completion, we had the opportunity to present the findings and tools to numerous groups of community, civic, government and business leaders, and to begin applying the tools to particular neighborhoods or issues in the field. In addition to benefiting from this key feedback and testing on the front lines, we are very grateful to those who are already picking up, enhancing and expanding upon the work.

# I. INTRODUCTION

The Dynamic Neighborhood Taxonomy project (DNT) was launched by Living Cities three years ago as an ambitious, large scale effort to begin developing a new generation of tools for the community development field. The project was designed to improve our understanding of how neighborhoods operate, and lay the foundations for conducting more routine and accurate analyses of the challenges and opportunities for development in particular places. This increased capacity in the field would then help businesses, investors, funders, governments and community development practitioners much better tailor and target their investments and interventions in neighborhoods.

The work was carried out in four cities (Chicago, Cleveland, Dallas and Seattle) in partnership with numerous local and national organizations (ranging from think tanks like the Brookings Institution, to private companies like TransUnion, to local governments), and benefited from the guidance of close to one hundred advisors – researchers, practitioners and civic leaders including many of the top community and economic development experts across the country.

The analysis was based on data between 1990 and 2005. Since then, cities and neighborhoods have experienced dramatic changes, most notably due to the foreclosure crisis and collapse of the housing market. Despite the significant impact of these phenomena on urban neighborhoods, we believe that the fundamental findings presented in this report hold true. The analysis of the drivers of neighborhood change uncovered mechanisms (such as the flows of people and investment) that have always been at the heart of neighborhood change, as well as longer term shifts (such as the return to central cities and the importance of density) that might have slowed down in recent times but have not been reversed.

One of the implications of this work that particularly holds true, and in fact has been reinforced by current events, is the need for specialized analytics and tools to target interventions in particular neighborhoods. In fact, as this report is being finalized, the tools developed by the project are already being applied to mitigate the effects of the foreclosure crisis and guide neighborhood stabilization interventions.

## Reader's Road Map: How to Use this Report

In giving a complete account of the project's many outputs, this report quickly became a very long document. In order to make it more accessible to the reader, the key findings and their implications for community and economic development practice are highlighted in text boxes at the beginning and end of each section. These findings are then backed up and explained in greater detail in the body of the report, while the more technical documentation and methodological notes are reported in the appendices (which are available as a separate document).

Moreover, most chapters can be accessed as stand alone documents, and the Outline at the beginning of the document provides a quick snapshot of the structure of the report and the contents of each chapter. In more detail:

- **Chapters I-III** explain **why the DNT project was conceived and how it was structured.** The reader mostly interested in the findings can skip this part and refer back to it only if particular questions on the project's background and structure arise.

- **Chapters IV, V and VI** present the **core findings from the analysis** of the patterns and drivers of neighborhood change. The key findings and implications are highlighted at the beginning and end of each section, and additional detail on the data and methodology are reported in Appendices B through H.

- **Chapter VII** presents the **DNT Neighborhood Typology**, including its structure and uses, detailed description of each neighborhood type, and implications.

- For a general overview of the key learnings of the project and their implications for development practice, including a **new framework for thinking about neighborhood change and development interventions,** the reader can refer to **Chapter VIII.** This chapter in particular is self-contained, and could be used as a high level summary of the contributions of this project to our understanding of neighborhood dynamics.

- **Chapter IX** describes **the portfolio of tools that the project has developed.** For each tool, this chapter provides a summary explanation of how it works, what it can be used for, and an example of its application.

- Finally, **Chapter X** reviews some of the **possible applications, going forward, of the data, models and tools** that the project has developed.

# II. PROJECT BACKGROUND

## A. Context and Opportunity

A convergence of interests in urban communities from business, civic and government organizations presents unique opportunities for the field of community economic development: organizations in the field (including foundations, local government agencies and community-based organizations) are becoming more sophisticated and business-like in their approaches, and are increasingly concerned about investing strategically and assessing the impact of their interventions; similarly, as businesses begin to realize the untapped economic potential of underserved urban areas, there is an increased demand for specialized analytics and products that are tailored to the unique characteristics of urban markets.

At the same time, this heightened interest in urban communities highlights a serious knowledge gap: the need to understand neighborhoods to guide investment, target programs and inform policy is greater than ever; yet remarkably little is known about the differences between varied types of urban neighborhoods and the dynamics that affect their evolution. In fact, historically, organizations in the field have tended to follow a "one size fits all" approach, pursuing whatever intervention was popular at the moment, often with little consideration of the unique challenges and opportunities presented by particular places. Conversely, if an organization wanted to develop more tailored approaches and interventions, it often lacked the tools and knowledge base necessary to routinely, effectively ands efficiently assess the challenges and opportunities for economic development presented by a particular place.

This is a considerable challenge, as neighborhoods are varied and complex entities. Not only are there different types of neighborhoods, characterized by different combinations of people, businesses, and real estate (differentiating, for instance, bedroom communities from "bohemian" areas from commercial districts) – these types also evolve over time along different paths. Thus, a "starter home" community might gradually grow and become stable, or might sink into abandonment, or gentrify into a different kind of neighborhood, playing a different role in the economy. Finally, evolution patterns can vary widely: change can occur gradually, as a continuous process, or it can happen more drastically once a critical mass (of people and businesses moving out, of investments flowing in, etc.) is reached.[1]

In order to fill this knowledge gap, we need to better understand how varied types of neighborhoods differ across multiple dimensions, how they evolve over time, what factors affect their evolution, and what development opportunities this creates for different constituencies. As importantly, we need to convert this knowledge into actionable tools that practitioners and investors can use in their decision-making process.

Until a few years ago, developing this level of detailed knowledge and tools on neighborhoods would have been unthinkable, due primarily to a lack of reliable data (the "raw material" for these kinds of analytics) for small geographies. Fortunately, several national initiatives over the past few years have focused on increasing the availability of the information necessary for understanding urban neighborhoods (including, for instance, the Urban Markets Initiative, the National Neighborhood Indicators Partnership and Dataplace). New methodologies and advances in the field of spatial analysis have also generated a new capacity to investigate complex phenomena such as neighborhood dynamics. This creates the opportunity for, and makes timely, new, large scale analytic efforts to understand how communities change over time and, more importantly, what factors drive the changes in different types of neighborhoods.

## B. Project Goals and Structure

In this context, the Dynamic Neighborhood Taxonomy project was conceived as a basic "R&D" effort that would lay the foundations for answering some of these questions. The long-term goal is to build over time a capacity to easily identify neighborhoods that offer particular opportunities or vulnerabilities, and what activities might make the most difference, based on neighborhood type, stage of evolution and key drivers of change. Community based organizations would then be able to better select interventions likely to address key issues and drivers in any given neighborhood. Businesses could use these tools to better identify opportunities in urban markets, and tailor investments to each market. Urban leaders and policymakers would be able to address community needs in more targeted ways, by selecting the policy interventions that are more appropriate for each neighborhood type, stage and drivers. These are clearly very ambitious goals, and cannot be achieved in the course of one project. Building upon work already done in the field, the DNT project thus set out to develop new research and an initial set of "prototype" tools that could then be applied, tested and refined by practitioners and others in the field.[2]

The work was informed by a view of neighborhoods as complex and dynamic entities that operate within larger systems. Neighborhoods are complex because they are composed of many different elements (people, businesses and institutions, infrastructure, housing stock) interacting with each other across several dimensions. Neighborhoods are dynamic because they are in constant motion: even stable neighborhoods are constantly renewing their population, business base and housing stock. These dynamics then are determined by the operation of social, political and economic systems (such as housing and labor markets, social networks, and local governance) that go well beyond the neighborhood. The region in particular is a key unit of reference because that is the scale at which many of the systems affecting neighborhoods operate: neighborhood residents are employed in a regional labor market, neighborhood housing is valued in the context of a regional real estate market, and so forth.

Neighborhoods are also diverse: there are different types of neighborhoods characterized by their mix of people, businesses, real estate and physical environment. Different types of neighborhoods are likely to perform different functions for their residents and play different roles with respect to the regional economy.

In order to capture the complexity of neighborhoods and tackle the empirical analysis of neighborhood types, trends and drivers, the Dynamic Neighborhood Taxonomy project was structured in four components: identify relevant dimensions of neighborhood health and gather data to measure them; examine patterns of evolution in neighborhoods; build models to identify drivers of neighborhood change; and construct a typology of neighborhoods grouping together neighborhoods that are similar with respect to key characteristics.

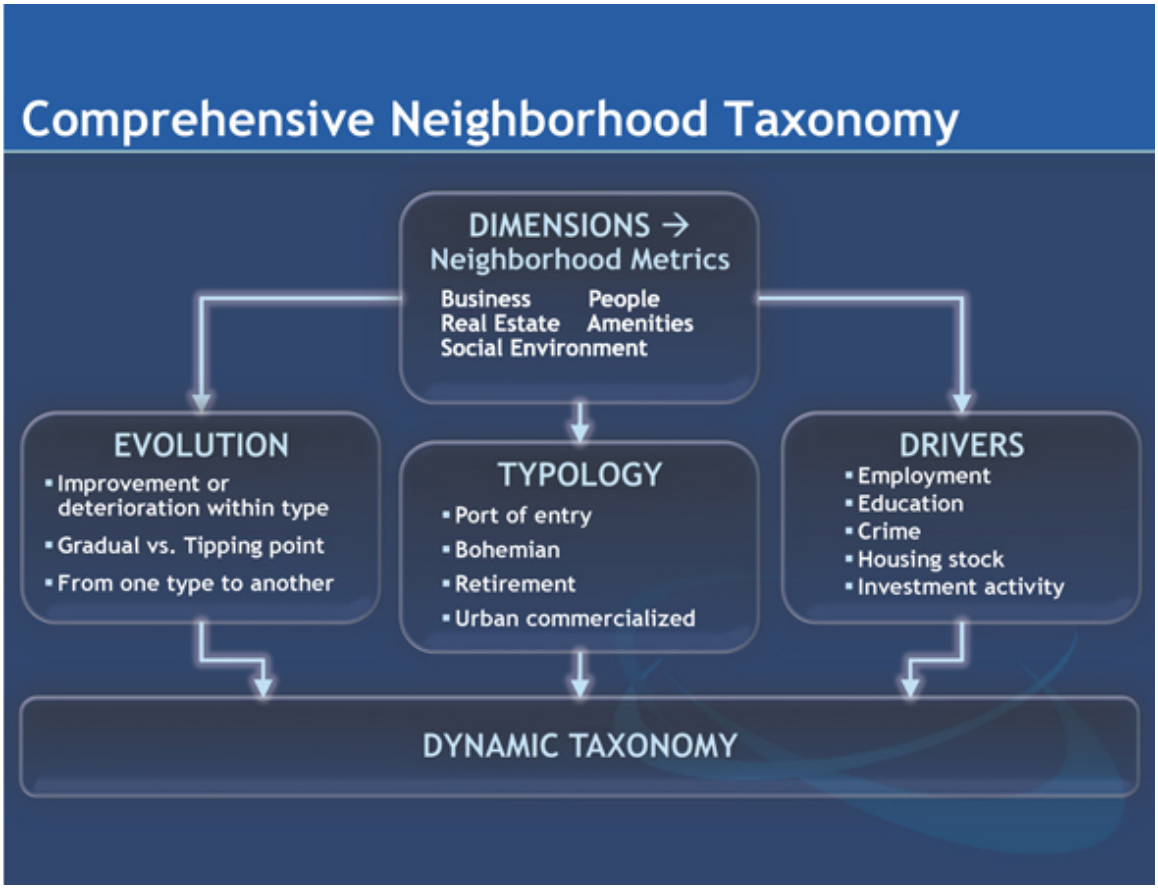
1. *Identify and Track Relevant Dimensions of Neighborhood Health.* Based on the view of neighborhoods summarized above and on a review of the literature on neighborhood dynamics,[3] the project first compiled an extensive list of factors bearing on various aspects of neighborhood health. The team then set out to identify possible data sources for those factors that were both more likely to be relevant and more easily measurable. While the net was cast broadly to make sure that no key factors were omitted from the exploration, the project identified a set of "priority indicators" (primarily around housing markets, business activity and demographics) on which to focus the data collection effort.[4] The data sources and metrics that were eventually used by the project are described in Chapter III.

2. *Descriptive Analysis of Neighborhood Evolution.* The second component was designed to set the backdrop for the analysis by answering some basic questions about neighborhood change: what were the overall patterns of change in the neighborhoods examined by the project, how much and how fast do neighborhoods change, and so forth. The results of this analysis are presented in Chapter IV of this report.

3. *Explanatory Analysis of the Drivers of Neighborhood Change.* The third component of the project specified a set of econometric models aimed at identifying the key drivers of neighborhood change. Using the variables identified in the first phase of the work, and examining their effect on the metrics constructed to track neighborhood evolution, these models sought to identify the factors and mechanisms that led to neighborhood improvement or decline. This analysis was conducted across all neighborhoods at first, and then for narrower subsets of neighborhoods of particular interest to the community and economic development field. The results of this work are presented in Chapters V and VI.

4. *Neighborhood Typology.* The final component constructed a typology of neighborhoods

by grouping together (using cluster analysis) neighborhoods that are similar along key dimensions, including the factors that proved most important in the first phases of the analysis. The typology, which is one of the main tools developed by the project and is illustrated in Chapter VII, was designed to enable identifying comparable neighborhoods, facilitate peer analysis, and help anticipate and manage neighborhood change.




These four components are not just separate stages of the work, but they inform each other: the models that identify the drivers of neighborhood change allowed us to pick the most relevant characteristics on which to base the typology; similarly, the typology helps us refine the description of neighborhood evolution, by accounting for the ways in which different types of neighborhood evolve over time. The combination of this work gives rise to a new understanding of neighborhood dynamics with important implications for community and economic development, summarized in Chapter VIII.

The research components of the project also led to tool development: in conducting the research, the project constructed new specialized metrics and methodologies which generated a capacity for granular analysis of small geographies that is in many ways unprecedented, and generated valuable tools for economic development practice. These new tools are presented in Chapter IX.

## C. DNT Process

Given the scope of the data collection effort, the project could only be conducted in a limited number of cities. The selection of the sample cities was based on three criteria:

- *Availability of rich neighborhood data,* which would be necessary to carry out the detailed analysis envisioned by the project;
- *Diversity of neighborhoods and regions,* to make it more likely that the sample selected would be broadly representative and that the results would be applicable beyond the cities selected for the project; and
- *Living Cities presence,* to facilitate initial contacts with local organizations and to ensure that the results would be immediately applicable to the work that Living Cities is conducting.[5]

After reviewing several potential candidates, the project selected four sample cities that satisfy these three criteria: Chicago, Cleveland, Dallas and Seattle.[6] It then proceeded to contact key organizations in each city (including city government, local foundations and community organizations, and local data centers) to ask for their participation and collaboration. Early in the project, site visits were conducted to each of the cities, in which the project team had the opportunity to tour the neighborhoods, present the project's goals and structure to local stakeholders, and gather feedback on the proposed work.

From its onset, the work was structured as an open and inclusive effort, and the project sought to establish a national network of partner organizations and individuals that would share data, provide feedback as the variables, models and preliminary results are developed, and help test, apply and refine the project outputs. In the process, the project secured the collaboration of over 20 institutional partners and close to 100 formal and informal advisors (including some of the top community and economic development experts around the country), which made important contributions at various stages of the process.[7]

While this process required a great deal of effort in the early stages of the project, it also ensured several elements that were critical to its success. The most immediate and "tangible" benefit is that these collaborations granted the project access to important data for the analysis. At least as importantly, they also ensured that the project incorporated as much of the field's collective knowledge base as possible, benefiting both from the academic rigor of researchers and from the experiential learning of practitioners. At the back end, this network of individuals and organizations provided a vehicle for the testing and dissemination of the project's results. Moreover, structuring the project's work and outputs as "open source" has the added benefit that it allows other individuals and organizations to pick up pieces of the work and carry it forward. The project team continues to work with various

participating cities and organizations to apply and improve the work in specific places or to particular subjects.[8]

## *Endnotes for Chapter II*

1 What makes this even more challenging is the fact that neighborhoods are constantly changing. As the continued evolution of the economy and society affects the way people live their lives and relate to space, neighborhoods are defined by different factors and come to serve different functions for the people who live in them and for society as a whole.

2 Rather than being a one time output, the DNT should be understood as a continually improving platform for understanding neighborhoods. While clearly imperfect and incomplete in its first iteration, it creates new potential for continually expanding and refining the knowledge base of the field.

3 A lot of work has been done in the field to analyze neighborhood trends and drivers of change. The project undertook an extensive review of the literature in order to build on this set of work and incorporate its findings. While including a dedicated literature review chapter would have unnecessarily added to an already lengthy report, key references are cited throughout the report, and the literature review work conducted by the project team informed every aspect of the project.

4 As anticipated, the data collection proved to be challenging on several fronts. The main challenge was finding historical data that would cover the entire study period (from 1990 to present) with sufficient frequency and consistency to enable us to measure trends over time. The project uncovered a wealth of data available going back just a few years, but very few reliable datasets going back to 1990. This is partly due to the fact that few organizations were using electronic archives and databases in the early nineties, and partly because in most cases the focus is on generating up-to-date data, rather than compiling historical information (this is particularly the case for most private data vendors, who sell their data not to researchers but to businesses who need the most current information to make market decisions). These challenges were compounded by the necessity of finding data at a small level of geography (ideally parcel or census tract) which generates confidentiality issues that further restrict access to many existing datasets.

5 An additional, albeit secondary, criterion was that the sample cities did not experience unique or unusual events over the study period that could skew the results of the analysis. For instance, Atlanta, which would have been an excellent candidate based on the first three criteria, was not selected because of the Olympics, which took place there in 1994 and caused significant change in its neighborhoods.

6 The project team is particularly grateful to Tom Kingsley of the Urban Institute for his guidance in the early stages of the selection process and for providing introduction to several institutions in each of the four cities, which became important partners in the project.

7 These individuals and organizations are listed in Appendix A.

8 Indeed, nearly all of the pieces of this Report have previously been disseminated. While important to aggregate and detail the work, the Report itself is not considered the main output of the project, but instead one more step in an on-going, collaborative research, product development and field building effort to which the DNT project contributes, but which we hope extends well beyond this particular project.

# III. MEASURING NEIGHBORHOOD DYNAMICS

## A. Housing Markets as Barometers of Neighborhood Change

### Highlights

- How well a neighborhood is doing can be conceived as the sum of the amenities it offers, and is reflected in whether people want to live there. If we can measure changes in the demand for a neighborhood, we can develop an overall measure of neighborhood change.
- Changes in demand for the neighborhood are reflected in housing prices and quantity. The price of a house is determined by the amenities (broadly defined) that the neighborhood has to offer and the qualities of the particular house, as well as by the supply of housing in that neighborhood and in neighborhoods like it.
- If the project could construct a measure of change in price of the same quality housing, used in models that also examine changes in supply, it could effectively measure changes in demand for the neighborhood.

In order to begin analyzing neighborhood dynamics, the project first had to identify a set of metrics that can adequately reflect how neighborhoods are doing, and thus enable the project to measure neighborhood change.

Ideally, these metrics would be derived from the evaluation of the people who know and experience the neighborhood every day. In economic terms, this evaluation is reflected in the demand for neighborhood housing: as a neighborhood improves, we would expect more people to want to live there and demand for housing in the neighborhood to increase. Conversely, neighborhoods that are deteriorating should experience a decrease in the demand for housing.

While we would like to measure the demand for housing in a given neighborhood, demand cannot be observed directly. However, demand is reflected in the price of local housing, which we can observe and measure. Yet the price is also influenced by the qualities of the individual house, as well as by the supply of housing in the area. For these purposes, we are interested in isolating the increase in price that is due to an increase in demand for the neighborhood from (1) the increase in price that is due to changes in the quality of the housing stock; and (2) the change in price that reflects how much supply is available. In order to achieve the first objective, the project developed an innovative methodology to estimate quality-adjusted appreciation at the census tract level, as explained in more detail

below. The project addressed the second issue through including supply in its modeling.

In order to get at drivers of neighborhood change, the project thus attempted to identify drivers of change in housing values and in the quantity of the housing stock. To do so, we first specify a more theoretical economic model of the determinants of change in housing price and quantity, which will be used as the basis to develop specific hypotheses regarding the nature and drivers of neighborhood change that can be tested empirically.[1]

In economic terms, the value of a housing unit (or rent) at any point in time is determined by three components: the rent of the land on which the house is built; the rent of the housing structure; and the value of the "amenities" associated with it. Amenities are defined here very broadly to encompass all of the characteristics of the neighborhood in which the house is located that affect its desirability (more on this below). The price of a housing unit at a given point in time reflects the present discounted value of the stream of rents that the buyer expects to get from the unit over time. This depends on the three factors mentioned above plus the expected future growth rate of amenities (the buyer's expectations on how the neighborhood will change over time).

Given that the cost of the structure does not change once the house has been built, price changes over time as a function of changes in the cost of land, changes in the value of amenities, and of the elasticity of supply. The elasticity of supply in turn depends on the neighborhood's potential for development (a combination of density and zoning restrictions) and on the cost of substitutes (housing options that present similar characteristics and bundles of amenities) in other parts of the region. Once we control for the elasticity of supply, what is left as a determinant of price change is changes in the cost of land and the value of the amenities. If we exclude the "intrinsic" value of the land (related to its agricultural or mining uses), which does not change over time, changes in the cost of land depend entirely on its location, i.e. on the amenities associated with it.

Therefore, as it pertains to the demand for neighborhood housing (i.e. controlling for the elasticity of supply), price change is driven by amenities (see figure 2 below). Price changes as a function of amenities in three instances: when the quantity of amenities changes (for example, a new park is created in the neighborhood); when the unit value of amenities changes (for example, people start valuing parks more than they used to); and when the expected growth rate of amenities changes (i.e. there is a change in people's perception of where their neighborhood is headed). Of these three, the empirical models will focus on the change in the quantity of amenities, as this is of particular interest to development practitioners, and much more readily measurable.

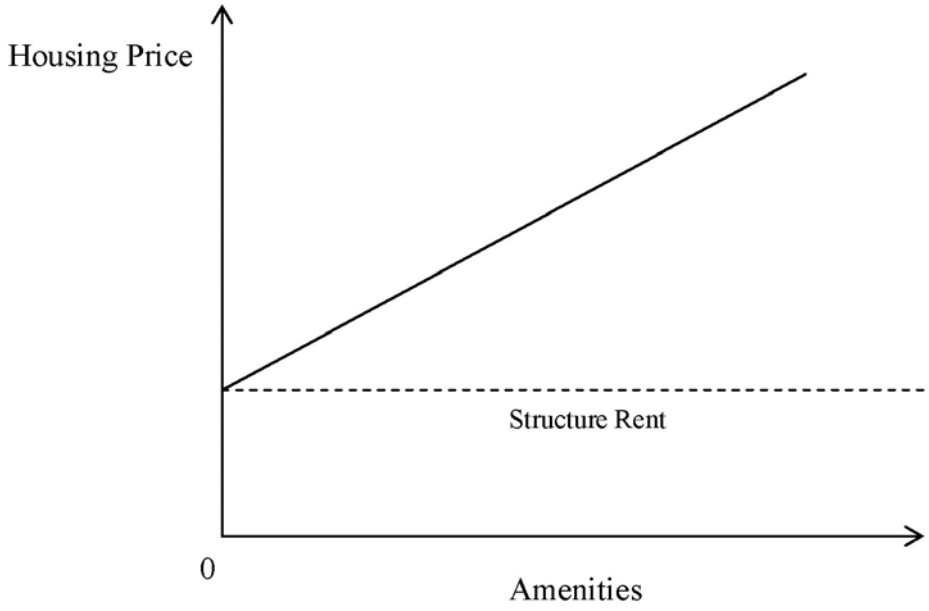



*Figure 2.*

In the simple version of the model, then (summarized in Figure 3), change in amenities affect demand, which determines a short run change in price. In the long run, change in price interacts with supply elasticity to determine the price and quantity of housing units bought and sold in a given neighborhood. Given an increase in amenities, then, we expect to see an increase in both sales price and the quantity of new housing units. Which one will increase more relative to the other will depend on the elasticity of supply.

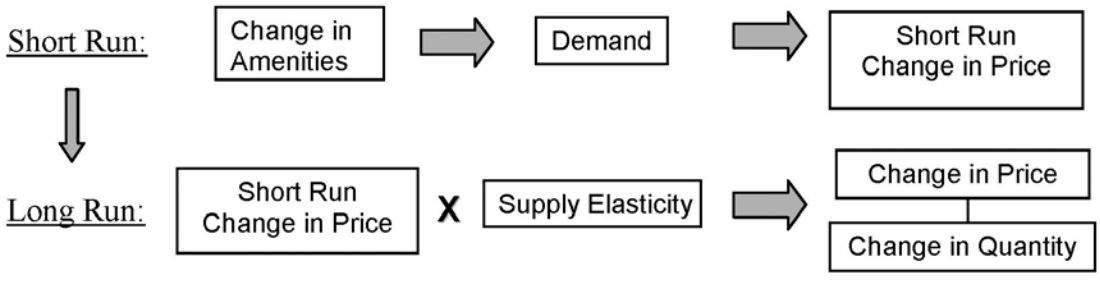



*Figure 3.*

This simple version is complicated by several factors: different amenities interact with and affect each other; as new housing units are built to accommodate increases in demand, this affects the elasticity of supply; finally, as new and different people move into the neighborhood, the amenities that the neighborhood offers change, determining a change in demand.[2] While it is important to acknowledge these issues theoretically, the empirical models (discussed in more detail in Chapter V) will not attempt to tackle them at this stage.

It should also be noted that the approach to the analysis of neighborhood evolution chosen by the project will necessarily focus on some aspects of neighborhood performance and not others. In particular, the focus on the desirability of the neighborhood as reflected in demand to live there means that the project will primarily measure improvement and deterioration in the neighborhood in terms of what residents and potential homeowners can perceive. This approach may thus tend to focus more on tangible characteristics of the neighborhood as a place, rather than on the well being of residents more broadly. While the well being of neighborhood residents could be conceived as an "amenity" affecting the desirability of a neighborhood, it is not as directly or immediately perceived and then reflected in demand to live there.[3] Also, the focus on appreciation as a measure of how a neighborhood is doing will not directly address the issue of affordability, and the social consequences of increases in housing values. These are of course important issues that are clearly relevant to community and economic development practice. To the extent possible, the project sought to address these questions by constructing more targeted analysis, along the lines of the "improvement in place" models presented in Section VI.B.

## B. Modeling Neighborhood Change: Theory and Hypotheses

### Highlights

- Neighborhood amenities are all of the neighborhood-specific factors that determine its desirability

- For the purposes of this project, neighborhood amenities are classified in five broad categories:
  - *Physical amenities,* related to the overall appearance of the neighborhood as well as to physical features such as the presence of waterfront;
  - *Transportation amenities,* related to the location of the neighborhood relative to regional centers of attraction (such as shopping or employment centers);
  - *Consumption amenities,* related to the range of consumption options (retail and services, museums, dining, etc.) available to neighborhood residents;
  - *Public Services and Interventions,* related to services such as schools, police and fire, but also interventions such as TIF districts and public housing;
  - *Social Interactions,* related to the human component of neighborhoods, including demographic and socioeconomic characteristics of neighborhood residents, social capital, and safety.

- The Drivers component of the project tested the effect of each of these categories of amenities on the key measures of neighborhood performance

In order to move from this theoretical discussion to the empirical analysis of neighborhood dynamics, we need to better specify what we mean by amenities, and develop a set of hypotheses on how they might drive change in housing prices and quantity. Since the goal is to explain the variation in outcomes across neighborhoods, we are interested here in factors that would have differential impacts on different neighborhoods. Factors that have uniform impact across neighborhoods (e.g. changes in interest rates affecting housing prices, or city-wide reform of the public school system) are not included.

Neighborhood amenities are classified here in five broad categories: Physical, Transportation, Consumption, Public Services, and Social Interactions.[4] A description of each category is provided below, along with a set of hypotheses on its expected effect on housing values. A more detailed discussion of the specific factors within these categories will then be provided in Chapter V, in the context of the presentation of the project's findings.

**Physical:** This category has to do with the physical environment of the neighborhood, including the presence of desirable features such as waterfront, parks, historic architecture/ landmarks, etc, as well as general neighborhood appearance. Many of these features do not change much over time, and thus are not likely to have a direct effect on change in housing price and quantity. However, they might interact with other factors to accelerate or slow down neighborhood change.[5] What does change over time is the general appearance of the neighborhood, including the presence of vacant or rundown buildings, vacant land, and so forth. Signs of neighborhood decline are likely to negatively impact change in housing prices, both because they make the neighborhood less desirable at the present time and because they could be interpreted as a signal of negative future trends (impacting the expected growth rate of amenities).[6]

**Transportation:** These amenities have to do with the location of the neighborhood relative to regional centers of attraction (such as shopping or employment centers), and with the transportation infrastructure that connects the neighborhood to the rest of the region. The location of the neighborhood clearly does not change, but new regional centers emerge over time and new transit connections are created, affecting the relative attractiveness of different neighborhoods. Neighborhoods that are closer or better connected to these regional centers are likely to experience positive change in housing prices.

**Consumption:** This category refers to the range of consumption options that are available to neighborhood residents. These include the availability of shopping, museums, dining, recreational facilities, and so forth. As the number and variety of consumption options available to neighborhood residents increases, housing prices are expected to increase as well.[7]

**Public Services and Interventions:** These amenities include public services such as schools, police and fire, as well as other government interventions. The quality of schools in particular is expected to have a significant impact on change in housing prices. The presence of government services such as police and fire stations could also have a positive effect on housing prices, both by increasing neighborhood safety (see below) and by affecting people's perceptions and expectations. With respect to government interventions, development interventions that aim at increasing the level of amenities in an area are expected to have a positive impact on housing prices, while interventions that cause negative externalities in the surrounding community (such as high concentration of public housing) might have a negative impact.

**Social Interactions:** This category is about the "human" component of neighborhoods, i.e. the characteristics of the people who live there and their interactions with each other. This is a broad category, which includes three main factors: demographics, safety, and social capital.

- *Demographics:* this factor refers to basic demographic and socioeconomic characteristics of neighborhood residents, such as race, education, employment and income. The characteristics of the people who live in a neighborhood affect the quality of life the neighborhood can offer, the benefits flowing from neighborhood relationships and networks, and can create risks or opportunities for its residents. Therefore, the people who live in a neighborhood can be considered as a neighborhood amenity, and change in the demographic characteristics of a neighborhood might result in change in housing values. In particular:
  - The economic status of residents is likely to be particularly important, since changes in income levels are likely correlated with changes in many other neighborhood amenities, and particularly with the availability of consumption amenities in the neighborhood.
  - The "consistency" of the neighborhood with respect to demographic composition (i.e. the fact that the demographic characteristics of the neighborhood remain constant over time regardless of turnover) might be considered a positive factor in and of itself, as it might be reassuring to investors and prospective residents.
- *Safety:* safety is a basic component of quality of life, and crime is likely to have a significant negative effect on housing values. Crime also increases the cost of doing business in a neighborhood, and has an impact on consumption amenities.
- *Social Capital:* The social networks and relationships component of a neighborhood might have an impact on neighborhood change. There are two main reasons for this:
  - Neighborhoods that are characterized by a more closely knit community might be more attractive places to live, as it is easier for people to establish relationships and mutual support networks. However, it is more difficult to assess this neighborhood quality from the outside, so its effect on demand might not be as significant.

- It is possible that neighborhoods characterized by higher levels of social capital are more stable, as people are more likely (and better equipped) to organize and react to change.

Neighborhood institutions such as churches, community organizations, but also hospitals and universities, were also included as neighborhood amenities, as they could play several roles with respect to neighborhood change. These roles include providing "consumption amenities" in the form of services to the residents, contributing to "social interactions" by boosting social capital, stabilizing the neighborhood by investing in its real estate, and so forth. The project focused in particular on neighborhood institutions in two respects:

- The social capital component of a neighborhood is closely related to the presence of neighborhood institutions such as churches, associations, and community based organizations, which facilitate the formation of social networks and the emergence of a sense of community.[8]
- "Anchor" institutions such as hospital and universities, which are not mobile and thus tend to invest more heavily in the surrounding community, might also have a stabilizing effect on the neighborhoods in which they are located.

For each of these categories of amenities, the project identified a set of more specific factors or potential drivers of neighborhood change, and then a set of variables that could be used to measure them. For instance, one of the factors under "Public Services" is the quality of neighborhood schools, and the variables associated with it are average test scores and student-teacher ratios. Or under "Social Interactions" one of the factors is safety, and the variables used to measure this factor include the number and rates of property and violent crimes. The next section will review the metrics constructed by the project to measure these factors, as well as the key measures of neighborhood performance related to change in housing price and quantity.

## C. Key Metrics and Data Sources

### Highlights

- The project developed an innovative repeat sales index that provides the single best indicator of neighborhood performance, as well as several other metrics designed to measure changes in the price, quality and quantity of a neighborhood's housing
- The project assembled an extensive database covering many key factors under each of the five broad categories of neighborhood amenities
- The database, which includes over 2,500 variables, spanning 15 years, for over 2,000 census tracts across four cities, is a valuable resource for the field

Two key sets of metrics were used by the project for the analysis of neighborhood dynamics: real estate metrics related to changes in the price, quantity and quality of the neighborhood's housing stock; and indicators of neighborhood amenities used to measure potential drivers of neighborhood change. The first set was used for the neighborhood evolution analysis and as dependent variables in the models designed to identify the drivers of neighborhood change. The second set of metrics was used primarily as independent variables in the drivers models and to construct the typology of neighborhoods developed by the project. Both sets of metrics, along with their related data sources, are described below, and additional details on the methodology used to develop the real estate metrics in particular can be found in Appendices D and E.

### *1 Real Estate Metrics*

In order to compile the real estate metrics that would be used for the Evolution and Drivers analysis, the project acquired historical, parcel-level data on every real estate transaction and every property in the four sample cities and their counties. The data for each county included two basic sets: data on real estate transactions (containing information on the properties that sold over the study period, including sale date and amount) and land use data (containing information on every property in the county, including its use). Both sets were derived primarily from public records maintained by county assessors and recorders of deeds.[9] Since the data was acquired from different sources in each city, it covers slightly different time periods and contains different information for different places.

To address this issue, the project generated a set of standard procedures to clean the data and make it comparable across cities. These procedures included appending spatial information to individual properties, calculating distances from every property to every census tract, tracking the sales history of the same property over time, identifying and excluding non-market transactions, and developing a universal land use code to compare parcels across cities.[10] The final real estate transactions datasets contain millions of records over at least twenty years across the four counties. The land use data is more limited in scope, but is nonetheless available back to 1990 in Cleveland and Dallas, 1993 in Chicago and 1997 in Seattle.

The extensive real estate data collected by the project was then used to develop a set of metrics to measure the various aspects of change in neighborhood housing markets. In particular, the project constructed several indices measuring appreciation rates, changes in the quality of the housing stock, and changes in the quantity of housing units at the census tract, city and regional (county) level. The metrics used to measure change in price and quantity are described in more detailed below.[11]

*a. Changes in Price*

Price growth in a neighborhood reflects changes in demand and supply of neighborhood housing. However, as illustrated in Figure 2 above, there are two components of the neighborhood housing stock that affect its price: the quality of the housing, and the quality of the amenities associated with its location. When we talk about changes in price as an indicator of change in demand for the neighborhood we are mostly interested in the latter.

In order to separate the appreciation due to changes in the housing stock (e.g. prices going up because bigger houses are being sold) from the appreciation due to a change in demand for the neighborhood, the project developed an innovative repeat sales index. Repeat sales indices are a good way to control for changes in housing stock because they only measure appreciation from the sales of the same property over time, but are difficult to use for small geographies due to sample size issues.[12] The index developed by the project used a cutting edge methodology to obtain reliable estimates at the census tract level while mirroring closely the reality of the housing market.[13] One of the most important features of the index is that the value for each census tract is calculated by taking into account real estate transactions inside the tract as well as in the neighboring tracts, and assigning them a declining weight based on their distance from the tract centroid. This reflects the fact that census tract boundaries are not relevant to housing market dynamics, but at the same time properties further away from the tract should have a smaller impact on its housing values than properties closer by.

The project also constructed and analyzed several other measures of change in housing values. A brief description of all of the variables constructed for this dimension follows.

- *Quality-adjusted appreciation:* This is the metric described above: total appreciation, in percentage terms, of a spatially-smoothed and temporally smoothed repeat sales price index (RSI). The index was estimated monthly as well as yearly, and total appreciation can be calculated between any two months in the time interval covered by the data.[14] As mentioned above, this metric estimates appreciation that is purely due to changes in the equilibrium prices for the neighborhood, as it controls (to the extent possible) for changes in price that are due to changes in the quality of the neighborhood housing stock.[15]
- *Median sales prices:* Median sales prices for all the homes sold over a given period.
- Raw change in median prices: The difference in the median sales price from one year to any other year in the sample.
- *Median sales price index:* Total appreciation, in percentage terms, of a spatially and temporally smoothed index based on all sales prices. This measure is entirely comparable to the repeat sales index, except for the fact that it is not quality-adjusted.

- *Temporal volatility of repeat sales price index:* As discussed below, price is also affected by the risk associated with the investment of buying a house. In order to get at this dimension, the project developed a measure of volatility, which is based on the standard deviation of the appreciation rates derived from the repeat sales price index (monthly frequency) from 1990 to the final year of the sample.

*b. Changes in Quantity*

In addition to change in price and change in quality, neighborhood change can also be reflected in increased quantity of houses, as new units are added in response to increasing demand. For instance, increased demand for a neighborhood can lead to the redevelopment of vacant land, or to the conversion of former industrial structures into residential properties, as in the case of the West Loop or the Clybourn corridor in Chicago.

The variables used to measure this dimension of neighborhood change are reported below.

- *Change in the number of housing units:* Using Census data, this metric is calculated as the percentage change in the total number of housing units in a tract between 1990 and 2000.
- *Change in the number of residential properties:* In order to get an annual measure of change in housing quantity, in addition to the decennial measure provided by the Census, the project used county land use data to calculate the change in the number of residential properties[16] from one year to the next. This metric is calculated from the first year for which the data is available to the final year in the sample, and provides an approximate indicator of the amount of new development in the neighborhood.
- *Change in the residential fraction of total land parcels:* Using city land use data, the percentage change in the fraction (Number of Parcels Zoned Residential / Total Number of Parcels) between the first year for which data is available to the last year in the sample is calculated. This represents the change in the portion of a neighborhood that is residential, versus other uses such as commercial or industrial.
- *The residential fraction of total land parcels in the final year of the sample:* Using city land use data, the fraction *(Number of Parcels Zoned Residential / Total Number of Parcels)* is calculated for the final year of the sample.

### *2 Indicators of Neighborhood Amenities*

To develop measures of the myriad neighborhood amenities, the project relied on several national datasets that could be secured for all four cities, and then integrated them with local data whenever possible.[17] These datasets were used to measure as many neighborhood amenities as possible, based on the classification reported in Section III.B.

- *Census:* data from the decennial census for the years 1990 and 2000 was used primarily for demographic (including race, unemployment, income and income diversity, age, turnover, etc.) and housing (age of housing stock, type of housing, homeownership rates, etc.) indicators. This dataset provided the core metrics for many of the physical and social interactions amenities.
- *Home Mortgage Disclosure Act (HMDA):* HMDA data was used primarily to track the characteristics of the people moving into the neighborhood, by compiling tract-level measures of the race, income and loan approval rate of borrowers that purchased owner-occupied homes. The dataset, which spans the years 1994-2004, was also used to measure the percentage of FHA loans and the volume of sub-prime lending in the neighborhood.
- *Dun and Bradstreet:* This was the primary source of data on the neighborhood's consumption amenities. The project acquired historical point-level data on retail and service establishments for selected years between 1990 and 2006, focusing in particular on establishments that operate at the neighborhood level.[18] In addition to retail and services, this dataset was also used to measure the presence of anchor institutions (major hospitals and universities) and of selected associations (including civic and social associations, churches and membership organizations) that were used as a proxy for social capital.
- *Zip Code Business Patterns:* This dataset was used primarily to identify regional employment centers, i.e. the zip codes with the greatest concentration of jobs in the region. Distances were then calculated from each tract to the centroid of these zip codes to measure the proximity of the neighborhood to jobs.
- *TransUnion's Trend Data:* TransUnion kindly shared with the project selected variables from its Trend Data dataset for the four sample cities, starting in 1996. The dataset tracks a sample of 20 million consumers nation-wide, and was used to provide census tract estimates of several variables related to credit access and use, including average credit limit, the ratio of balance to credit limit for credit card accounts and the number of accounts past-due.
- *ESRI Data and Maps:* ESRI was also a key project partner, and shared with us its demographic estimates for 2006 (used for the neighborhood typology), as well as historical GIS data on zip code boundaries and parks.
- *National Center for Education Statistics (NCES):* This data was used to compute student-teacher ratios for all public schools in the four sample cities. NCES data was also integrated with state-level data on test scores for each school. Student teacher ratios and test scores were used as indicators of school quality. A key challenge with respect to this dataset was matching schools to tracts in the absence of data on attendance zones for each school. The matching was done based on the distance between schools and tract centroids, and the project focused in particular on elementary schools, for which attendance tends to be more localized.
- *Administrative Data:* In addition to the national datasets mentioned above, the project gathered significant amounts of local data in each city, primarily from administrative

sources. These datasets include historical data on crime, transit stops, police and fire stations, libraries, and Tax Increment Financing (TIF) districts.

While the coverage of the different factors the project set out to measure is generally good, it is also uneven. The project had good data on factors such as real estate transactions, business establishments, and lending activity. For other factors, such as demographic characteristics, there is good coverage across the four sample cities but the data is not available for every year. Finally, the project did not surface good historical data across the four cities on factors such as social capital, zoning regulations, or building permits. To the extent possible, the project attempted to address these data limitations by identifying potential proxies (such as using presence of associations and membership organizations as an indicator of social capital). However, some disparities remain, and the final dataset provides different coverage (in terms of years and level of geography) for different factors. As explained below, this mostly affected the Drivers component of the project, while it was not a substantial barrier for the Evolution and Typology work.

Despite these limitations, the database assembled by the project is an impressive repository of information for every census tract across four cities (and in many instances their counties and MSAs) spanning over 15 years. This data, which includes, among other things, over 10,000,000 real estate transactions and well over 2,500 variables could be of great value to others in the field, as it is a uniquely rich and extremely detailed source of information on neighborhood dynamics. The data and metrics developed by the project can be to a large extent made publicly available, and many organizations have already contacted the project team about using the data and analysis in their work.

*Endnotes for Chapter III*

1 What is provided here is a non-technical translation of the formal model, which is reported in its more rigorous formulation in Appendix C.

2 It is also possible that the regional housing market is in effect divided in several housing quality submarkets (see, e.g., Jerome Rothenberg et al, "The Maze of Urban Housing Markets," The University of Chicago Press, Chicago, IL, 1991). In this view, housing submarkets are not determined by spatial proximity (as in the case of neighborhoods). Rather, they are composed of all of the housing units within the region that share similar characteristics and can be considered substitutes for each other (both with respect to the surrounding amenities and to the characteristics of the housing structure). In this case, long term price change would not depend on the elasticity of supply in a given neighborhood, but on the overall supply elasticity of that housing submarket.

3 Interestingly, this is partly a function of the lack of good, transparent information on the less tangible aspects of a neighborhood, such as social capital or personal well being. If this information was more readily available, it would both be better appreciated and attract more interest and investment in neighborhoods that are doing well in these respects.

4 Many different categorizations are of course possible. We tried to develop one that would be as straightforward as possible while at the same time capturing most of the potential drivers of neighborhood

change found in the literature.

5 It is possible, for instance, that given an increase in demand for housing at the regional level (due to increased in-migration to the region), neighborhoods that have desirable physical attributes such as waterfront are redeveloped first, or conversely, given an out-migration trend, they tend to decline more slowly as people leave less desirable neighborhoods first.

6 Unfortunately the project could not secure enough data on the quality of the physical environment across the four cities to test many of these hypotheses.

7 For some of these amenities (such as bars or supermarkets for instance), it is possible that their effect on the adjacent properties might actually be negative, and that it only becomes positive at a certain distance. The effect might also vary based on the quality of these amenities, which is often not easy to measure.

8 For these reasons, the key metric used by the project to measure social capital is the presence of these types of organizations in the neighborhood.

9 In particular, the project is grateful to the following individuals and organizations for providing the data used for this phase of the project: Chris Cunningham, Atlanta Federal Reserve Bank; the Cook County Assessor's Office; the Dallas County Department of Assessments; the King County Assessor; NEOCANDO and the Center on Urban Poverty and Community Development at Case Western Reserve University.

10 The real estate data preparation procedures are explained in more detail in Appendix B.

11 The project also constructed an index measuring change in the quality of housing, since neighborhood change can also be reflected in increased investment in housing, resulting in larger, higher quality houses. This index was based on the difference between actual price growth (measured in terms of median housing values) and constant quality price growth (the RSI), since price growth reflects the combination of increased value of the location (improving neighborhood amenities) and increased quality of the house. However, this metric proved to be too unreliable to be used in the analysis.

12 The two most common methodologies to estimate quality-adjusted change in housing prices are hedonic models, which estimate change in price by looking at all sales and controlling for the attributes of the units that are being sold, and repeat sales models, which only look at the appreciation from the sales of the same unit over time, assuming that the characteristics of the unit remain constant. Repeat sales models might be biased if some of the units in the sample have been remodeled in between sales. Hedonic models, on the other hand, are vulnerable to omitted variable bias since it is very difficult to account for all of the relevant characteristics of a housing unit. Given the type of research and the quality of the available data (which often did not include full details on property characteristics), a repeat sales index was deemed the most appropriate metric for this project. For a discussion of repeat sales and hedonic methods, see, for example, McMillen, Daniel P., and Jonathan Dombrow, "A Flexible Fourier Approach to Repeat Sales Price Indexes," *Real Estate Economics* 29:2 (2001), pp. 207-225; and Theodore Crone and Richard Voith, "Estimating House Price Appreciation: A Comparison of Methods," Working Papers 92-21, Federal Reserve Bank of Philadelphia (1992).

13 The index was developed based on the work of Dan McMillen (McMillen, Daniel P., and Jonathan Dombrow, "A Flexible Fourier Approach to Repeat Sales Price Indexes," *Real Estate Economics* 29:2 (2001), pp. 207-225.), who is a project advisor, and reflects significant improvements. A technical paper with a detailed description of the procedures and methodology developed to estimate this index is available upon request. This index is also in and of itself a new powerful tool for community economic development, and its applications are fully discussed in Section IX.

14 The real estate transaction data ranges from 1985 to 2006 in Chicago, from 1976 to 2006 in Cleveland, from 1979 to 2004 in Dallas, and from 1982 to 2006 in Seattle.

15 One of the limitations of repeat sales indices (and ours is no exception) is that they cannot perfectly control for changes in quality in places where there is significant remodeling activity. Major remodeling

(such as gut rehabbing, or properties being torn down and rebuilt) could be identified and excluded, but smaller scale renovation activity often could not.

16 Due to data limitations, we can only count how many residential properties are in each tract, as opposed to how many housing units. This means that we are unable to distinguish between, for example, apartment buildings and single family homes. It also means that phenomena such as condo conversions (where one rental property is split into multiple individual properties) will be captured as increases in the number of residential properties even though there are no changes in the actual number of housing units in the neighborhood.

17 A detailed table of variables and data sources is reported in Appendix G, and a complete catalog of the datasets used by the project is available online at www.rw-ventures.com/datacatalog.

18 While the dataset included all retail categories, only "local services" were selected, excluding categories like advertising agencies or legal services, which do not serve particular neighborhoods and tend to cluster in the central business district.

## IV. Neighborhood Evolution: Nature and Patterns of Neighborhood Change

As a first step in the analysis of neighborhood dynamics, the Evolution component of the project was designed as a descriptive examination of how neighborhoods change over time, looking primarily at the key indicators of neighborhood performance developed by the project. In particular, the project first took a look at the overall patterns of appreciation across the four sample cities, and then proceeded to ask a set of questions related to the nature of neighborhood change: how much and how fast neighborhoods change over time, to what extent neighborhoods tend to converge (i.e. lower value neighborhoods tend to grow faster and "catch up" to higher value ones), whether there are distinct and identifiable patterns of change, and what is the relationship between the various dimensions of neighborhood change identified by the project. The answers to these questions, along with their implications for development practice and for the next phase of the analysis, are reported below. Additional details on the metrics and methodologies used for the analysis are reported in Appendix D.

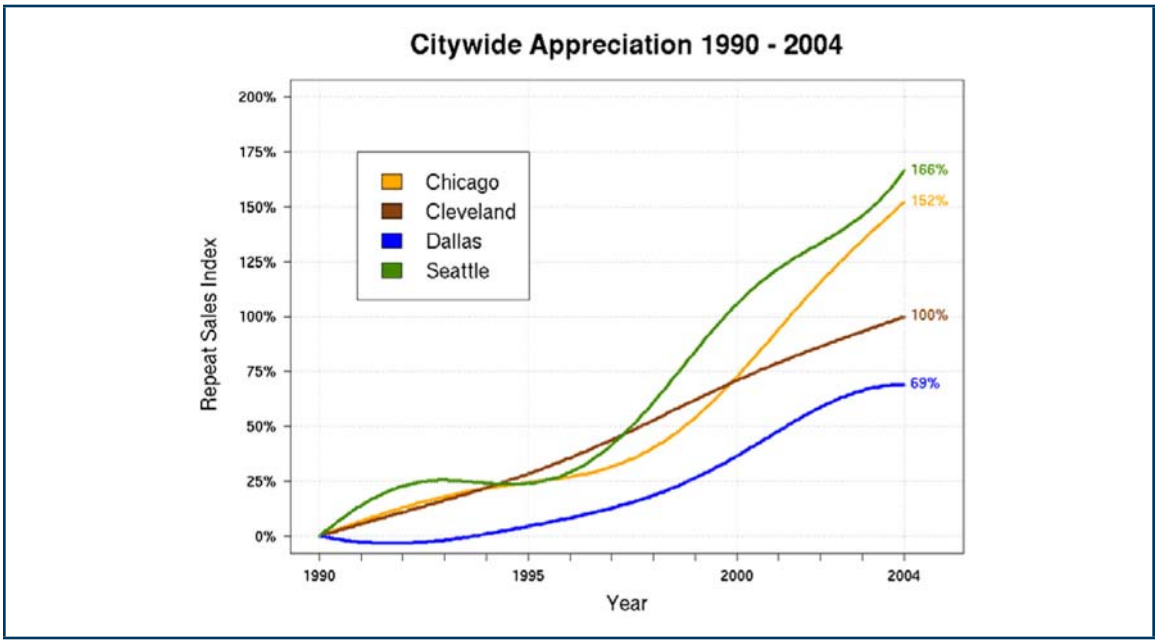
## A. Neighborhood Change Across Cities: Overview

**Question:**
*What overarching trends can be observed with respect to neighborhood change in the four sample cities?*

**Findings:**
- Over the time period observed by the project, many of the poorest neighborhoods were the ones that grew the most, outperforming wealthier communities in each of the four sample cities.
- The analysis of overall appreciation trends confirms a pattern of revitalization of the central cities.
- Within central cities, areas in and near downtown did better than neighborhoods at the edge of the city.

**Implications:**
- Poorer neighborhoods present the most opportunities for investment: they are more volatile, but they appreciate the most overall.
- By increasing the availability of information on these markets (including particularly the kinds of information being developed by this project), we could reduce risk, increase market activity, and help stabilize these communities, strengthening their performance.
- Despite the current market downturn and wave of foreclosures, which particularly affected many of these neighborhoods, these communities still have the characteristics that can make them particularly attractive to investment once the market recovers. Now is the time to implement comprehensive strategies that can best position these neighborhoods to take advantage of future investments.

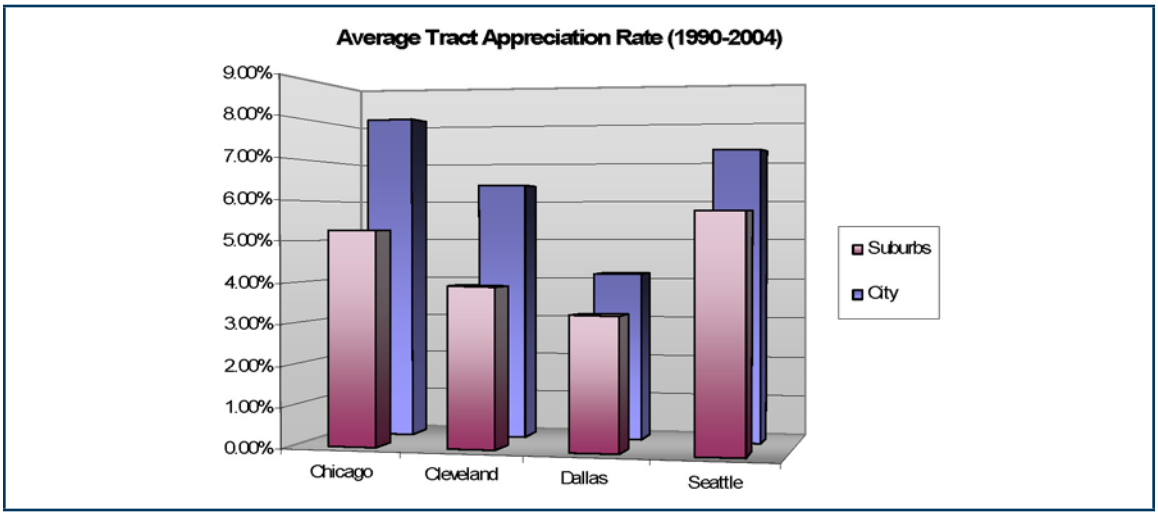
A useful starting point for this analysis is to look at the overall housing value trends in the four sample cities. This will help uncover some general patterns and provide the key backdrop for the analysis that will follow.[1]



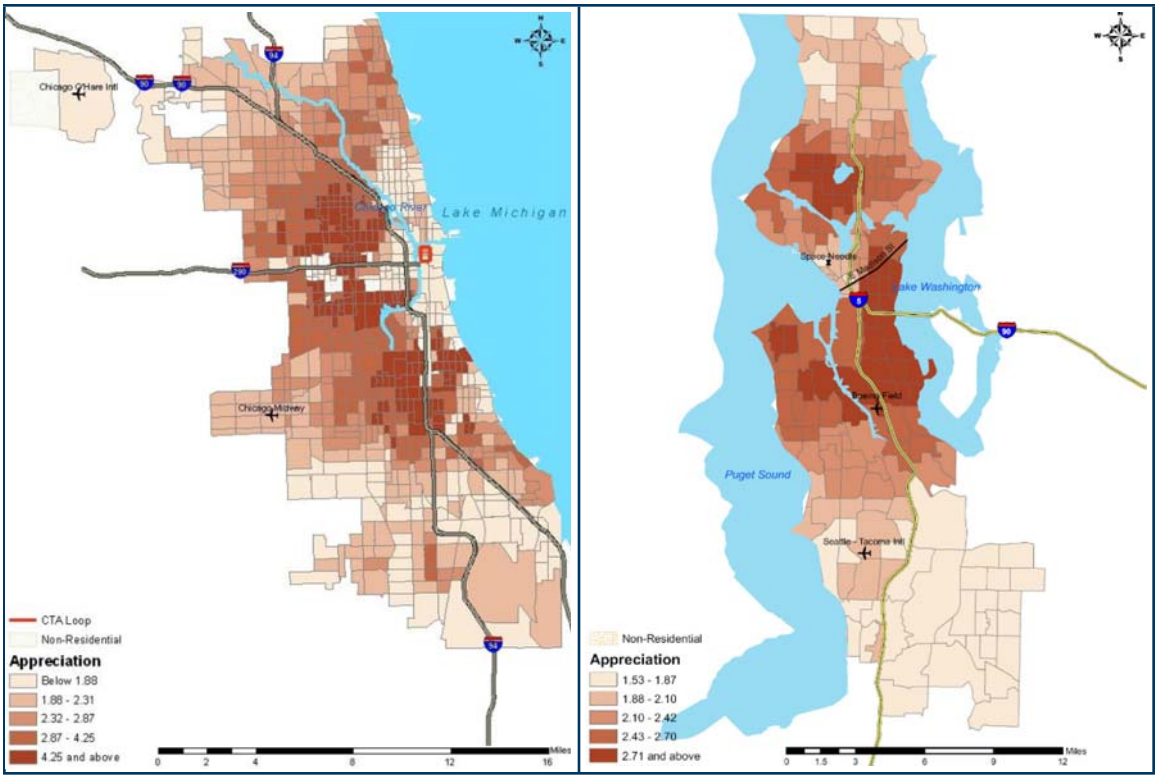

The fifteen year study period was generally a good time for urban areas across the country, and our four cities are no exception. **Housing values, as measured by the quality-adjusted repeat sales index, increased in all four cities over the study period,** with some variation: prices grew the most in Chicago and Seattle (where the city as a whole appreciated at a rate of 166% and 152% respectively between 1990 and 2004), and the least in Dallas, which recorded an appreciation rate of 69%.[2] As we will see below, the low appreciation in Dallas relative to the other three cities was likely due to regional characteristics (such as fewer constraints on the supply of land) that distinguish Dallas from the other three cities.

While in Seattle and Dallas the growth in housing values was relatively uniform across the city, in Chicago and Cleveland there was more variation. In particular, housing values increased in every neighborhood in Dallas and Seattle, while appreciation rates in Chicago and Cleveland were more dispersed, and some areas in these two cities actually experienced a decline in value.

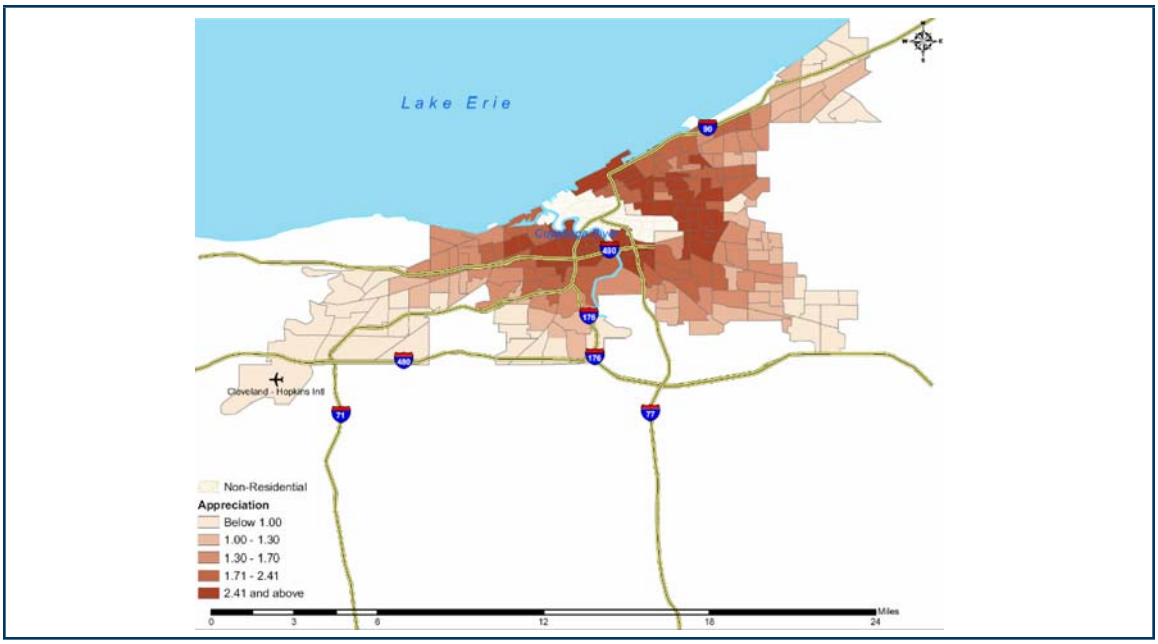
Overall, on average **urban neighborhoods grew faster than suburban ones,** in line with the national revival of central cities across the country over the fifteen year study period.[3] This trend is also consistent with the pattern of suburbanization of poverty that has emerged from several national studies.[4] Between 1990 and 2000, **in three of the four cities average neighborhood poverty rates have declined in the central city, but have increased in the suburbs.** In Dallas, where the average neighborhood poverty rate has increased in both the city and the suburbs, the increase in the suburbs was significantly larger than the increase in the central city.



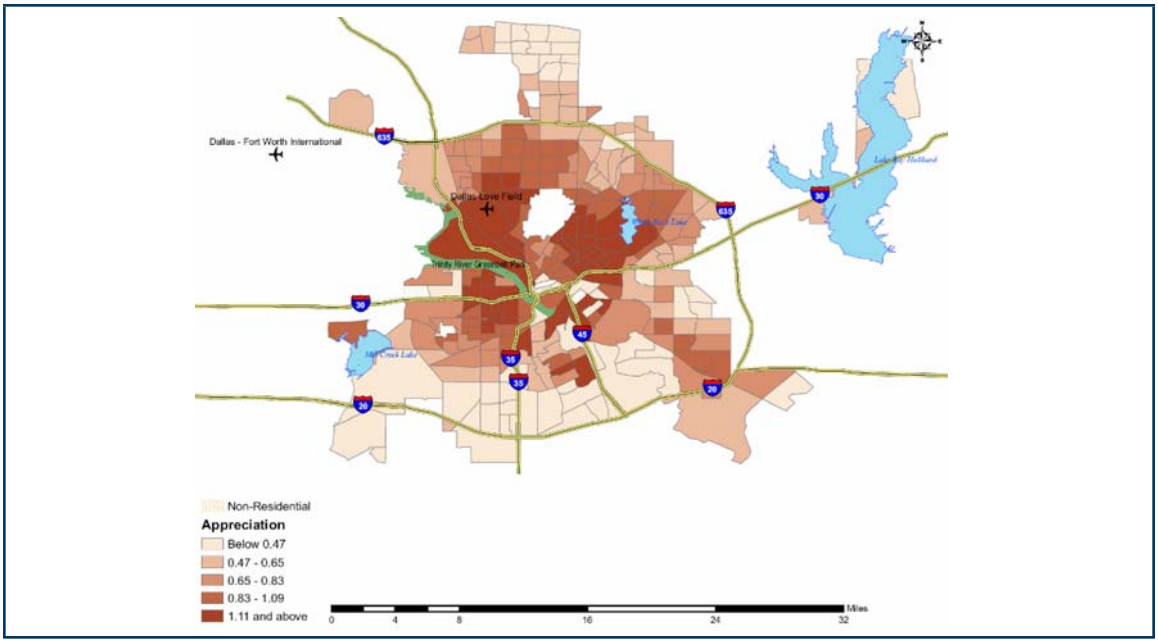

Moreover, even within the city, **the neighborhoods near the city center experienced higher growth than the neighborhoods at the outer edges**.[5] The spatial patterns of appreciation (as measured by the repeat sales index) across each city can be seen in the maps below.[6]




*Chicago* *Seattle*

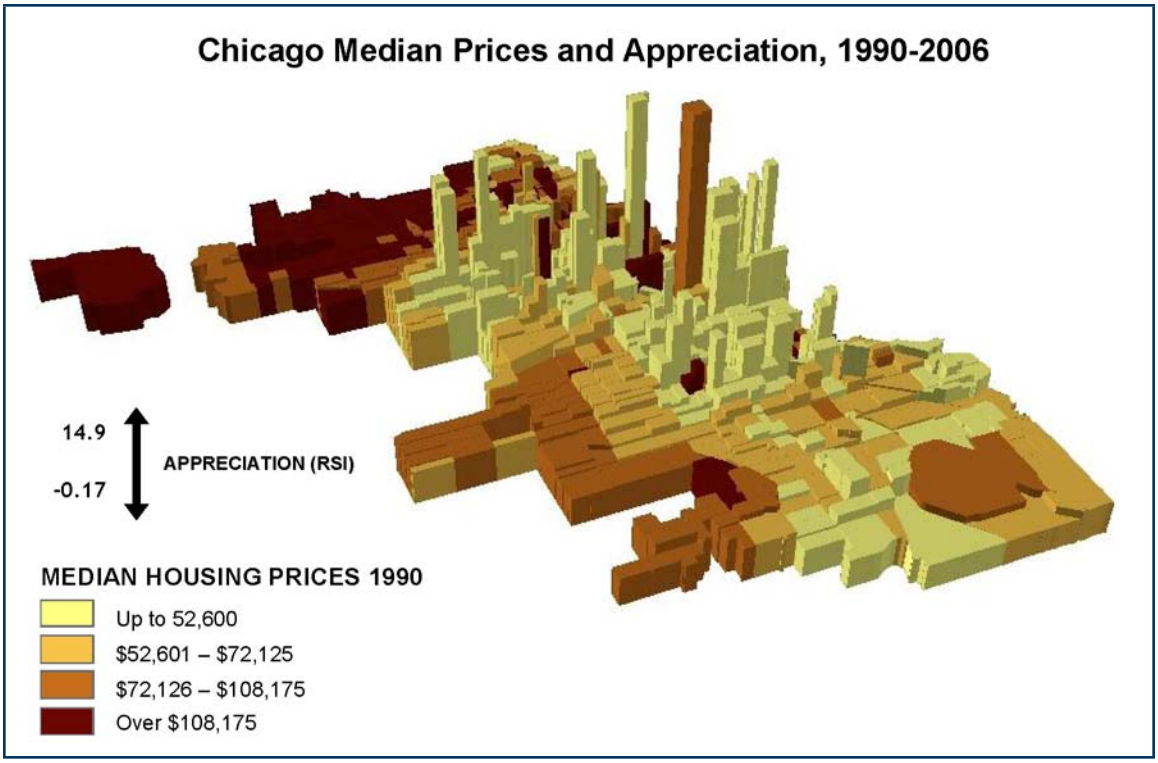



*Cleveland*




*Dallas*

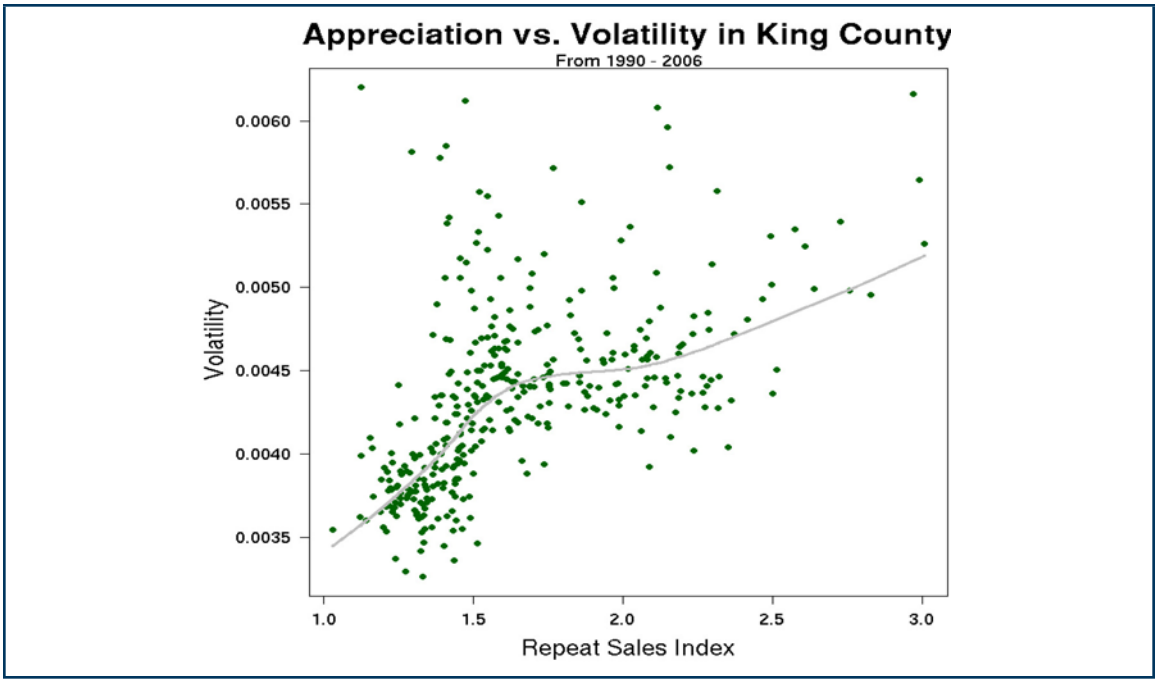
A key observation that emerges from these results is that **some of the poorest neighborhoods in these four cities are the ones that have shown the greatest appreciation over the 15 year study period, outperforming wealthier communities.** A dollar invested in the South Side of Chicago fifteen years ago would have yielded a much better return than a dollar invested in the wealthy Gold Coast neighborhood.




This finding raises an important question: given their high growth rate, why isn't there more investment in these communities? Part of the reason is that people's decisions are affected by their perceptions of future price growth, which determines the perceived economic return associated with neighborhood choice. It is important, then, to examine both the rate of price appreciation and the risk associated with the investment.[7]

In order to measure risk, the project developed a volatility metric, measured here as the amount of variation over time in a tract's repeat sales index. One would expect that, all other things being equal, investors would demand higher appreciation in high volatility communities.

Indeed, while poorer areas had the most appreciation, they are also the most volatile.[8] If somebody were to invest in one of these areas, the outcome of that investment would be more uncertain than in a more stable area. An analysis of the correlation of appreciation and volatility across the four cities shows that the two are in fact positively correlated. This can be thought of as analogous to investing in small cap stocks. Overall, these stocks yield higher returns, but they are inherently more risky than big cap stocks.




The higher risk associated with poorer neighborhoods is likely due to two distinct phenomena: on the one hand, there might be more real or perceived uncertainty about the future of the neighborhood in these communities than there is in wealthier neighborhoods. On the other hand, though, this uncertainty could also be due to lack of information. In these communities there is often less real estate market activity, and this reduces the availability of information on what a property can sell for. The lack of information in the housing marketplace in turn generates uncertainty on what the returns to investing in the neighborhood might be. The risk perceived by buyers and investors is thus greater than it would be if more information were available.

The implication, for community development purposes, is that by increasing the availability of information on these markets we could reduce risk, increase market activity, and help stabilize these communities. This concept is similar to what companies like MetroEdge and Social Compact have shown in the context of commercial development, where better information on the market potential of inner city neighborhoods has helped attract new investment. In this respect, the DNT project has taken an important first step by producing a set of metrics (including in particular the RSI) that can be used to track and evaluate urban real estate markets at a level of detail and granularity that was not possible before.[9]

Many of these communities have been severely affected by the recent market downturn and foreclosure crisis, which (consistent with the volatility observation above) has erased many of the gains made by these neighborhoods over the previous decade. However, as we will see in more detail below, the characteristics that made these areas attractive in the first place (such as proximity to downtown, availability of undervalued real estate, etc.) have not changed, and these communities could be in good position to take advantage of renewed

investment interest once the market recovers. The work that is under way to stabilize these communities and help them recover presents a unique opportunity to develop comprehensive and far-sighted supply side strategies for workforce and affordable housing, which would ensure a more balanced and inclusive development pattern going forward.

## B. Neighborhood Convergence

**Question:**
*Does the market tend to reinvest in poor neighborhoods in the absence of interventions?*

**Findings:**

- Over the time period examined by the project, neighborhoods tended to naturally "catch up" with each other: poorer neighborhoods grew faster than wealthier ones, and thus neighborhoods tended to converge over time.
- Unlike the other three cities, Dallas did not display this pattern, likely due to unique characteristics of the region.

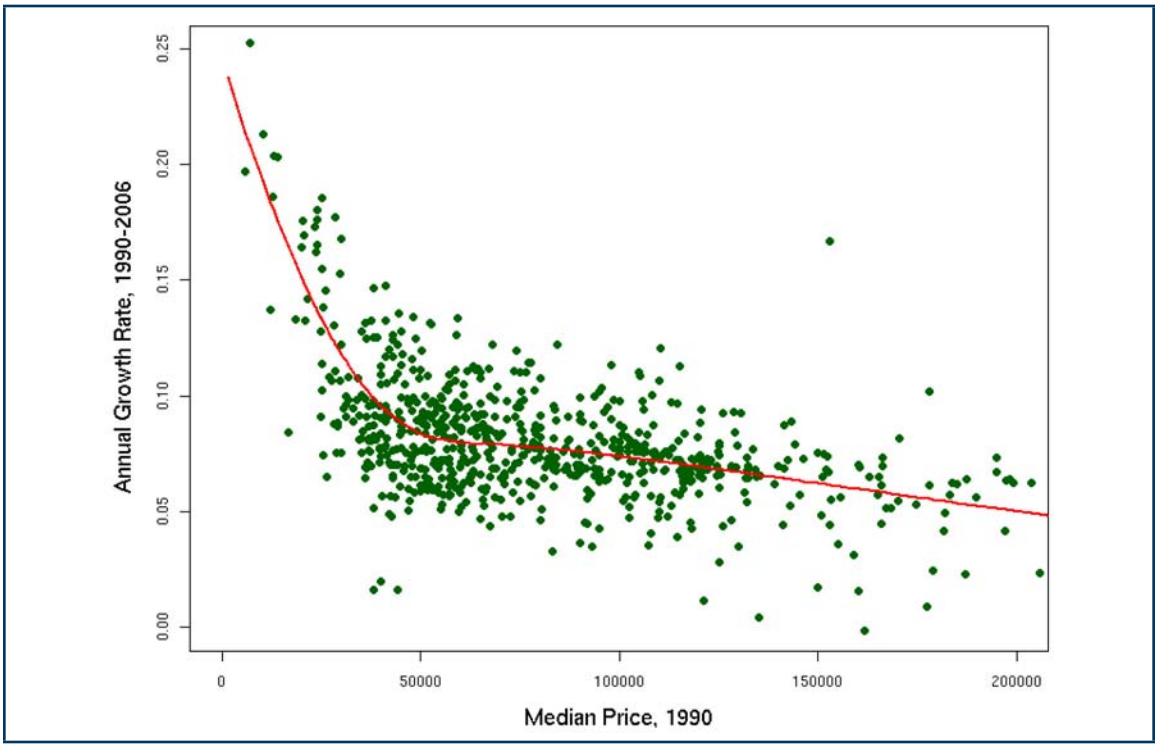
**Implications:**

- The fact that, if left to their own devices, many underserved neighborhoods will improve over time, enables us to better target community development interventions.
- Interventions in neighborhoods that are likely to catch up should be different than interventions in neighborhoods that are not as likely to be "rediscovered" by the market. Interventions in "converging" neighborhoods should be aimed at shaping growth and preserving diversity, while interventions in "non-converging" neighborhoods could aim at spearheading market activity.
- By analyzing what accounts for the difference between these two groups of neighborhoods, we can uncover key factors that make communities attractive to investment and help them improve.

Economic theory suggests that over time places that are less developed will grow faster, as capital and investments flow to areas where they are underutilized. Extensive research has been conducted to test this theory in the context of national economies and, to a lesser extent, of regions. The faster appreciation rates observed in poorer neighborhoods suggest that this phenomenon, typically referred to as "convergence," might apply to neighborhoods as well. From a community development standpoint, this is an important issue, as it implies that poorer neighborhoods would tend to catch up with more successful neighborhoods even in the absence of development interventions.

If convergence across neighborhoods was in fact occurring, we would expect poorer neighborhoods to grow faster than wealthier neighborhoods, and the difference in value between neighborhoods to diminish over time. In terms of our real estate market metrics, prices will have to rise faster in low-priced areas than they do in expensive neighborhoods, and the variation between prices in high and low price neighborhoods will have to decrease. Formally, these two kinds of changes are modeled as "beta convergence" and "sigma convergence."[10] Beta convergence occurs when cheap neighborhoods appreciate faster than expensive neighborhoods do, and sigma convergence occurs when the variation of prices across neighborhoods decreases.

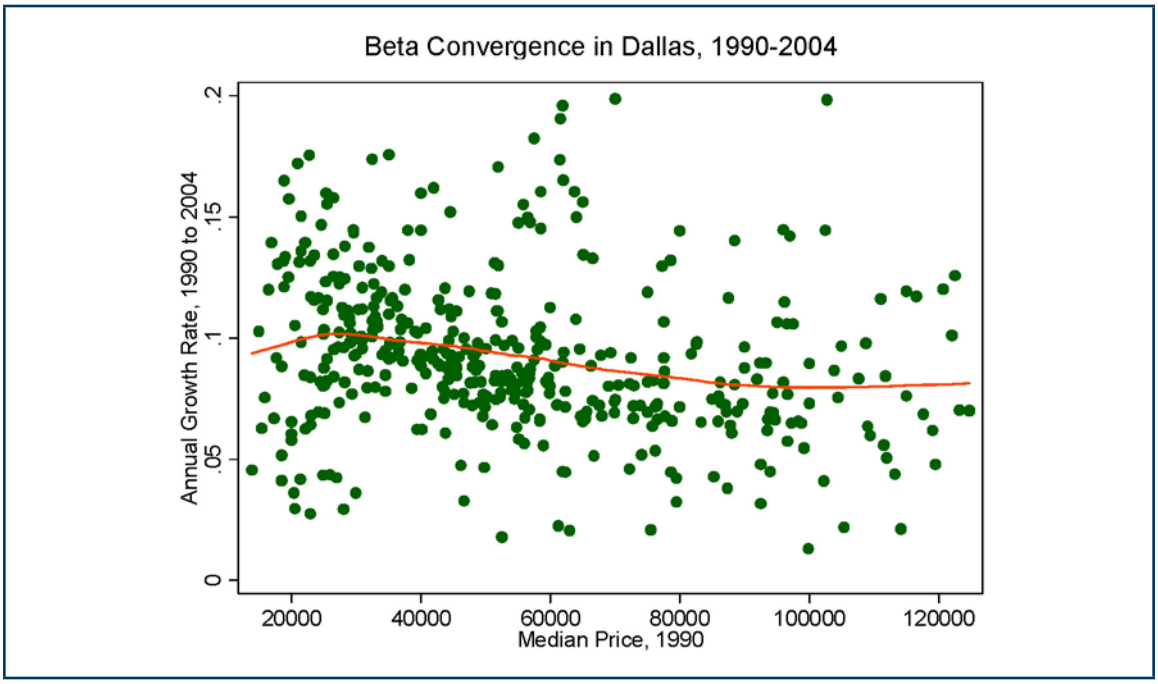
Overall, the project found some evidence that **neighborhoods do tend to converge over time in three of the four cities, at least over the period for which data was available.**[11] The scatter plot below shows a relatively strong negative correlation between growth rate and initial price, meaning that tracts that started out with low median prices in Chicago had higher growth rates than tracts that started out with high median prices. The same evidence of beta convergence was found in Cleveland and Seattle, even though the pattern is less pronounced in Seattle than in the other two cities.




The project also found significant evidence of sigma convergence in these three cities, as prices were significantly less dispersed in 2006 than they were in 1990.[12]

The one exception to the overall trend of convergence in the sample is Dallas, which did

not display the same pattern as the other three cities. In fact, there appears to be little or no relationship between starting median price and annual growth rate in Dallas.




Similarly, the project found no evidence of sigma convergence in Dallas: prices remained as dispersed in 2004 as they were in 1990.

These findings raise the question of what might account for convergence across neighborhoods, and why some places converge while others don't. One hypothesis is that the neighborhoods that converge are located in places where location matters and there are constraints on the supply of land. The one inalienable feature of a neighborhood is its location. No matter what else happens in a neighborhood, it will always be located at the same distance from the central business district, or from the waterfront, or from other regional centers of gravity. To the extent that location is valuable, and that it becomes more and more difficult to find undeveloped land, there will always be a market incentive to redevelop areas that have been neglected.

In this respect, it might not be a coincidence that Dallas is the least centralized of the four cities in the sample, being more dispersed and also part of a region that includes another large central city. This means that there is less of a premium on location (for instance, in terms of distance from the central business district) associated with neighborhoods in the city. At the same time, Dallas has the least constraints on supply, given the availability of land and the absence of major geographical barriers to development (unlike Seattle, for example). As a result, there are very few incentives to redevelop and reinvest in areas that are

struggling, which tend to be left behind. In the absence of convergence forces, which could spontaneously bring about change in some of the underserved areas of the city, community development interventions in Dallas (and in neighborhoods that are unlikely to be "rediscovered" by the market due to their location) are particularly important.[13]

There are of course other intervening factors that could prevent particular neighborhoods from converging. There could be other costs that offset the low cost of land (such as, for instance, brownfield cleanup costs), or there could be a lack of demand for housing in a particular neighborhood due to negative amenities associated with that location (high crime, lack of infrastructure, etc.). The analysis of drivers of change in particular types of neighborhoods, reported in Chapter VI, will return to this phenomenon, investigating in particular what factors differentiate poor neighborhoods that experienced convergence from the ones that did not.

This is clearly an important question for community and economic development purposes, as it would enable more strategic targeting of interventions in different types of neighborhoods, based on the likelihood that market forces would bring about change and investment in the community.

## C. How Much and How Fast Do Neighborhoods Change?

**Question:**
*What is the overall magnitude and pace of neighborhood change?*

**Findings:**
- Over a 15 year period, most neighborhoods tend to maintain their position relative to the other neighborhoods in the region
- Urban neighborhoods are more mobile than their suburban counterparts: approximately half of all city neighborhoods moved by at least one quintile in the distribution of median sales prices over the study period
- Approximately 10% of all city neighborhoods experienced significant change, moving by two or more quintiles.
- The neighborhoods that move the most are also more likely to move upward: the change was positive for two thirds of the neighborhoods that moved by two or more quintiles.

**Implications:**
- Neighborhood change is a slow process: for the majority of neighborhoods, major change takes a long time to occur.
- A relatively small subset of neighborhoods is more likely to change significantly. Identifying and targeting interventions to these communities is likely to yield the best results.

We have seen that neighborhoods clearly change over time and that in some places changes occurred more rapidly than in others. But to what extent do neighborhoods really change their status relative to the other neighborhoods in their region? And how long does it take for a neighborhood near the bottom to move up the ranks and make its way to the top? To answer these questions, the project looked at a series of "transition matrices," which show how many neighborhoods moved from one quintile of the median house prices distribution to another over a given period.[14] Two sets of matrices were constructed, one for all of the tracts in the sample, and one for the city tracts only.

**While neighborhoods certainly improve or deteriorate, this is a most often a slow process, and they tend to maintain their position relative to the other neighborhoods in the region.** In other words, we rarely see neighborhoods going from being among the worst to being among the best. As could be expected, over longer time periods, more mobility among neighborhoods can be observed. However, even over the entire time span covered by our data (which in some cities is close to 30 years), the neighborhoods that significantly change their position are relatively few. At the same time (and as seen above) there is a subset of neighborhoods (particularly in the central city) that have experienced substantial change.

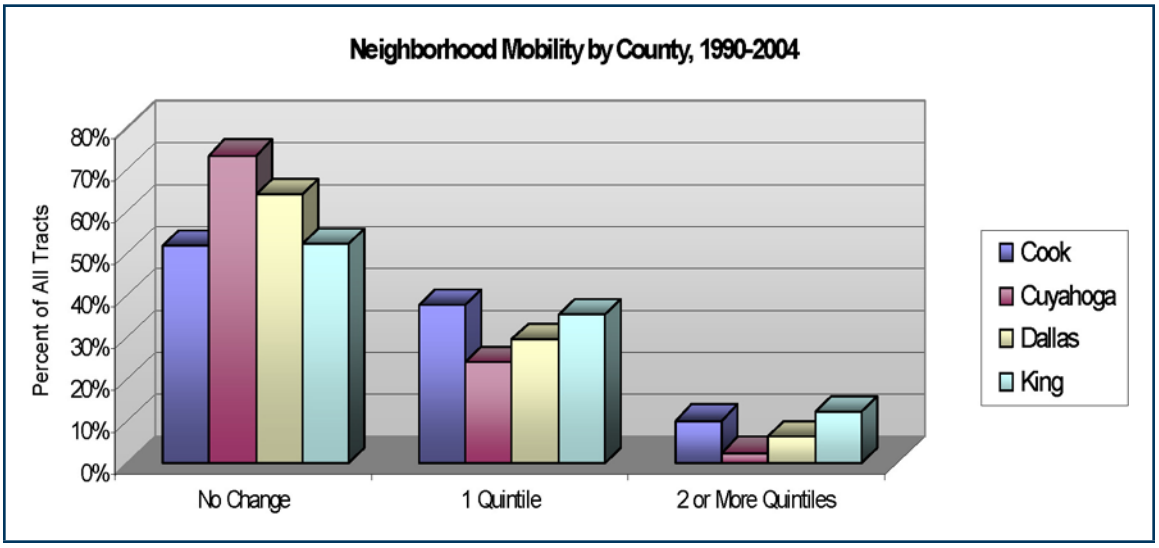
Based on the entire sample (including urban and suburban neighborhoods), over a five year period more than 80% of the neighborhoods in the bottom quintile of the median housing value distribution remained at the bottom. Similarly, over 80% of the neighborhoods that were at the top remained at the top five years later. This result does not change much if we look at 10 year intervals. Moreover, the neighborhoods that do change, in general do not change much: after five years, 95% of all neighborhoods moved (either upward or downward) at most one quintile, and after 10 years this figure was still over 90%.

**Average 10 Year Median Sales Price Transition Matrix[15]**
**Dallas County**

| Tracts | Final Quintile | | | | |
|---|---|---|---|---|---|
| Initial Quintile | **1** | **2** | **3** | **4** | **5** |
| **1** | **87.5%** | 11.0% | 0.3% | 0.5% | 0.7% |
| **2** | 9.7% | **71.2%** | 15.2% | 2.3% | 1.5% |
| **3** | 1.3% | 15.0% | **67.1%** | 14.3% | 2.4% |
| **4** | 0.6% | 2.3% | 15.1% | **68.5%** | 13.5% |
| **5** | 0.9% | 0.4% | 2.4% | 14.2% | **82.1%** |

The picture that emerges from looking at the entire study period (1990-2004) across the four cities is similar: **most of the neighborhoods that started at the top remained at the top, and most of the neighborhoods that started at the bottom remained at the bottom.**

This does not necessarily mean that the difference between these two groups has remained the same. In fact, **there is evidence that this difference is shrinking,** as suggested by the finding that, overall, poorer neighborhoods appreciated more than wealthier ones.




Over 15 years, one third of all tracts changed by one quintile, and approximately 8% changed by 2 quintiles or more in either direction. At the same time, it is worth noting that there are some significant differences across cities and between urban and suburban neighborhoods.

Overall, neighborhoods in Cook and King County were more mobile: in these two counties, almost 50% of tracts did move by at least one quintile over the study period, while in Cuyahoga and Dallas that figure was closer to 30%. Moreover, urban neighborhoods in general were more mobile than their suburban counterparts.[16] This is particularly true in Cleveland: while for the entire Cuyahoga County over 75% of the neighborhoods did not change at all over the study period, and only 2.5% changed by more than one quintile, in the city of Cleveland only 46% of neighborhoods did not change at all, and 13% changed by more than one quintile.[17]

Interestingly, across all cities, **the neighborhoods that move the most are also more likely to move upward.** Of all the urban neighborhoods that changed by more than 1 quintile over the study period, two thirds experienced significant improvement, while only one third declined. This suggests that, **at least over this study period, neighborhood improvement happened rapidly (at least in some neighborhoods), while neighborhood decline was a slower process.**[18]

In sum, neighborhood change is by and large a slow process, and neighborhoods tend to maintain their position relative to other neighborhoods in the region. At the same time, urban neighborhoods appear to be more mobile than their suburban counterparts, and a

small fraction of neighborhoods does show major changes, both in absolute terms and relative to the other neighborhoods in their region. One of the areas of focus in the following phases of the project was to examine these neighborhoods that did change substantially in more detail, to gain further insight into the causes and dynamics of neighborhood change.

## D. Patterns of Change

**Question:**
*How do neighborhoods change over time?*

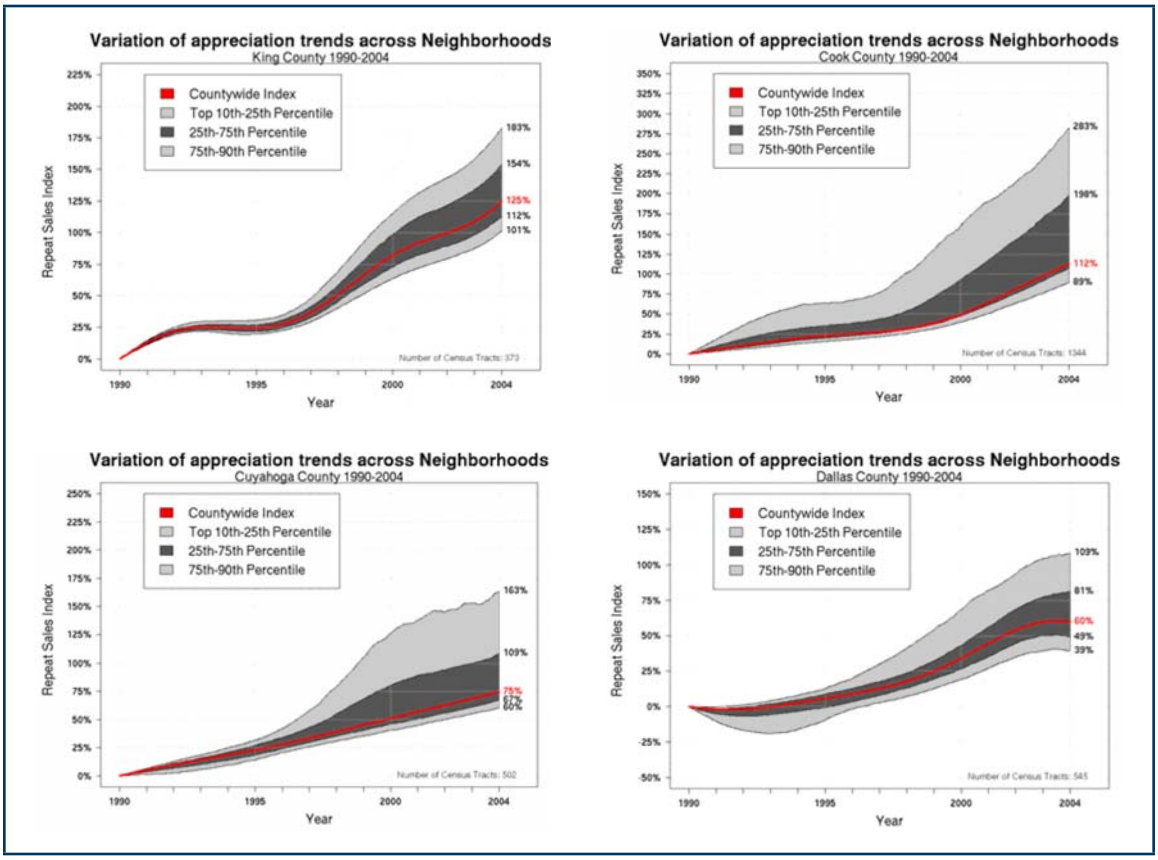
**Findings:**
- Neighborhood change is a gradual process: most neighborhoods do not display dramatic or sudden changes, and follow similar overall patterns of change
- There is a significant subset of neighborhoods that do experience significant change over relatively short periods of time
- The project identified several distinct and consistent patterns of change, including patterns of neighborhood decline, turnaround, and rapid appreciation (likely gentrification).

**Implications:**
- The project identified several distinct and consistent patterns of change, each of which has different, and important, implications for community development.
- For each tract in the four sample cities, the project now has the capacity to describe and specify its pattern of change over any time period within at least 15 years, and can search for tracts that followed the same pattern of change, over the same or different time periods.
- This capacity lays the foundation for new analysis of the factors that drive, or might mitigate, specific patterns of change, as well as for anticipating types and effects of change by examining neighborhoods that have previously followed identical patterns.

The basic question that the Evolution piece of the Dynamic Neighborhood Taxonomy project attempted to address was not just whether and how much neighborhoods change, but also how this change occurs: how do neighborhoods get from one point to another? Do neighborhoods follow specific paths, or stages of development? Do different types of neighborhoods evolve in different ways?

The first overarching observation with respect to these questions is that **at any given point in time, most neighborhoods will exhibit similar trends, and will not stray very far from**

**the overall direction of their region.** The dark gray area in the graphs below shows how 50% of all neighborhoods in the four sample cities and their counties are relatively tightly clustered together, and as a whole mirror the trajectory followed by their region (more on this below).[19] In many cases, 90% of all neighborhoods (the light gray area) are remarkably similar.[20]




This analysis also confirms the observation, made in the previous section, that neighborhood change is a gradual process: most neighborhoods appear rather stable, and follow a relatively steady path without major fluctuations.

In order to be useful, the analysis of patterns of change should go beyond these general observations and enable us to identify and describe particular dynamics and patterns that might take place in different neighborhoods at different times. For instance, there might be particular stages of development, or cycles of appreciation, or patterns of decline, that most neighborhoods go through at some stage of their evolution. Identifying what these patterns are would be very informative, as it would enable us to look for what might be causing them, and ultimately help practitioners understand what dynamics are at play in a given neighborhood and what can be expected next.

This is of course a very complicated question, given the range and number of possible patterns and the difficulty of distinguishing actual patterns from idiosyncratic movements. In order to tackle this task, the project experimented with several different approaches, with varying degrees of success. Two in particular showed promising results: a trend break analysis of change in median sales price, and a "pattern search" analysis based on the first derivatives of the smoothed median price index. The trend break results are discussed below, while the pattern search methodology is discussed in Chapter IX, as it is a particularly promising tool that could enable a different level of analysis and diagnostics of neighborhood patterns.

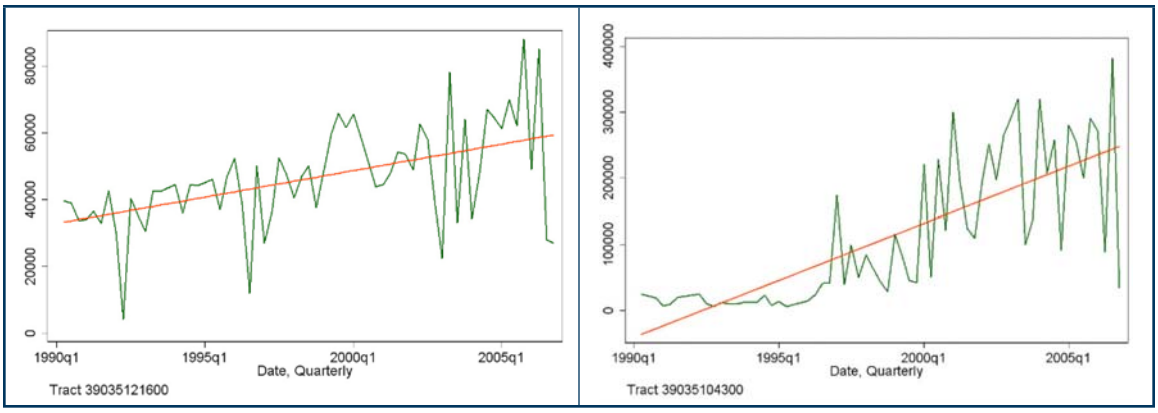
The trend break analysis is based on the observation that what we call a "pattern of change" is basically a series of changes in the direction in which the neighborhood is moving and in the rate at which it is changing. For instance, a period of stability followed by rapid growth followed by slight decline is a pattern of neighborhood change identified by two changes in direction (from flat to up, from up to down). These changes in direction can be empirically detected in the data by testing for "structural breaks" in the change in median prices. Note that the absence of breaks also identifies a pattern, which can be characterized as linear change (and in turn classified as linear change upward, downward, or stability).[21]

This method is particularly appealing because it enables us to classify every neighborhood based on what changes it underwent. Moreover, it identifies neighborhoods that experienced the same pattern (i.e. the same succession of breaks) regardless of when that pattern occurred.

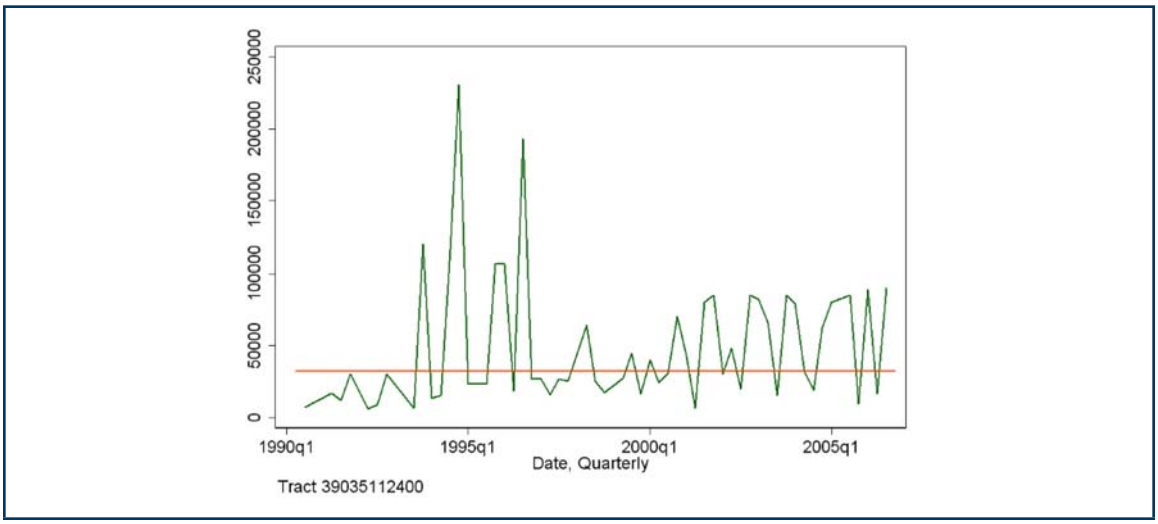
Consistent with the other findings presented so far, the trend break analysis showed that **there is a significant amount of stable, upward growth across cities:** at least a fifth of the tracts in each county exhibit upward growth with no trend disruptions.

**At the same time, there is a large amount of variation in the stability of growth patterns between the four cities.** Cleveland is extraordinarily stable, with nearly two thirds of tracts showing a stable upward trend from 1990 to 2006, and as many as 98% of tracts showing fewer than two breaks. Chicago and Dallas are less stable than Cleveland: about 90% of tracts in each city exhibit stable growth or a single break in trend. Seattle shows a quite different story than the other three: less than a quarter of tracts show a stable trend, and a much larger share of tracts show more than one break—30%—than in the other cities.

It should be noted that even among the neighborhoods that display overall stability, there are important long term differences in the trends themselves. For instance, in Cleveland (which generally has high levels of neighborhood stability) trend growth ranges from an anemic $1,580 annually in Tract 39035121600 to a robust $17,224 annually in Tract 39035104300 (see next page).




Over long periods of time this stability in trend growth can actually cause divergence across neighborhoods. In addition, approximately 3% of all tracts appear stable, but are actually declining. This is the case for tracts such as the one depicted below (also located in Cleveland). As noted above, this is due to the fact that growth is expressed here in nominal terms. A growth rate of zero is equivalent to a slow decline once inflation is taken into account.




Beyond these general observations, it is the nature and timing of the breaks that are the most revealing. In particular, there are a number of dimensions upon which the neighborhoods patterns can be assessed, including:

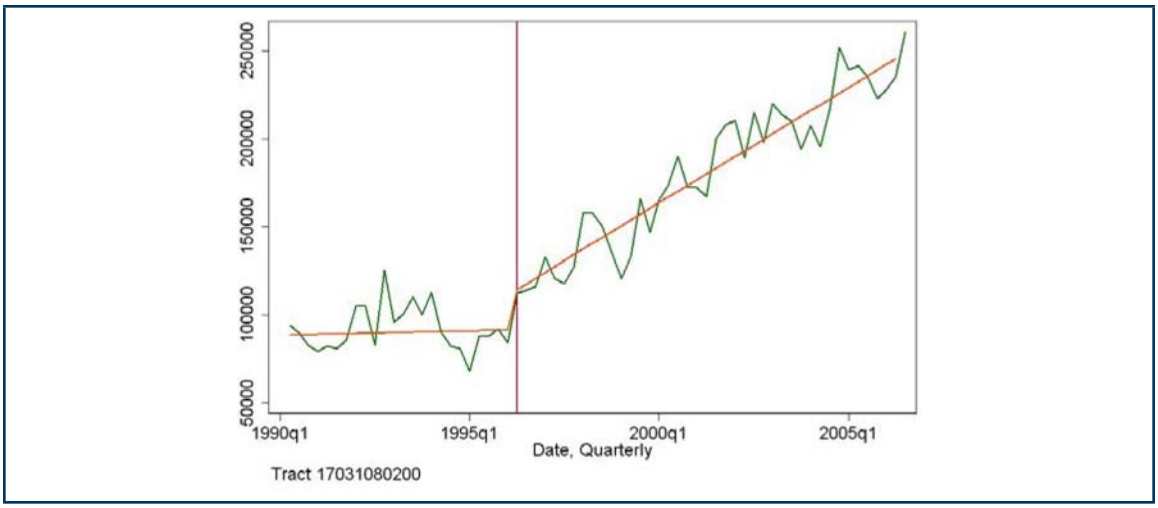
- Number of trends: how many significant changes do we observe over the study period?
- Slope of individual trends: how fast are prices changing?
- Discrete shifts in trends: are there sudden jumps in prices?
- Duration of trends: how long do prices tend to follow the same path?
- Changes in direction of trends: how frequently do neighborhoods shift directions?

Based on this classification, **the project identified five types of breaks that occur enough**

**times to be considered consistent patterns in the data and have possible relevant implications for community development.**

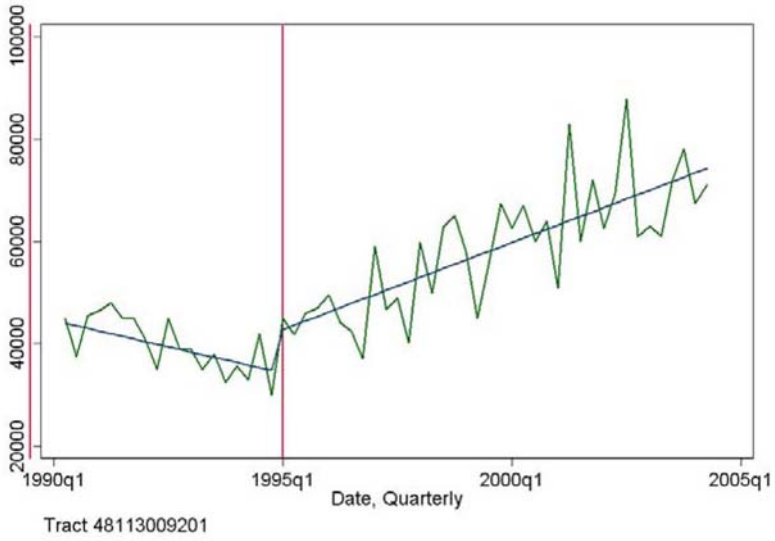
*Possible Tipping*

This pattern is characterized by a period of flat or modest growth followed by a sudden shift upwards and then faster growth. The sudden shift likely identifies the point in time at which the possible tipping occurred. Approximately 10% of the tracts displayed this pattern, although in varying degrees. Below is an example derived from a tract in the near North Side in Chicago.



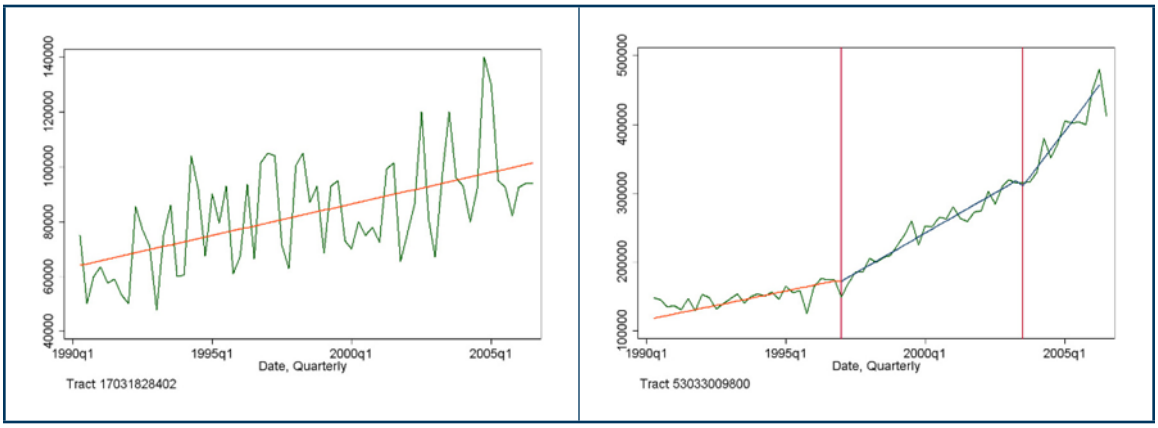

*Neighborhood Turnaround:*

This is a pattern in which a neighborhood manages to reverse its course, and is characterized by a period of decline followed by a period of growth (an example from Dallas is reported below). These neighborhoods are particularly interesting from a community development point of view, as they might help uncover useful models and best practices.



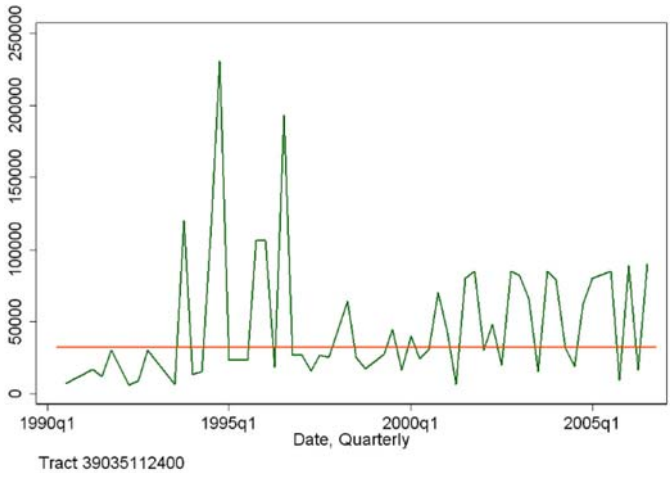

*Rapid Appreciation:*

This process, which in some cases could be associated with displacement, could manifest itself in several patterns of change. Two that seem particularly interesting are: a high growth rate sustained over a long time period (as in the case of the tract on the left below, located in the northern suburbs of Chicago, where values have grown $45,000 annually for close to 17 years); and several consecutive accelerations (as in the graph on the right, from a neighborhood in Seattle). This pattern (as well as the "Possible Tipping" pattern above) is consistent with what is commonly described as "gentrification."[22] The second pattern in particular (found mostly in Seattle) is consistent with the theory that gentrification occurs in stages: the first is a wave of "benign" gentrification due to the influx of "urban pioneers," which typically buy and rehab vacant units without causing much displacement, while in the following waves middle and upper middle class households start moving in, reducing the availability of affordable housing for the original residents and causing their displacement.[23]



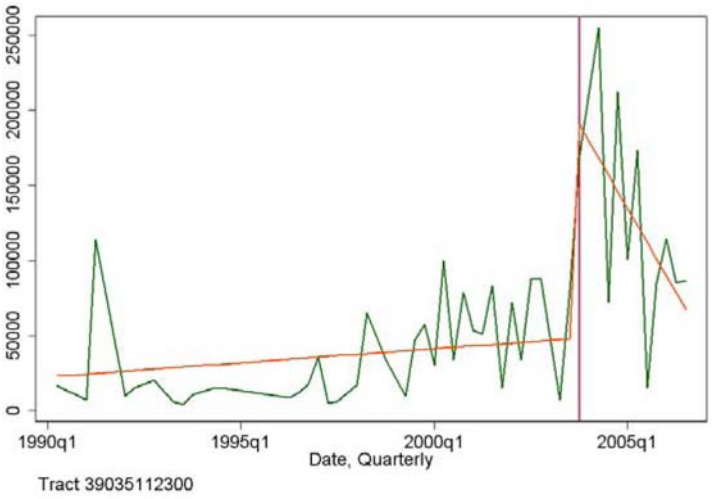
*Neighborhood Decline:*

These are neighborhoods that display either a sustained pattern of negative growth, or a sustained pattern of flat growth. There are very few neighborhoods in the sample that fall into the former category. However, there are approximately 3% of neighborhoods in the sample that display a growth rate of zero. Since growth here is expressed in nominal terms, a growth rate of zero is equivalent to a slow decline once inflation is taken into account. The Cleveland neighborhood below is a good example of this trend, which might be indicative of a pattern of disinvestment and/or population loss.




*Speculation:*

Neighborhoods that are targeted by speculators might experience a sudden rise in prices, followed by decline. This pattern appeared in a few tracts, mostly in Cleveland. An example is below. In addition to the shift in price, we can also see a significant increase in volatility (i.e. the fact that the median prices fluctuate a lot more from one quarter to the next), which is also consistent with speculation activity. A similar pattern, also characterized by an upward shift followed by decline (though perhaps not quite as pronounced), might be due to an event (like a new development) that has an immediate impact on the neighborhood, but that does not reach enough critical mass to really change the trajectory of the neighborhood in the long run.




Beyond the observations reported here, the analysis of patterns of change informed some of the specialized drivers analysis and tool development described in later chapters of this report. Moreover, the ability to identify these patterns, combined with other tools for neighborhood analysis such as the ones presented in Chapter IX), will enable more refined and targeted work to understand what accounts for each pattern.

## E. Neighborhood Change in 3D

**Question:**
*What is the relationship between changes in price, quantity and quality of housing?*

**Findings:**
- Neighborhood change manifests itself in changes in housing price, quality and quantity.
- The combination of these dimensions gives rise to different types of neighborhood change.
- Neighborhoods where housing quantity increases tend to experience less appreciation.
- Neighborhoods that increase in both price and quantity are also more likely to experience significant changes in their demographic characteristics.

**Implications:**
- Different types of neighborhoods will change in different ways: the location of the neighborhood, the quality of the housing and the availability of developable land determine how a neighborhood will evolve in response to a change in demand.
- The development of new housing can help slow down rising property values and reduce displacement.
- On the other hand, neighborhoods with less room for development of new housing are at greater risk of displacement, as housing prices will increase faster than in areas where more housing units can easily be developed.
- Both changes in housing values and changes in the amount of residential development need to be taken into account when evaluating neighborhood change, and appropriate interventions will depend on the balance of price, quantity and quality in each neighborhood.

So far the analysis has focused on change in demand for the neighborhood as reflected primarily in quality-adjusted housing values. However, in order to get a complete picture of how neighborhoods in the four cities have changed, we need to look at the combination of change in price, quantity and quality. In fact, in neighborhoods that are improving the most, we would expect to see increases in all three of these dimensions, as neighborhood residents and developers would be more willing to invest in the local housing stock. Conversely, neighborhoods that are deteriorating would experience a decline not only in housing values, but in housing quality and quantity as well.

Moreover, the combination of these three outcomes can reveal different patterns of devel-

opment: significant increases in quantity and quality could be associated with neighborhoods transitioning from commercial/industrial to residential (or with the development of previously undeveloped areas), while increases in price and quality might be indicative of people reinvesting in the existing housing stock in older residential neighborhoods.

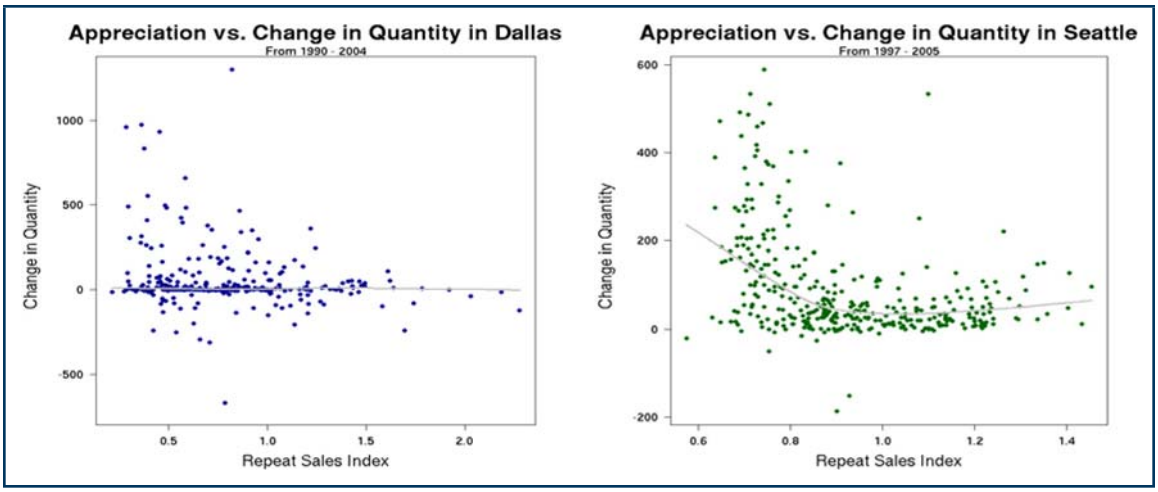
Due to limitations in our measure of housing quality, and to the fact that this dimension is implicitly controlled for in the RSI, the project focused primarily on change in price and change in quantity. The analysis first looked at the correlation of changes in price and quantity across the four sample cities and their counties overall, and then examined how the combination of these dimensions gives rise to particular spatial patterns of change across neighborhoods.[24]

### *1 How Changes in Price and Quantity Interact*

With respect to the overall relationship between change in price and change in quantity, the analysis revealed that the sign of the relationship is generally negative, but also that there is very little correlation between these two dimensions. This is not surprising: on the one hand, increases in supply should result in lower prices because more units are available on the market; on the other hand, though, more development tends to occur in areas where prices are increasing.

The strength of the relationship between price and quantity also varied by city. In particular, neighborhoods in Cleveland and Seattle displayed a stronger negative correlation between these two factors, while the correlation in Dallas and Chicago was very close to zero. This variation is likely due to different constraints on supply from neighborhood to neighborhood and from city to city.

Supply elasticity, which determines the extent to which an increase in demand will result in an increase in price, an increase in quantity, or a combination of both, depends on city and neighborhood-specific factors, such as availability of land and zoning restrictions. Consider the two scatter plots below, comparing the relationship between price and quantity in Dallas and Seattle: in Dallas, where supply is likely very elastic (due to availability of land), there is almost no relationship between price and quantity. On the other hand, in Seattle, where supply might not be as elastic (due to the geographic constraints posed by the presence of the Puget Sound, Lake Washington, and the surrounding mountains) there is a stronger negative correlation between the two.




In general, increases in both price and quantity characterize areas that are in high demand, as more people are willing to move there despite higher prices. As we will see below, these are also the areas that tend to experience more significant socioeconomic change, as people with higher incomes move into the neighborhood.

This analysis has several important implications for community and economic development. First, these findings confirm that both changes in housing values and changes in the amount of residential development need to be taken into account when measuring neighborhood change, and which one is more relevant will depend on the characteristics of each neighborhood. Second, different types of neighborhoods will change in different ways, as the geography of the neighborhood, the quality of the housing stock and the availability of developable land determine how a neighborhood will react to a change in demand.

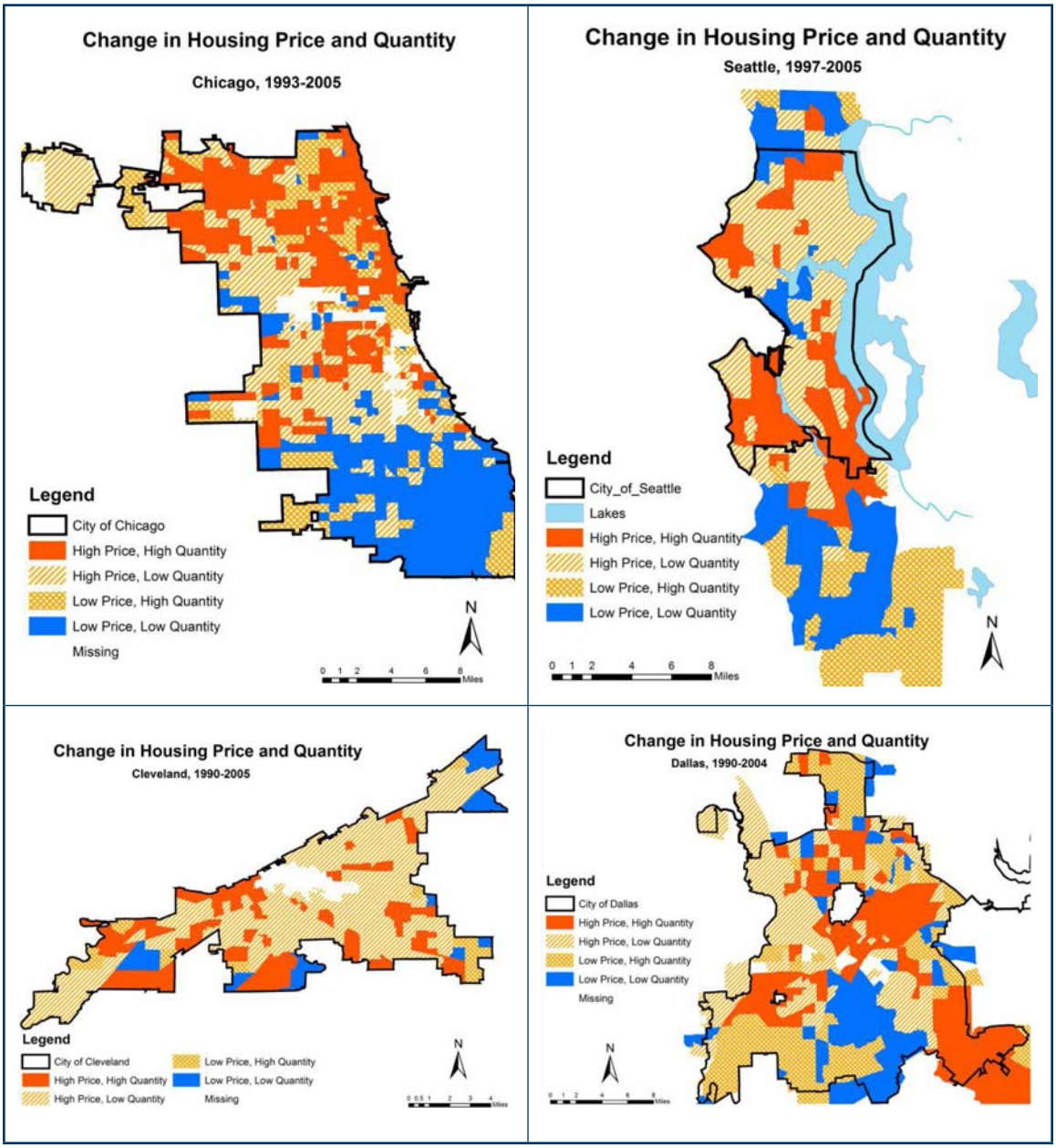
The third implication is that the development of new housing can actually help slow down the increase in property values and reduce displacement. This is perhaps a bit counterintuitive, as people often associate new housing development with gentrification. However, these results suggest that without new housing being developed, the neighborhood would experience even greater appreciation and increased displacement of the original residents. A related point is that neighborhoods with lower supply elasticity are at greater risk of displacement, as housing prices will increase faster than in areas where more housing units can easily be developed.

### *2 Combining the Dimensions: Different Types of Neighborhood Change*

Based on the combination of changes in price, quantity and quality, we can categorize all neighborhoods based on the type of change they underwent. For simplicity, we will combine changes in price and quality by looking at change in median sales prices (which reflects both appreciation and changes in housing stock) using the smoothed median index. This grouping gives rise to four broad categories of neighborhoods: neighborhoods with high growth in both

price and quantity, neighborhoods with low growth in price and quantity, neighborhoods with high price and low quantity and neighborhoods with low price and high quantity.[25]

The maps below display how each neighborhood in the four sample cities can be characterized. In general, the red areas can be considered the "hot" markets, where both quantity and price have increased more than the median, and the blue areas can be considered the "cold" markets where both have decreased or increased less than the median. These are the areas that likely experienced the greatest changes in demand and consequently underwent the biggest (positive or negative) neighborhood transformations.



These maps give a less detailed but in some respects more complete picture of neighborhood change than the appreciation maps displayed in the previous section. In particular, we can see how some of the areas that displayed high appreciation actually experienced below-median change in quantity. As discussed above, this disconnection between price and quantity increases could be due to differences in supply elasticity. Moreover, the maps show how some of the poorer neighborhoods in 1990 actually remained "cold" over the study period, particularly in Chicago and Dallas, while others experienced explosive growth. This suggests that there are some important factors that cause apparently similar areas to move in very different directions. The Drivers analysis, presented in the next section, modeled independently change in price and change in quantity to see what factors drive one or the other or both.

*Endnotes for Chapter IV*

1 All of the findings reported in this document refer to city neighborhoods only, unless otherwise specified.

2 Throughout this report, appreciation is measured in nominal terms, i.e. does not take into account inflation. Therefore, neighborhoods that show no change and might appear stable are in fact losing ground. Given that the inflation rate over the past 15 years has been approximately 2.7% nationally, areas that appreciated at a nominal rate lower than 2.7% can be thought of as actually declining.

3 Note that the database covers the central cities and their counties, not all counties in the metropolitan regions – so the comparison is to the inner ring suburbs only.

4 See, e.g., Alan Berube and Elizabeth Kneebone, "Two Steps Back: City and Suburban Poverty Trends 1999-2005," The Brookings Institution Metropolitan Policy Program, December 2006.

5 Chicago is the only city in which the downtown area has not appreciated at a higher rate. However, the ring of neighborhoods around the central part of the city did have higher appreciation.

6 The color scale in each map is different, due to the differences in the overall appreciation rates in these four cities.

7 Renters will of course have a different perspective, as they do not capture any of these returns to the investment. The analysis of appreciation and volatility is conducted primarily from the perspective of home owners and investors.

8 This is consistent with findings from the literature examining similar issues in the previous decade. In particular, in an analysis of neighborhood change over the 1980s, Galster et al. found that the poorest tracts in 1980 were as likely to increase their poverty during the next decade as they were to decrease it (roughly ⅓ each); the low-poverty ones, on the other hand, were mainly stable, with a slight tendency to increase poverty. See George Galster, Roberto Quercia, Alvaro Cortes and Ron Malega, "The Fortunes of Poor Neighborhoods," *Urban Affairs Review* 39 (No. 2, 2003): 205-227.

9 More information on this point can be found in Section IX of this report, which presents the "portfolio" of tools developed by the DNT project.

10 Barro, Robert J., and Xavier Sala i Martin, "Economic Growth and Convergence Across the United States," NBER Working Paper No. 3419 (1990). Cambridge, Mass.: National Bureau of Economic Analysis.

11 Exploratory analysis of Census data for the city of Chicago from 1970 and 1980 suggests that this is in fact a relatively new phenomenon. The opposite was true during the 1970s (and presumably the previous

decade as well), as the neighborhoods that started out with higher housing values in 1970 appreciated faster between 1970 and 1980. The first signs of convergence in Chicago neighborhoods emerge during the 1980s, and to a greater extent during the period between 1990 and 2006. It would be very instructive to examine the effects of the recent downturn in housing markets on these trends, and their implications for this theory going forward.

12 To assess the extent of sigma convergence in each city, we conducted a series of tests of the equality of the variance in the first year with the variance in the final year of the sample, based on its *F* statistic and *p*-value. The null hypothesis for these tests is that the ratio of the price variance in the first year of the study period to the variance in the final year is equal to one (i.e. prices are as dispersed at the end of the study period as they were in the initial year). We then test three alternative hypotheses: that the ratio is not one, that it is less than one, and that it is greater than one. If sigma convergence is occurring, we would expect the ratio to be greater than one, meaning that prices are less dispersed at the end of the study period than they were at the beginning. The tables containing the formal results of this analysis are reported in Appendix E.

13 For a more detailed discussion of these findings, particularly as they pertain to the city of Dallas, see Riccardo Bodini, "Regional Effects and Convergence in Dallas Neighborhood Housing Markets," *The Williams Review,* Vol. 2 ( 2007).

14 Medians were used here instead of the RSI because we are interested in two different "snapshots" of neighborhood status rather than a measure of change over time.

15 The table illustrates a 10 year transition matrix for Dallas. The rows correspond to the quintile each tract was in at the beginning of the 10 year interval, while the columns indicate where (i.e. in what quintile) the tracts ended up at the end of the period. For instance, the cell in the top left indicates that 87.5% of all the tracts that started out in the top quintile were still in the top quintile ten years later. 11% of the ones that started out on top dropped by one quintile, and so forth. Looking at the diagonal (the cells highlighted in bold), we can see that the majority of neighborhoods in each quintile remained in that quintile 10 years later, although there is more movement in the middle of the distribution (around the 3rd quintile) than at the extremes. Similar matrices were estimated for the other counties and for each of the central cities, for five and ten year intervals as well as for the entire time period.

16 This could be due to the fact that suburbs have fewer of the lowest quintile neighborhoods, which are the ones that move the most.

17 Interestingly, Seattle is somewhat different from the other cities in this respect: urban neighborhoods displayed less mobility than suburban ones, likely due to the fact that the entire city has moved together and has outpaced the rest of the region over this period.

18 This observation is confirmed by the analysis of patterns of change below, which shows how the only examples of possible neighborhood "tipping" found in the data are cases of rapid neighborhood improvement.

19 This is an important issue, both for the analysis of neighborhood dynamics and for identifying the most appropriate level of intervention (e.g. neighborhood versus regional strategies), and we return to it at the beginning of Chapter VI.

20 While at any point in time all tracts are within a few percentage points from each other in terms of appreciation rates, over the entire period this can give rise to significant differences. This is why the graphs show a wider range as time goes on.

21 This analysis is conducted using quarterly median sales prices. Since this metric is not temporally smoothed (unlike the repeat sales and median indices) it is more likely to reveal genuine trend breaks. Additional details on the methodology can be found in Appendix D.

22 The term gentrification often is used loosely and with many different connotations. The term is used here to describe a pattern of neighborhood change characterized by rapid appreciation. This appreciation may or may not be associated with the displacement of neighborhood residents.

23 See Levy, Comey and Padilla, "In the Face of Gentrification: Case Studies on Local Efforts to Mitigate Displacement," The Urban Institute Metropolitan Housing and Community Policy Center, 2006.

24 Unfortunately, due to the limited availability of the data on housing quantity, this analysis had to be conducted on different time intervals in different cities. The project looked at the entire study period for Dallas and Cleveland (1990-2004), but was limited to the period of 1993-2004 in Chicago and 1997-2004 in Seattle. Still, enough data was available to conduct a meaningful analysis of the relationship between these factors.

25 "High" and "low" here refer to above and below the median value for the county.

# V. Drivers of Neighborhood Change: The Big Picture

The evolution phase of the DNT project developed sophisticated metrics to measure demand for (and so desirability of) neighborhoods, and used those metrics to investigate a set of key questions about the nature of neighborhood change. The goal of the next phase of the project was to identify what *drives* that change: more precisely, to create statistical models that begin to explain what factors influence different patterns of neighborhood change in varying types of neighborhoods over time. This analysis was conducted at first across all neighborhoods in the sample, and then for specific subsets of neighborhoods and patterns of change of particular interest for community and economic development purposes.

This chapter of the report presents the results of the analysis conducted across all neighborhoods – the "big picture" findings on the key drivers of neighborhood change. After a brief methodological note on the challenges faced in doing this work and on the solutions adopted by the project, the chapter first investigates the broad forces (such as national and regional trends) that drive neighborhood change, setting the context for the analysis of the effect of neighborhood-specific factors. Section V.C then presents a set of findings that shed light on the basic mechanisms through which neighborhood change occurs, and Section V.D identifies some of the drivers that trigger those mechanisms, organized based on the categories of neighborhood amenities described in Chapter III. Finally, Section V.E provides a summary of the project's findings with respect to this set of issues and highlights their implications for community and economic development.

## A. Methodology

In Chapter III, we presented a theoretical model of neighborhood change (as reflected in change in the price and quantity of housing) as a function of neighborhood amenities. The Drivers phase of the project sought to translate this theory into a set of empirical models that could be used to test it and identify significant drivers of neighborhood change. This operation presents significant conceptual and statistical issues.

The main conceptual issue is due to the fact that house prices and housing investment, whether in new housing or upgrading existing housing, are the outcome of market decisions. These market decisions, in turn, are the result of the supply and demand for housing services and for neighborhood location. Since we are primarily interested in what drives demand for the neighborhood, we need to control for supply effects. In order to do so, it is important to understand the factors that affect both the supply and the demand for housing in each neighborhood.

Some of the factors affecting supply include:

- the amount of vacant land in the neighborhood;
- land use and zoning regulations;
- the current price of land and the price of land in competing neighborhoods;
- expectations about the future value of land and property.

The demand for housing in a particular neighborhood will depend on factors such as:

- the current price of housing;
- current neighborhood amenities including physical, transportation and consumption amenities, public services and social interactions.
- expected future neighborhood amenities and price of housing.

Together, the supply and demand for housing in a neighborhood determine the price, quantity, and quality of housing in a neighborhood. Therefore, each of the indicators of neighborhood success that we are attempting to model in order to identify the drivers of neighborhood change reflect the interaction of supply and demand. For example, rapidly increasing prices in a neighborhood could be the result of very strong demand to locate there, or it could be the result of moderate demand increases coupled with highly constrained supply. On the other hand, stable prices in a neighborhood could be associated with static demand, or there could be rapid growth in demand and corresponding rapid growth in supply.

While the concepts of supply and demand are straightforward, understanding the factors that change supply and demand is much more complex. Because housing and neighborhood choice are fundamentally long-run decisions, the factors affecting supply and demand include not only current conditions but, just as importantly, expectations regarding future conditions. Yet our statistical models, necessarily, must be based on observations of the past and the present.

These conceptual issues are compounded by several statistical challenges, including in particular endogeneity. This issue arises both because two of our key outcome measures depend on each other (as the price of housing depends in part on the quantity of housing produced, and vice versa), and because many explanatory variables (such as crime, for instance) could also be considered outcome measures that are impacted by changes in housing prices. This makes it difficult to cleanly infer causality.[1]

Due to these technical and statistical difficulties, the overall Drivers analysis was a particularly challenging component of the project.[2] Over the course of this work, the project team

experimented with a number of different approaches, and estimated hundreds of models reflecting different specifications and combinations of variables. The methodology summarized below and specified in detail in Appendix F (along with the model tables reported in Appendix H) reflects the end point of this process, and describes the final structure of the models that generated the results presented in the following sections.

The project estimated separate models for change in price and change in quantity of housing. Change in price was estimated primarily using the repeat sales index developed by the project. Models using median price change as the dependent variable are also included for comparison purposes.[3]

Ideally, the impact of all the different factors that could matter on each of these outcome variables would be estimated by a single regression model that would encompass all of the key drivers of change. However, this would require having a dataset that has data on all of these factors (ranging from business establishments to crime to schools) for the exact same years and level of geography in all four sample cities. As discussed in Chapter III, this was not possible, as not all datasets have the same time coverage and periodicity, making it very difficult to combine them into a unified dataset suited for time series analysis.

In order to address this issue, the project estimated three different sets of models, selected to maximize the overlap in time and geography across different datasets: 1990-2000 decennial models, in order to take advantage of Census data; 1994-2004 time series models, to take advantage of key datasets such as HMDA and Zip Code Business Patterns; and 1999-2004 time series models, to capture factors that were available only for more recent years, including credit information and crime. A more detailed description of each of these sets of models is reported in Appendix F.

## B. The Context for Neighborhood Change

### Key Findings

- Neighborhood change is heavily linked to regional change: overall, approximately **35% of neighborhood change is accounted for by regional trends**.
- This varies greatly over time and place, as the magnitude of regional effects on neighborhoods ranged from 7% (Cleveland) to 81% (Seattle).

Neighborhoods cannot be understood in isolation. They are part of larger social and economic systems, and are affected not just by their own internal characteristics but also by city, regional and national trends. Therefore, before reviewing the results of the Drivers models (which are designed to examine the effect of neighborhood-specific amenities), it is

useful to examine some of the broad forces that can affect neighborhood change.

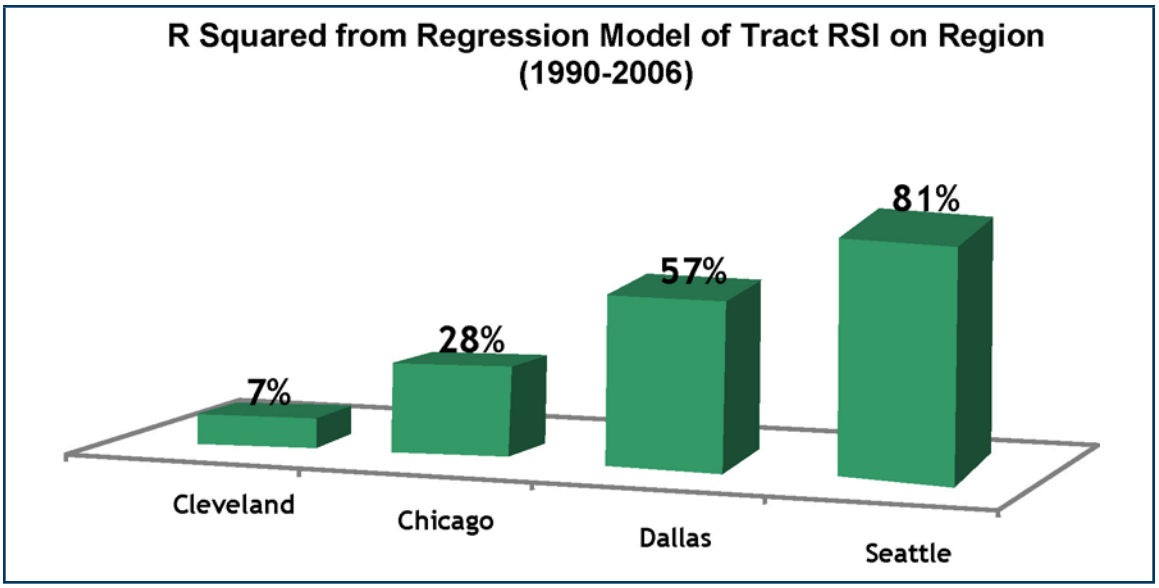
By all accounts, the past twenty years have been a period of fundamental change for American Cities. The decline of American central cities in the second half of the 20th century is well documented. At the same time that older cities were declining, newer, auto-oriented cities, primarily in the South and West, were growing rapidly. Starting sometime in the 1990's, however, the economic forces driving urban decline (declining transportation costs, changes in production technology, decline in manufacturing, demographics, negative cultural perceptions of cities) seem to have, in some measure, run their course. At the same time, new economic trends (particularly related to the ascendance of the knowledge economy) have increased the value of the density of people, businesses and amenities that cities have to offer. As a result, rather than systematic decline and disinvestment, many cities experienced increasing investment and began to fulfill new roles as centers of interaction, information, and culture.[4]

Given these trends, an important question with respect to the analysis of neighborhood dynamics is the extent to which a neighborhood is being driven by region-wide or city-wide forces versus its own idiosyncratic, neighborhood-specific forces. The relationship between neighborhood and regional trends (and consequently between regional- and neighborhood-level interventions) has also been at times a contentious issue within the economic development field: while the practice of community economic development typically focuses on the neighborhood as the primary unit of intervention, in recent years increasing attention has been paid to the region as a key unit of economic activity.[5]

There are several ways to address this question, and none of them is perfect, partly due to the fact that it is difficult to distinguish the correlation between changes in the tract and changes in the region that is due to the impact of genuine regional shifts from the correlation that is due to the fact that the region is in fact the sum of its neighborhoods.

In general, we have seen already how most neighborhoods tend to move together, and generally seem to follow the regional trend. To more formally address the issue of local versus regional shocks, the project examined the correlation of tract level indexes with county-wide house price indexes, and ran a set of regressions to estimate the extent to which regional forces affect the RSI across neighborhoods.[6] These models were run for the entire sample of tracts (including a full set of fixed and interaction terms to allow each region to have its own idiosyncratic growth patterns) as well as individually for each region.

In the regression across all tracts and all cities, regional effects accounted for 35% of the variation, meaning that, **overall, over a third of neighborhood change is explained by regional trends.** At the same time, though, **this figure varies significantly from city to city**.[7]




In the city-specific regressions, the coefficients were positive and significant in all cities, although the explanatory power of the model (which tells us how much of the neighborhood variation is explained by the regional trend) varied from city to city. In Cleveland, the value was very low, indicating that neighborhoods there have moved largely in idiosyncratic ways. By the same metric, regional trends in Chicago account for approximately 30% of neighborhood change. In Dallas and Seattle, on the other hand, the region has a much greater impact: over 50% of neighborhood change in Dallas is explained by the region, and over 80% of all neighborhood change in Seattle is accounted for by regional change.

Another way to think of this is that during the study period Seattle had more change in its regional economy (such as growth in various business clusters) that heavily impacted neighborhoods (for example, as employment rose or new people were attracted in), in contrast to Cleveland, whose regional drivers were less strong in this period. Understanding these relationships in more depth would enable better determining when to focus on strengthening neighborhood-level drivers and when to focus on regional interventions, and ultimately how best to link the two.

The Drivers models presented in the next chapter control for these regional effects in order to isolate neighborhood-specific drivers of change.

**Implications for Community and Economic Development:**

- Neighborhoods are parts of larger systems, such as housing and labor markets, which reach well beyond the neighborhood boundaries and operate primarily at the regional level. For instance, the fact that most neighborhoods in Seattle experienced very high growth in demand over the past ten years is largely due to the economic growth of the region.
- As a result, neighborhood change is a function of the interaction of neighborhood factors with regional forces. While intervention at the local level is critical (and sometimes more practical), neighborhood improvement can best be achieved through a concerted effort that takes into account both the neighborhood and the regional levels, linking for example neighborhood assets to regional markets.
- The variation in the importance of the region in different places has implications for the relevant level and type of intervention. For example, in areas of high regional growth, it may be more important to focus on neighborhood level strategies, including in particular interventions that strengthen the connections to regional forces; whereas in regions with less activity, regional growth strategies may deserve emphasis.

## C. Neighborhood Change and Changing Neighbors

**Question:**
*What are the key neighborhood-specific factors that account for neighborhood change?*

**Key Findings:**
- The findings confirm a pattern of central city revitalization: low income neighborhoods close to downtown experienced the greatest change.
- Overall, the primary mechanism for this change was households moving into the neighborhood: across models, the variables that had by far the strongest and most consistent effects were the ones related to the socioeconomic status and ethnicity of people purchasing homes in the neighborhood.
- Over a 10 year period, 70% of households in the four sample cities moved at least once.

**Implications:**
- Mobility is the primary mechanism of neighborhood change. Who a neighborhood retains and attracts reflects and defines the status, direction and nature of change in the neighborhood.
- Neighborhoods are constantly in motion ("dynamic"!): even relatively stable neighborhoods must constantly be renewing their population. Mobility is not primarily about gentrification and displacement.
- This suggests a new framework for community and economic development, based on understanding the roles of different constellations of neighborhood amenities in retaining and attracting specific types of residents in varied types of communities.

After discussing the role of regional and city forces in affecting the fate of urban neighborhoods, we can now turn to the neighborhood-specific factors that drive neighborhood change.

*Findings*

The first observation with respect to this analysis is that it confirmed the pattern of central city revitalization surfaced by the Evolution findings: low income neighborhoods close to downtown experienced the greatest appreciation. In particular, the decennial model (looking at the effect of conditions in 1990 on change in price and quantity between 1990 and 2000) and the random effects time series models showed how tracts that had higher vacancy rates, lower educational attainment and higher minority populations tended to appreciate

faster. The table below summarizes these results across both sets of models. Plusses denote positive impacts, minuses denote negative impacts, stars denote statistical significance, and zeros denote no impact.[8]

| 1990 Conditions | Effect on the RSI | | | |
|---|---|---|---|---|
| | Decennial Model | | Random Effects Model | |
| Percent Black | + | | + | * |
| Percent Hispanic | + | * | + | * |
| Percent Age 65+ | + | * | + | |
| Education more than High School | 0 | | - | * |
| Percent Vacant Units | + | * | + | |
| Distance from CBD | - | * | 0 | |

In addition to confirming a pattern of reinvestment in previously distressed areas, the analysis also began to shed light on the mechanisms and dynamics through which this change took place. In this respect, the models revealed that **mobility** (and specifically the influx of new movers into the neighborhood[9]) **is the main mechanism of neighborhood change.** Across all time series models, the variables that had by far the strongest and most consistent effects were the ones related to the socioeconomic status and ethnicity of people purchasing homes in the neighborhood.

These factors were measured using the information collected through the Home Mortgage Disclosure Act, which requires financial institutions to disclose the income and race of their borrowers. The data also identifies what loans are used for home purchase, and which of those units are owner-occupied. Therefore, using this information, we can find out the income and race of people moving into the neighborhood.[10] The loan approval rate can also shed light both on the socioeconomic status of the borrowers and on the overall outlook for the community, as it reflects the loan officer's knowledge of all the characteristics (related both to the borrower and to the neighborhood) that might affect the collateral value of the loan.[11]

The table below summarizes the results related to the variables measuring the socio-economic status of people purchasing homes in the neighborhood (borrower's income and loan approval rates). Both variables are strongly positive and significant both with respect to change in the RSI and with respect to change in the quantity of housing: the tracts that experienced the greatest increases in both dimensions were the ones that either had higher income households moving in or that were close to tracts that did.

| | 1994-2004 Random Effects Model (All Cities) | | 1994-2004 Random Effects Model (Chicago Only) | | | | 1999-2004 Fixed Effects Model (All Cities) | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | RSI | | RSI | | Quantity | | RSI | | Quantity | |
| Median Income (own tract) | + | * | + | * | + | * | + | * | + | * |
| Median Income (neighboring tracts) | + | * | + | * | + | * | + | * | - | |
| Loan Approval Rate (own tract) | + | * | + | * | + | * | + | * | - | |
| Loan Approval Rate (neighboring tracts) | + | * | + | * | + | | N/A | | N/A | |

The picture that emerges from the analysis of these indicators is that, during the period between 1994 and 2004, **lower income minority communities experienced positive outcomes, as they attracted wealthier or non-minority households.** This does not automatically mean that this influx resulted in the displacement of the original residents – in fact, there is evidence suggesting that this might often not be the case.[12] The findings do indicate, however, that a key mechanism leading to neighborhood change is the movement of people in and out of the neighborhood.[13]

This trend is even clearer when we examine the findings related to the race variables in the models. Consider the race effects as shown in Table 3, which displays the sign and significance of the coefficients of the variables measuring the percentage of African American population both as starting points (as reported in Table 1) and as influx of in-movers captured by the HMDA data.

**Table 3. Percent African American Coefficients, 1994-2004 Random Effects Models**

| | | All Cities RSI | | Chicago RSI | | Median | | Quantity | |
|---|---|---|---|---|---|---|---|---|---|
| Census | Own | + | * | + | * | 0 | | + | * |
| Census | Neighbor | + | * | + | * | + | * | + | * |
| HMDA | Own | - | * | - | * | 0 | | - | * |
| HMDA | Neighbor | - | * | - | * | - | * | - | * |

Table notes: "own" refers to within a Census tract, and "neighbor" refers to the average percent black in neighboring Census tracts. HMDA refers to the percentage of black loan applicants on an annual basis, and Census refers to the percentage of residents in a tract that are black in 1990.

The estimations summarized in Table 1 indicate that having a higher percentage of Black

residents in a given tract in 1990 had significantly positive impacts on both the RSI (in the whole sample and in Chicago) and on change in the quantity of residential units. Thus, communities with higher percentages of African American residents saw positive impacts on price and quantity. Additionally, the impact of the racial composition in neighboring tracts was strongly pronounced.

These findings suggest that communities with high percentages of African American residents had positive outcomes in Chicago as well as in the sample as a whole. Taken by themselves, these findings would be encouraging—minority neighborhoods having better outcomes—but they must be interpreted in light of the data on the racial composition of borrowers on neighborhood outcomes.

The impact of the percentage of African American residents in 1990 stands in stark contrast to the impact of the percentage of African American residents receiving home purchase loans in the census tract in the following years. The negative coefficients on the percent of African American borrowers receiving loans in a tract and its neighboring tracts indicates that neighborhoods that experience an influx of African American households do not appreciate as fast as neighborhoods in which the new movers are White (which is the omitted category in the models). These findings are consistent across samples and model specifications.

The findings regarding the role of race are mirrored in the role of Hispanic ethnicity. Table 4 shows the same set of coefficients as those in Table 3, only this time for percent Hispanic instead of percent Black. With minor exceptions, the results are essentially the same. Neighborhoods with higher percentage of Hispanic residents in 1990 realized generally good outcomes, but the HMDA data suggest that these positive outcomes were likely driven, at least in part, by the influx of non-minority residents.[14]

**Table 4. Hispanic Population Coefficients, Random Effects Models (1994-2004)**

| | | All Cities RSI | | Chicago RSI | | Chicago Medians | | Chicago Quantity | |
|---|---|---|---|---|---|---|---|---|---|
| Census | Own | + | * | + | | 0 | | + | * |
| Census | Neighbor | + | * | + | * | + | | + | * |
| HMDA | Own | - | * | - | | 0 | | - | * |
| HMDA | Neighbor | - | * | - | * | - | * | - | * |

Table notes: "own" refers to within a Census tract, and "neighbor" refers to the average percent Hispanic in neighboring Census tracts. HMDA refers to the percentage of Hispanic loan applicants on an annual basis, and Census refers to the percentage of residents in a tract that are Hispanic in 1990.

*Interpretation and Implications*

The key point of this analysis is the extent to which **neighborhood change is really about mobility.** As mentioned above, this should not be equated to gentrification and displacement. In fact, there are at least three ways in which mobility can be related to neighborhood change, and only one of them entails significant displacement of the original neighborhood residents.

First, mobility can simply "renew" the neighborhood's population as the people who move in and the people who move out have similar characteristics. An example of this dynamic might be a "port of entry" community in which new immigrants move in, stay a while, and eventually (as their economic situation improves) move out, to be replaced by other new immigrants arriving into the country. This is probably the most common dynamic: consider for instance that across the 1,500 census tracts examined by the project in four cities, roughly 70% of people moved at least once over a ten year period.[15] This means that most neighborhoods are renewing their population while relatively few are experiencing dramatic changes. Note, of course, that neighborhoods that fail to renew their population are vacating and declining.

Second, mobility can increase demographic and economic diversity in the neighborhood, without displacing current residents, as new movers with different socioeconomic characteristics (think for instance of "urban pioneers") infill a community previously occupied exclusively by lower (or higher) income households. Based on the Evolution findings presented in Chapter IV, this dynamic is more likely to occur in areas that have more room for new development, and can accommodate the new movers without major increases in housing prices related to the new demand for neighborhood housing.

The third dynamic related to mobility is the one that is frequently associated with gentrification: an influx of higher income households generates an increase in property values which results to some degree in the displacement of original neighborhood residents. In some instances this change is dramatic and happens over a very short period of time. In most cases, though, this is a very gradual process: neighborhoods that become more desirable tend to attract marginally wealthier households, who in turn attract different amenities (such as, for instance, new retail establishments), which make the neighborhood marginally more attractive, and so forth. Over the period studied by the project, both kinds of change took place, and they are examined in more detailed below.

Understanding mobility as a mechanism of change has several important implications for community and economic development. The first and most immediate implication is the importance of identifying which communities are undergoing different dynamics of

change, and tailoring interventions to the different dynamics. For example, if we can identify the neighborhoods that are more at risk of displacement, we can prioritize interventions that can mitigate the negative consequences associated with these trends. This issue will be addressed in more detail in Chapter VI.

The second and broader implication is the view of neighborhoods that emerges from these findings – a view of neighborhoods as dynamic entities in constant motion, shaped by the flows of people that move in and out of their boundaries. This observation stands in contrast with a more static view (often at the root of many community development interventions) that sees neighborhoods as self-contained units in which people are deeply rooted and spend their lives. The importance of mobility in determining neighborhood change thus suggests the need for a new framework for community and economic development practice, a subject that we will revisit in Chapter VIII.

With respect to the effects of the race-related variables in the models, there are at least two possible explanations: one is that what is observed here is not a genuine causal relationship, but a spurious correlation due to the fact that (even after controlling for income) minorities might have fewer housing options, and so might have no choice but to move to neighborhoods that are already otherwise declining. However, these results are also consistent with a body of literature that suggests that racism is still significantly affecting urban housing markets, as people perceive the influx of minorities into a neighborhood as a negative amenity, regardless of their socioeconomic status.[16] The clear implication then would be that - even during a period at the end of which we were on the brink of electing our first African American president - much more work remains to be done on race relations in America.

The findings presented in this section also raise an important analytical question: if mobility is the key mechanism of change, what attracts movers to different communities? The other results of the Drivers analysis, to which we now turn, begin to answer this question.

## D. Big Picture Drivers of Neighborhood Change

**Question:**
*If mobility is the key mechanism of neighborhood change, what neighborhood amenities help retain and attract residents?*

**Key Findings:**

- There is no "silver bullet:" different factors matter in different types of neighborhoods.
- People are attracted to places with undervalued housing but otherwise sound economic and social fundamentals.
- Being connected is important: access to public transit and downtown jobs and amenities is critical.
- Income diversity is an important neighborhood amenity, and as diversity increases the neighborhood becomes more attractive.
- Consumption amenities are not the main event – supermarkets are the only kind of retail that seems to matter everywhere.
- Neighborhood spillovers are important: what happens in your neighborhood is a function of what happens in neighborhoods next to you.

As described in the methodology section above and revealed in the analysis below, it was extremely difficult to find consistent effects across all neighborhoods and over time. This was due in part to measurement and methodological issues (such as possible non-linear effects along the lines of the ones examined in Section V.E.2 below), but also to the fact that neighborhoods are indeed highly differentiated and specialized, and so only a limited number of factors can be expected to matter "across the board."

The factors that did prove significant everywhere showed that the neighborhoods that did best are the ones that had undervalued housing but were well connected and had overall sound economic fundamentals: access to transit and downtown jobs and amenities were generally positive, as were lower unemployment rates and higher income diversity. Among consumption amenities, supermarkets in particular proved to be important to neighborhood desirability. While relatively few specific amenities were significant everywhere, the factors that drive neighborhood change do generally have effects that play out across neighborhood boundaries. This means that change in one neighborhood is often affected by what happens in the surrounding communities.

The main results from this analysis, organized based on the categories identified in Chapter III, are presented below.[17]

### Physical Amenities

This category of amenities is related to the overall appearance of the neighborhood as well as to physical features such as the presence of waterfront. While there is a rich literature on the effects of various physical amenities (ranging from parks to brownfields to vacant properties) on neighborhood change, very few of these theories could be directly tested by the project due to data limitations. For instance, the project could not secure data on the overall conditions of the buildings in the neighborhood, or on the presence of brownfields or abandoned properties. However, the project did include measures related to the presence of vacant lots and vacant units, the presence of industrial sites, and the percentage of the tract area dedicated to parks.

Contrary to expectations, the presence of vacant units proved positive and significant in the decennial model, and generally positive (though not statistically significant) in the time series models. However, it is important to note that this variable only measures the initial conditions in the neighborhood, and its effect could be due (as discussed above) to the overall pattern of reinvestment in previously distressed areas of the city.

Two physical amenities that did have the expected effect on neighborhood change were the presence of vacant land, which proved negative and significant, and the presence of parks. The literature on this amenity in particular shows that properties right next to urban parks might suffer from negative externalities related to trespassers, vandalism and noise,[18] while properties a bit further away (or separated from the park by a street or other barrier[19]) actually benefit from the presence of this amenity.[20] Our results mirror these findings closely, as **park area proved to be positive and significant in neighboring tracts,** but not significant within the tract itself.

### Access and Transportation Amenities

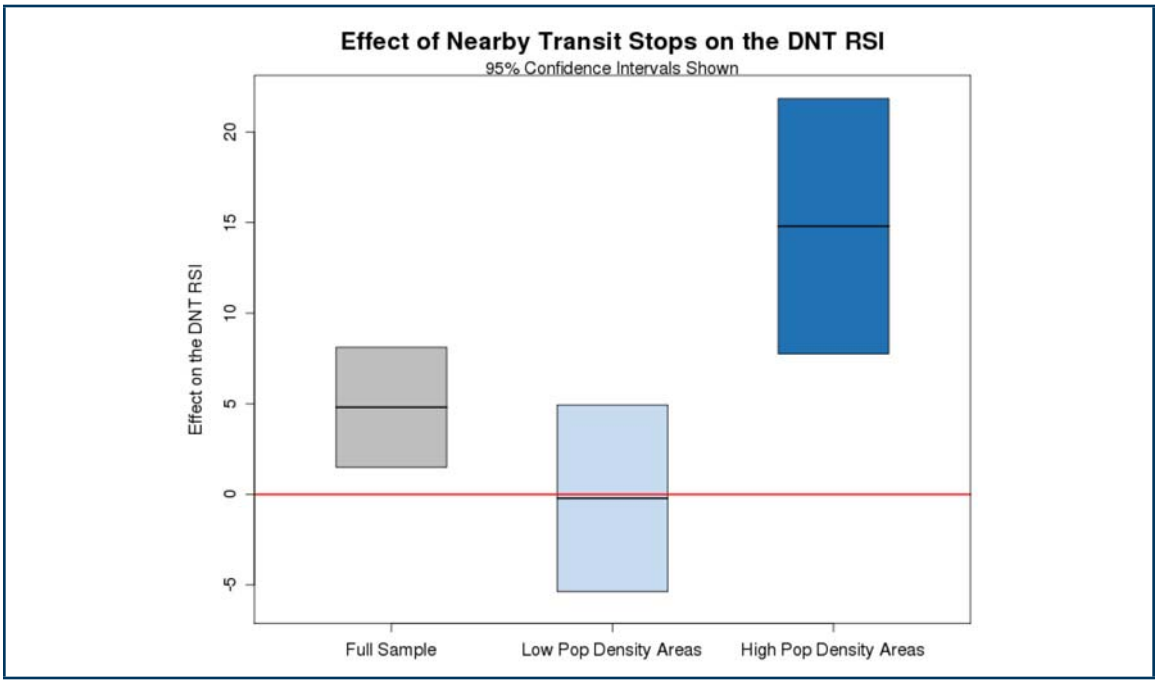
This category of amenities has to do with access to regional centers of attraction, including employment and shopping centers and regional amenities such as major parks, stadiums and museums. Access is defined both in terms of geographic proximity and of availability of public transportation. The project developed five key measures related to this dimension: distance from the central business district, distance to the closest employment center,[21] number of jobs in the closest zip code, proximity to regional amenities (defined as the number of regional amenities[22] in neighboring tracts) and number of transit stops.

We have seen how distance from the central business district was a significant factor, as neighborhoods closer to downtown generally appreciated faster over this time period. **The number of transit stops also had a positive and significant effect on the RSI,** though only for neighboring tracts, suggesting that this amenity is valuable to neighborhood residents,

but only when it is located nearby, rather than right in their own neighborhood.[23] The effects on quantity recorded in the Chicago model were even more pronounced: the effect was negative and significant within the tract, and positive and significant for neighboring tracts.[24]

These findings are consistent with much of the literature on the effects of transit stops, which highlights how access to public transportation can have both positive and negative externalities. In particular, public transit stations provide access to employment centers and other regional amenities, and can facilitate retail development around the station. However, they also provide access to the neighborhood for "undesirable" outsiders[25] and produce negative externalities such as noise. As such, transit stops might have little or negative effect for homes "too close" to them, and then a positive effect for the area that benefits from still having access to the station while not being affected by the negative externalities associated with it.[26] The negative impact on quantity could also be due to the fact that transit stops are located in areas that tend to be already built out, and so less likely to experience an additional increase in residential properties.

The segmentation based on population density yields additional insights into the effect of this factor. **While transit stops in neighboring tracts were generally positive** and significant across the entire sample, **the effect was close to zero in low-density areas. Conversely, it was highly positive in the areas with the highest population density.** This is a good example of the extent to which neighborhoods are segmented and differentiated in terms of what matters to their success, and thus of the importance of tailoring analysis and development interventions to the characteristics of particular places.



### Consumption Amenities

This dimension refers to the range of consumption options (retail and services, museums, dining, etc.) available to neighborhood residents. From Jane Jacobs to the new urbanism movement, this has always been considered an important driver of neighborhood success or decline. In order to measure its effects, the project specified a number of variables designed to capture the effect of retail and services in general as well as the effects of more specific retail and service categories. In particular, the project tested the effect of the concentration of retail and services in general by measuring the total number of retail and service establishments in the neighborhood and in the surrounding communities; it also measured the number of establishments in narrower retail and service categories, including in particular supermarkets, art galleries, bars and restaurants, and movie theaters.[27]

Overall, the analysis did not reveal consistent effects for most of the variables in this dimension, as the estimates have been remarkably unstable. **The one exception is supermarkets, which displayed a positive and significant effect on the RSI across all of the 1994-2004 model specifications.** The presence of supermarkets had a slightly negative effect on change in the quantity of housing units in the Chicago model, though this could be due to the fact that supermarkets tend to follow new residential development, and so locate in neighborhoods that are relatively more built out.

One possible explanation for the overall lack of consistent results in this dimension is the fact that the data only captures fairly broad categories of retail and service establishments, and does not enable us to distinguish between "good" and "bad" establishments within the same category. For instance, many different types of establishments can be classified as "bars and restaurants", some of which (such as sit-down restaurants) can be expected to have positive effects for the neighborhood while others can be expected to be negative. It is also possible that the spatial effects of these amenities are more nuanced: for instance, some retail establishments might have a negative impact on the closest properties due to negative externalities such as congestion, but a positive impact on properties located further away. In an analysis at the census tract level, these two contrasting effects might wash out. Finally, the effect of these amenities could vary by type of neighborhood, and so is not likely to be picked up in this kind of general model.[28]

### Public Services and Interventions

This dimension includes services such as schools, police and fire, but also interventions such as tax increment financing and public housing. The project gathered data on several public services, including public schools, social service agencies and libraries.[29] For the city of Chicago, the project also included data on the location of police and fire stations. The models

also include data on the following interventions: public housing, Low Income Housing Tax Credit (LIHTC) projects, FHA lending, and (for the city of Chicago) Tax Increment Financing (TIF) districts. The findings with respect to each of these factors are discussed below.

*Public schools*

The literature shows that the quality of public schools generally affects the choice of residential location,[30] and it is expected that neighborhoods with high quality schools will have an increased demand for housing. Due to data limitations, this theory could be tested only in the context of the 1999-2004 model, which yielded mixed results. Math test scores for elementary schools[31] proved to have a positive and significant effect on the RSI, suggesting that school quality does matter to neighborhood improvement. At the same time, though, the effect on change in housing quantity was negative. A possible explanation could be that the best performing schools are in more stable areas with less new development. It is also possible that these results are due to data limitations, and in particular to the difficulty of attributing schools to census tracts in the absence of clear boundaries for school attendance.

*Social Services*

Social service agencies include a wide range of organizations, from job training facilities to adult daycare centers to community groups, which are generally thought to play a vital role in the well-being of a community and its residents. The models confirm the importance of these functions as **social service agencies had a generally positive effect on the RSI**.[32]

*Public Housing*

The history and evolution of public housing over the years are well documented, and a large body of literature investigates its effects on the surrounding community. The evidence generally points to a negative effect on surrounding property values, though the effect seems to vary based on the characteristics of the project (e.g. whether it is high density or scattered site) and on the differences between the inhabitants of the public housing (minority, families, elderly) and the people already in the neighborhood.[33]

While the data acquired by the project did not enable us to test these theories in detail, **the models did show a negative effect of nearby public housing projects** on property values, as well as a negative effect on change in quantity.[34] It is also important to note that our study period was characterized by important changes with respect to this factor, as numerous HOPE VI projects (and most notably the Plan for Transformation in Chicago) significantly changed the public housing landscape in the four sample cities.

*Low Income Housing Tax Credit*

Unlike public housing, LIHTC projects have often been found to have positive effects on surrounding property values. As in the case of public housing, however, these effects might vary based on project and neighborhood characteristics[35] that were not gathered for this project. Partly due to this fact, the effects were inconsistent in the models, and generally unstable across specifications. Another issue with this analysis is that the effects of LIHTC developments are typically much more localized, and could be missed in a regression at the census tract level. A more nuanced, parcel-level analysis of the impact of LIHTC projects on surrounding property values did in fact reveal a positive effect.[36] The role of LIHTC projects in determining neighborhood change was also examined in more detail in the context of the analysis of non-linear effects presented in the next section.

*Other Services and Interventions*

Using the HMDA dataset available in all four cities, the project tested the impact of FHA loans on neighborhood outcomes. Overall, the percentage of FHA-insured mortgages in a neighborhood had a negative effect on both outcome variables, though interestingly the effect was positive in particular neighborhood segments, as discussed in the next chapter.

These findings are consistent with the literature on the effects of this program. Several studies, dating back to the 1970s, have found that FHA loans had an adverse effect in most neighborhoods. This has been attributed to several reasons, including poor underwriting practices resulting in high foreclosure rates, FHA loans concentration in the poorest inner city areas with the worst housing stock, and the fact that conventional lenders refrained from providing credit in communities with high concentrations of FHA loans, compounding the problems of disconnectedness and isolation.[37] All of these reasons point to the fact that the negative effects might not be related to the loans themselves, but to their use and underwriting. The positive effects found in particular circumstances (described in Chapter VI below) show that FHA loans can help if the program is implemented well.

The models also tested the effect of two basic public services (in addition to public schools and social services): police and fire stations. While data on schools and social service agencies was available across all four cities, though, data on police and fire stations was only available in Chicago.

The models suggest that **police stations might have a positive effect on price** (likely due to increased safety and reduction in crimes in the area where they are built), **while fire stations did not seem to make a difference.** This would suggest that fire stations do not provide the more direct neighborhood benefits that police stations do (perhaps because their

operations are more diffuse over a large area and they do not offer the same "deterrence" effect that police stations provide with respect to crime), or that the benefits they provide are offset by potential negative externalities associated with their operations.

The project also collected data in Chicago on the presence of Tax Increment Financing districts, which are one of the most common economic development tools used in the city. While much more detailed analysis would be needed to conclusively examine the impact of this policy, the models show that, on average, it had a positive effect on neighborhood change. In particular, **the percentage of the tract area designated as a TIF district had a positive and significant effect on the neighborhood's RSI,** while it had a slightly negative but non-significant effect on change in housing quantity.

**Social Interactions**

The Social Interactions category includes a diverse set of factors related to the human component of neighborhoods, including demographic and socioeconomic characteristics of neighborhood residents, social capital, and safety.

*Demographic Characteristics*

With respect to the demographic dimension, a first set of findings were discussed above in the context of the results on the effects of race and socioeconomic status of people moving into the neighborhood. These findings confirmed a pattern of reinvestment in inner city neighborhoods, with higher income households moving into lower income areas. One additional finding worth noting is the **negative effect of the initial neighborhood unemployment rate,** even after controlling for income, in the time series models. This finding suggests that **new movers are attracted to neighborhoods that have undervalued housing but relatively sound economic fundamentals,** as higher unemployment rates are likely indicative of more economic distress and social instability. In other words, the findings suggest that the neighborhoods that offer the most opportunities for investment (and might be particularly attractive to early movers) are the ones that present cheap housing options coupled with stable socioeconomic conditions.

While these findings shed light to what demographic characteristics might make a neighborhood attractive to new movers, they do not address the effect of change in the socioeconomic conditions of people living in the neighborhood. Measuring these effects has been difficult because of a lack of reliable annual measures of socioeconomic status. The project was fortunate to acquire from TransUnion a set of metrics that could be used for this purpose. This data, extracted from historical credit files for a sample of the US population, was used to construct a number of indicators related to income diversity, access to credit and

financial distress for the neighborhood population. These variables were available annually for all four cities from 1999 to 2006, and were included in the 1999-2004 time series model.

Three factors in particular proved to have significant effects: income diversity, measured based on TransUnion's income estimates;[38] the ratio of credit card balance to credit limit, which can be interpreted as an indicator of financial distress; and the ratio between the number of people in TransUnion's database and the total tract population, which can be interpreted as a proxy for access to credit as it provides a rough indication of how many people have credit files.

The table below summarizes the effects of these factors on neighborhood change. These results were robust across model specifications.

| **1999-2004 Time Series Model** | | | | |
|---|---|---|---|---|
| **Factor** | **Effect on DNT RSI** | | **Effect on Change in Quantity** | |
| Income Diversity | + | **** | + | |
| Ratio of Balance to Credit Limit | - | *** | - | *** |
| % Population in TU Database | + | | + | *** |

The first result shows that **increasing income diversity has a positive effect on neighborhood outcomes.** This result is particularly revealing since it is obtained controlling for the income of people moving into the neighborhood. In other words, the result is not due to the fact that income diversity increases because of wealthier people moving in, which as we have seen leads to higher property values. Rather, it suggests that **people value income diversity as a neighborhood amenity, and as diversity increases the neighborhood becomes more attractive.**

The ratio of credit card balance to credit limit is a good proxy for economic distress because it shows the extent to which neighborhood residents are financially "overextended". Not surprisingly, **the models revealed that high credit card balance to credit limit ratios among residents have negative effects on neighborhood success,** indicating that neighborhoods in which the financial conditions of the residents deteriorated did not perform as well as other neighborhoods on either measure of success.

Finally, **as the percentage of consumers with credit files increases (i.e. as more people have access to credit), neighborhood outcomes improve.** This result, confirming the importance of having access to credit, provides a useful reminder at a time in which the backlash from the subprime mortgage crisis risks seriously curtailing the availability of credit in many lower income communities.

*Safety*

The other important dimension in the social interactions category is safety. To get at this dimension, the project gathered data on violent crimes (including homicides, armed robberies, sexual assaults) and property crimes (including burglaries, arsons, thefts) in the four cities. Homicides were also modeled separately given their importance. Unfortunately the data was not available for the entire time period, so these factors could only be included in the 1999-2004 model.

The model results with respect to these variables were inconclusive. While the crime indicators included in the model had generally negative signs, the effects and significance shifted considerably across specifications. Ultimately, none of the crime-related factors had significant effects in the final specification. There is of course little doubt that crime has a negative impact on a neighborhood, and it goes without saying that there would be plenty of other reasons to fight it even if it did not. The results suggest, however, that the impact of crimes might be more localized, and not picked up in an analysis at the census tract level. A more nuanced investigation of the effect of various crime types on the surrounding community would be needed to better understand its impact. The tools developed by the project and described in Chapter IX now make it easier to undertake this kind of analysis, which would be a fruitful line of further research.

## E. Digging Deeper

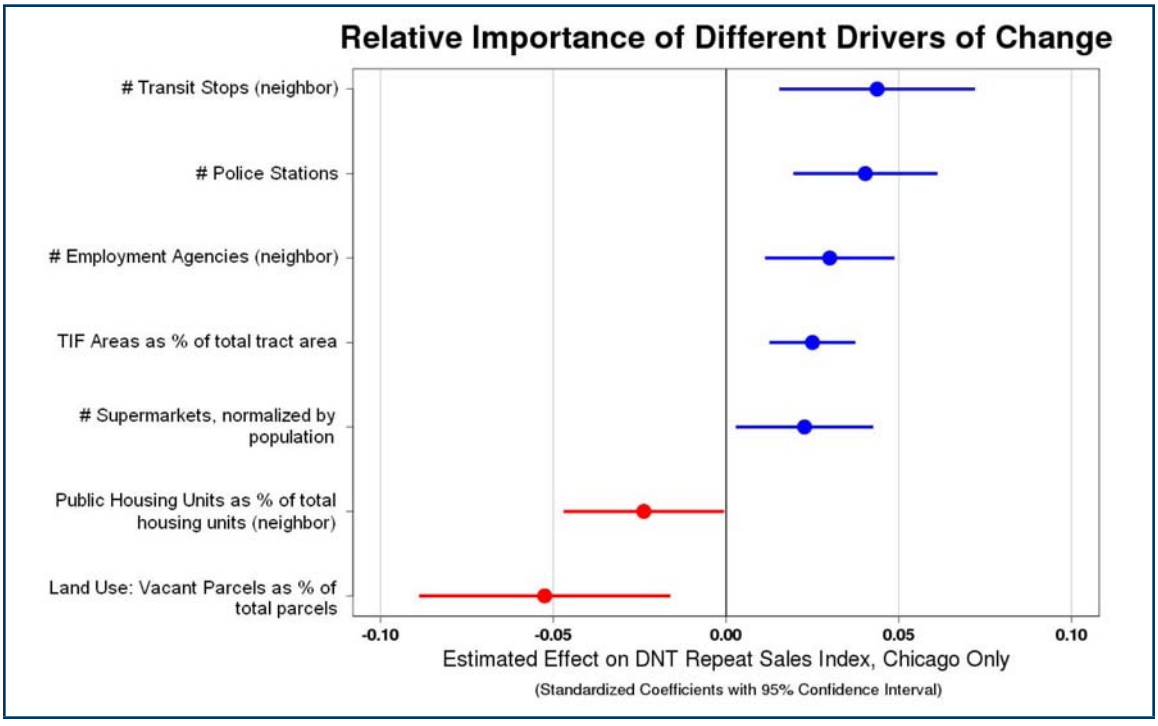
Beyond the big picture observations reported above, the lack of consistent findings on many of the neighborhood amenities variables commonly associated with neighborhood improvement (such as, for instance, consumption amenities like retail and services) suggests that there are few "silver bullets:" variation across neighborhoods means that many of the questions regarding the drivers of neighborhood change posed by the project cannot be answered "across the board." Rather, more specialized analysis is needed, along with new tools to enable investors and practitioners undertake customized analysis for particular places and circumstances.

This additional analysis proceeded in two directions: examining in more detail the effects of specific factors and the relationships between drivers of change; and identifying the drivers of change for particular sub-sets of neighborhoods. Chapter VI will present the findings related to particular neighborhood segments, while here we review some of the more detailed effects of specific factors across all neighborhoods, including in particular some observations on the relative importance of different drivers of change, non-linear effects, and effect variations over time.

### *1 Relative Importance of Different Drivers of Change*

The models used for the analysis presented in the previous section can shed some light not only on what factors matter overall, but also how much they matter relative to each other. While model coefficients typically show the effect of a unit change in the independent variable, the standardized model coefficients presented in the tables in Appendix H show the effect (expressed in standard deviations of the dependent variable) of a change of one standard deviation in the independent variable. So for instance a coefficient of one means that a one standard deviation change in that factor will lead to one standard deviation change in the RSI. This means that the magnitude of the effect is directly comparable across independent variables, even if the units in which they are measured are very different.

The analysis of these standardized coefficients shows that the variables related to race and income (both as initial conditions in the neighborhood and as flows of people moving in) generally have the largest effects in the model. The most useful observations, however, come from comparing the effects of the factors that can be influenced by development interventions. For simplicity, it is best to compare effects that come from the same model, and we focus here on the Chicago random effects model of change in the RSI, which has the most information on policy factors. The graph below shows the relative effects of these factors (the dots) as well as the confidence interval around each estimate (the lines on either side of the dot).



The chart, which only focuses on a sample subset of indicators that seemed particularly interesting for policy purposes,[39] reveals how **proximity to transit stops has the largest positive effect among these factors, followed closely by the number of police stations:** one standard deviation change in the number of transit stops leads to a 0.04 standard deviations in the RSI. By comparison, the effect of supermarkets is about half, as one standard deviation change in the number supermarkets leads to a 0.02 standard deviations change in the RSI.[40] **At the negative end of the spectrum, vacant lots have the largest negative effect,** as one standard deviation increase in the percentage of vacant parcels in a tract leads to a 0.05 standard deviations decrease in the RSI.

**Application for Practice: ROI Analysis**

This information provides the first step towards an effective "return on investment" analysis that could help prioritize development interventions. By tying the magnitude of the effect to the cost of an intervention it will help assess which strategies are most cost-effective.

Use of this analysis to guide policy decisions has two important limitations. First, the results reported here only apply to the city of Chicago for the period between 1994 and 2004, and caution should be used before generalizing beyond this context without further work. The second and more significant limitation is that having information on the relative importance of the effect is a very useful first step towards being able to prioritize interventions based on their expected impact, but it is not enough. Just because change in a factor yields larger benefits, it does not mean that interventions affecting that factor should automatically be preferred. What is missing here is the "cost" side of the equation. For instance, it might be much more difficult or expensive to increase the number of transit stops than it would be to increase the number of TIF districts in the city. Therefore, even though TIF districts have a smaller impact on neighborhood change, they might provide a "smarter" development strategy.

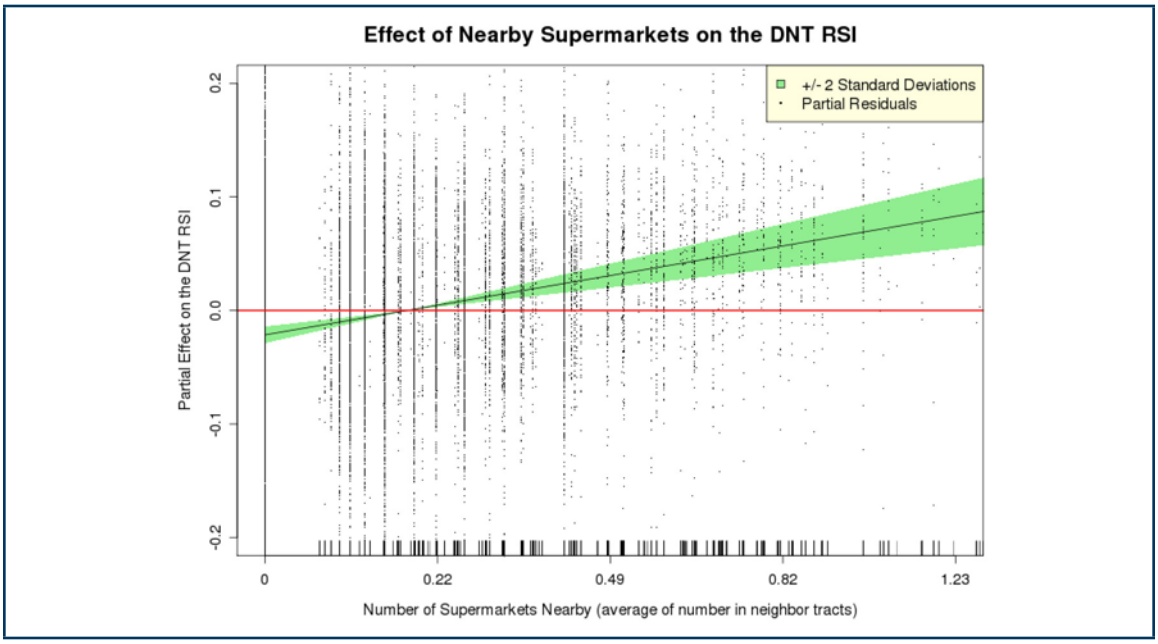
In this respect, a useful next step in the analysis would be to quantify the cost of different interventions vis-à-vis the magnitude of their effects, to assess which strategies are most cost-effective.

### *2 Non-Linear Effects*

Typically, a regression model estimates effects in a linear fashion: it assumes that the relationship between the driver and its outcome is always the same. However, the literature on neighborhood change often talks about "critical mass" phenomena and tipping points – instances in which the effect of a factor dramatically increases when its concentration reaches a certain threshold. This type of relationship would be missed in a model such as the ones discussed so far. In fact, in some instances (for example when the effect is negative up to a

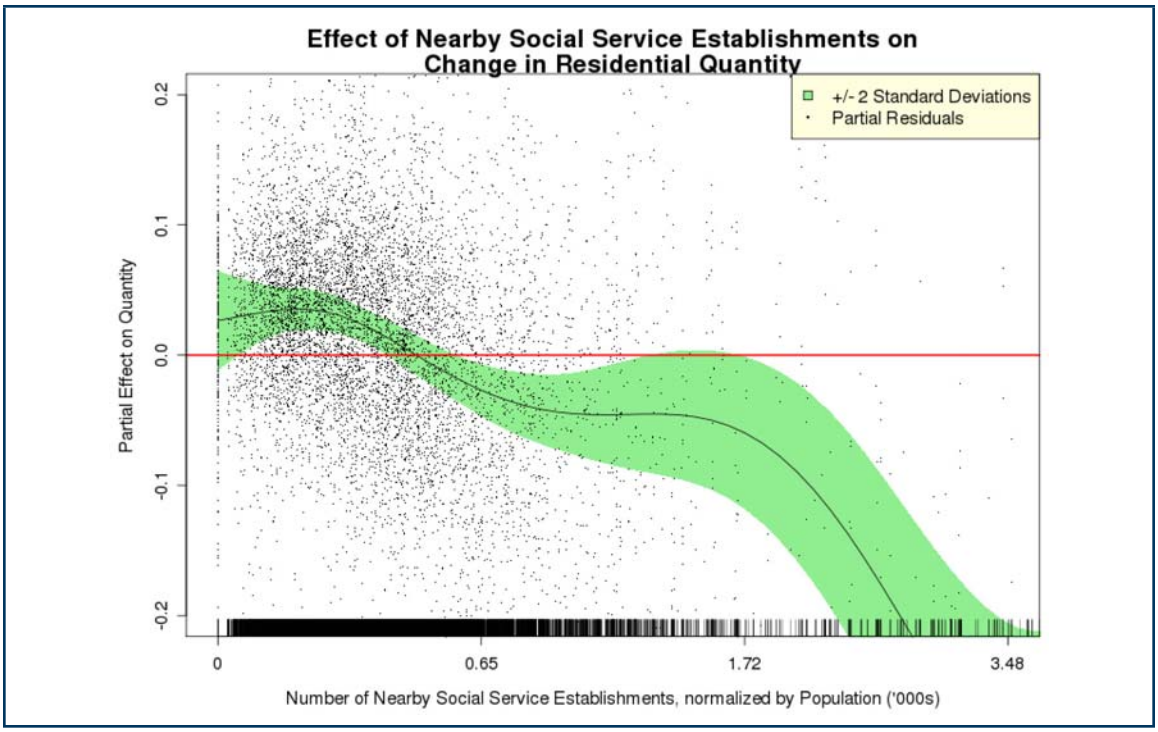
certain point and then becomes positive) the model might miss the effect altogether, as the positive and negative effects might "wash out."

To address this issue, the project used a technique called Generalized Additive Model (GAM), a procedure that extends the traditional regression model by automatically identifying and characterizing non-linear effects.[41] In other words, this method allows the relationship between independent and dependent variable to vary as the quantity of the independent variable increases. This procedure was applied to the 1994-2004 time series models, and generated a series of plots identifying possible non-linearities in the effects of each driver. In some instances (as in the case of supermarkets, depicted in the chart below[42]) this analysis confirmed the linear nature of the effects.

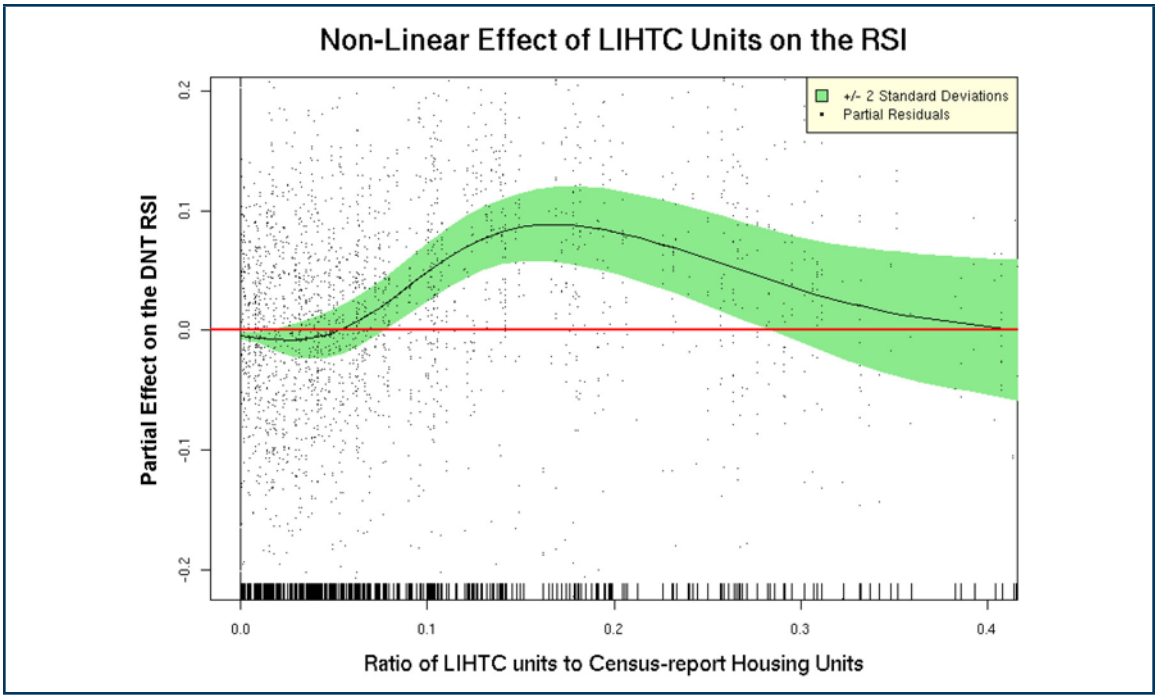



In other cases, however, GAM revealed effects that would have otherwise been missed. The two most interesting examples are the effect of nearby social service agencies on change in housing quantity and the effect of LIHTC projects on the RSI.

The graph below shows the effect of social service agencies. In the overall model, the effect was generally positive and significant. The GAM plot, however, suggests that **the magnitude of the effect of social service agencies declines as the concentration of social service agencies increases.** Moreover, it shows that the effect might actually become negative past a threshold of approximately 1 social service agencies per 1,500 people.




Another example is the effect of Low Income Housing Tax Credit units on the neighborhood RSI. As we have seen, the overall models did not reveal a consistent and significant effect for this factor. The GAM analysis, however, shows that this story is at best incomplete. As the plot below shows, the effect is indeed non-significant when there are few LIHTC units in the neighborhood, which makes sense since the effects of each project are likely localized and it might take several projects to impact an entire census tract. However, **the effect of Tax Credit units becomes positive once a greater concentration of LIHTC units (approximately 8% of the total units in the tract) is reached.** The effect then stays positive, but up to a point: as the concentration of units exceeds a certain threshold, the effect becomes less positive.




### *3 Lagged Effects: The Impact of Sub-Prime Lending*

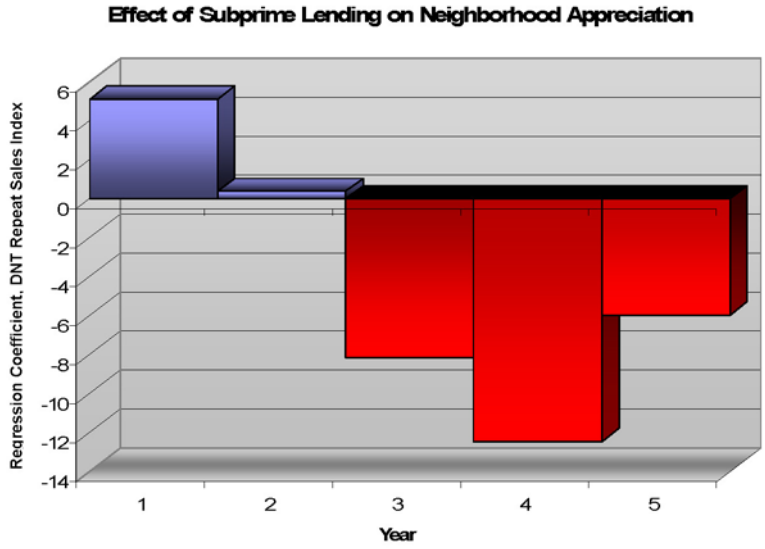
All of the time series models presented so far test for the effect of a factor on neighborhood performance the following year. However, some factors might take several years to effect change, or the effects might last longer than a year and possibly change over time. The project decided to "dig deeper" in this direction with respect to two sets of factors: the effects of the characteristics of people moving into the neighborhood, and the effects of sub-prime lending.

With respect to the demographic characteristics of people moving into the neighborhood, as discussed in Section V.C, the project found that the effects are strongest in the first year, and tend to decrease in the year after that. The findings on sub-prime lending are more nuanced and potentially useful for community and economic development purposes, and warrant a more detailed discussion.

One of the key things that people care about with respect to the sub-prime lending crisis is how it is going to play out over time: specifically, what can be expected over the next few years? With this in mind, the project investigated the effect of sub-prime lending activity on the RSI over a five year period, while controlling for all the other factors included in the 1994-2004 random effects model.

This analysis revealed an interesting pattern: **initially, having more sub-prime lending activity actually appears to be positive for the neighborhood.** As time goes on, however, the

picture changes dramatically. **After just two years, the effect is close to zero, and after three it is sharply negative. The effects are at their worst four years out, and remain negative but start to fade at five years.** The model results also allow quantifying the size of this effect: based on the regression coefficient, **a ten point increase in the percentage of sub-prime loans today will result in a 2.2% reduction in housing values over the next four years.**




In addition to shedding more light on the effects of an important factor in determining neighborhood change, this analysis has important practical applications. For instance, one can identify the number of sub-prime loans in any given year, past or present, and estimate where the neighborhood is in the cycle of "fallout" and negative impact. These results show that **the detrimental effects on the neighborhood of sub-prime lending tend to "bottom out" after four years.**

While it might seem counterintuitive, the initial positive impact of sub-prime loans is not surprising: increasing the availability of credit in the neighborhood expands investment and enables more people to become homeowners. However, since this particular extension of credit is poorly underwritten, over time it translates to higher foreclosure rates, fami-

**Application for Practice: Anticipating Impact**

These findings can help practitioners anticipate (and hopefully ameliorate) the effects of the sub-prime crisis in particular places. By monitoring the levels of sub-prime activity over the past few years, practitioners can have a good sense of how the effects will play out in the years to come. For instance, neighborhoods that have seen sub-prime lending activity peak in 2005 should expect the situation to deteriorate over the next couple of years and possibly "bottom out" around 2009, unless specific countermeasures are taken.

lies losing their homes, and an overall deterioration of the quality of the neighborhood.

The disastrous results of the irresponsible and sometimes fraudulent business practices associated with the sub-prime mortgage market have fueled a backlash against the extension of credit in lower income communities. Consistent with this research, it is worth observing that the issue should be framed differently. The problem is not how much credit is available, but what type of credit. Credit is broadly good for communities, provided that it is the "right" credit – i.e. credit that is underwritten well. Development finance institutions have proven both the opportunities and benefits of expanding the right types of credit.

### F. Conclusions from Overall Drivers Analysis

**Key Implications:**

- Rather than being implicitly approached as static, self-contained entities, neighborhoods are better understood as shaped by a constant flow of people and investment that is determined both by the mix of amenities the neighborhood has to offer and by its linkages to regional systems.
- These observations highlight the symbiotic relationship between -- and need to coordinate -- people and place based strategies, as the well-being and movement of people affect the health of the neighborhood, while the characteristics of the neighborhood affect the lives of its residents.
- When it comes to the drivers of neighborhood change, there is no "silver bullet," as neighborhoods are highly differentiated and specialized. More detailed analysis is needed, along with new tools to enable investors and practitioners to undertake customized analysis for particular places and circumstances.

The analysis of drivers of change across all neighborhoods generated some important observations. First, it confirmed something that we already knew, but that is sometimes forgotten in community and economic development practice: neighborhoods are not isolated entities. Rather, they are part of larger systems that shape their evolution. Regional trends in particular are a key element in determining the fate of individual neighborhoods, and neighborhood change cannot be understood without taking into account what is happening in the broader city, regional and national economies.

On that note, we have seen how the past two decades have been a period of fundamental change for many American cities: due to a variety of social, economic and cultural factors, after decades of decline many cities have experienced increasing investment and are fulfilling new roles as centers of interaction, information, culture, and economic activity. This shift has brought new resources and investment to many urban neighborhoods, along with

an inflow of new (and often wealthier) residents.

This has been an important dynamic of change for many urban neighborhoods. In fact, the analysis of the factors that operate at the neighborhood level reveals the extent to which neighborhood change is really about the movement of people. Neighborhoods exist in the context of a broader market place where people have choices and move to places that meet their needs and preferences, and these choices in turn contribute to shaping the neighborhood and determining its evolution.

If mobility is a key mechanism of change, the next logical question is what factors drive mobility. In other words, what are the neighborhood-specific characteristics that make them attractive to potential in-movers (or to keep residents from moving out)? In general, people seem to be attracted to places which have undervalued housing, sound economic fundamentals (including low unemployment rates and more income diversity), and access, particularly to transit and downtown jobs and amenities.[43]

Beyond these big picture observations, though, the lack of consistent findings on many of the neighborhood amenities variables commonly associated with neighborhood improvement (such as, for instance, consumption amenities like retail and services) suggests that there are few "silver bullets." Rather, neighborhoods are highly differentiated and specialized, as different people are likely to value different amenities. In other words, the key drivers of change are likely to vary based on neighborhood type and stage of development.

In addition to confirming the extent to which neighborhoods are specialized, the variation across neighborhoods means that many of the original questions posed by the project cannot be answered "across the board." Rather, more specialized analysis is needed, along with new tools to enable investors and practitioners to undertake customized analysis for particular places and circumstances. An obvious place to start in this respect is the neighborhoods that are more disadvantaged, since these are the areas we are most interested in for community and economic development purposes.

**Implication for Practice: Coordinating People and Place-Based Interventions**

Neighborhood change arises from flows of people and investment, which are driven by (and in turn influence) neighborhood characteristics. This dynamic highlights the importance of coordinating people and place-based interventions. These strategies are not mutually exclusive. Rather, there is a symbiotic relationship between the two, as the well-being and movement of people affect the health of the neighborhood, while the characteristics of the neighborhood affect the lives of its residents.

## *Endnotes for Chapter V*

1 The project addressed this issue to the extent possible by adopting Edward Glaeser's approach of regressing change on initial conditions (which was popularized by Barro in Robert Barro, "Economic Growth in a Cross Section of Countries," *The Quarterly Journal of Economics,* Vol. 106, Issue 2 (1991), pp. 407-43, and adopted for urban growth models by Edward Glaeser, Jose Scheinkman, and Andrei Shleifer in "Economic Growth in a Cross-Section of Cities," *Journal of Monetary Economics, V*ol. 36 (1995), 117-143), as well as by experimenting with various lag structures in the time series models.

2 The work, which took over six months to complete, was conducted primarily by Richard Voith and Graeme Blair of Econsult Corporation, and benefited along the way from contributions from some of the top experts on urban housing markets in the country, including George Galster, Claudia Coulton and Dan McMillen.

3 Indexes of median house prices reflect both the changes in the underlying price of a constant quality house and the changes in the quality of houses in the market. Since median housing price indexes are based on all sales in a given time period, changes in the index are, in part, dependent on the distribution of the types of houses sold. For that reason, a median-based price index is less reliable as an indicator of the underlying change in the price of housing. We examine the median index for two reasons: 1) to look for areas of consistency with the RSI and 2) to see if apparent differences between median and RSI models can be reasonably explained by changes in quality over time.

4 The three older cities in our sample, Chicago, Cleveland and Seattle experienced population losses from 1960 through 1990. From 1990 through 2006, however, the trends changed, with Seattle and Chicago experiencing net population growth. Cleveland continued to decline, but at a slower rate than in the 60s, 70s and 80s. Dallas, a newer, auto oriented city grew rapidly through 1960 through 2000, but saw very little growth from 2000 forward.

5 By focusing on economic rather than political boundaries, regional approaches might more effectively tackle development issues and devise more comprehensive strategies for economic growth. At the same time, though, the success of the region arguably depends on the wellbeing of its cities and neighborhoods, and investing in the neighborhood could be critical to strengthening both the neighborhood and its region. For a discussion of the importance of neighborhood wellbeing to regional economic growth, see Robert Weissbourd, "Strengthening communities for regional prosperity," *Living Cities Policy Series* (Vol. 1), 2006, available at http://www.livingcities.org/2006%20Files/Policy_Series_V1/Weissbourd_full.pdf.

6 In order to measure this statistically, the project measured the proportion of variance explained (the R-squared statistic) in the monthly differenced tract-level indices accounted for by ordinary least squares (OLS) regression on the monthly differenced countywide price indices.

7 These findings are consistent with previous research on low income neighborhoods across the US, which showed that regional economic cycles and population changes were the predominant factors in determining change in neighborhood poverty rates. See George Galster et al,, "The Fortunes of Poor Neighborhoods," *Urban Affairs Review,* Vol. 39, No. 2, 205-227 (2003).

8 Complete model results are available in Appendix H.

9 The flow of people moving into the neighborhood is the only aspect of mobility that we can actually measure, as there is no way of tracking directly who is moving out. However, this dynamic should not be equated to gentrification, as discussed in the implications section below.

10 While this data is extremely useful, it also has important limitations. The main one for current purposes is that it does not capture the renters who might be moving into the neighborhoods, and so it gives us only a partial picture of the new movers' demographics. It also does not tell us anything about who might be leaving or staying in the neighborhood. For other limitations of the HMDA dataset, see Paul Huck, "Home Mortgage Lending by Applicant Race: Do HMDA Figures Provide a Distorted Picture?",

*Housing Policy Debate,* Volume 12, Issue 4, 2001; and Jim Berkovec and Peter Zorn, "How Complete is HMDA? HMDA Coverage of Freddie Mac Purchases". *Journal of Real Estate Research,* 11:1,39–56. 1996.

11 See George Galster, Chris Hayes and Jennifer Johnson, "Identifying Robust, Parsimonious Neighborhood Indicators," CNR Paper 23 (November 2004).

12 In a recent study of the demographic processes underlying the gentrification of low income neighborhoods, McKinnish et al. find no evidence of displacement of low income minority households in gentrifying neighborhoods. Rather, they attribute the income increases in these communities to the disproportionate in-migration of white college graduates coupled with the retention of black high school graduates. See Terra McKinnish, Randall Walsh and Kirk White, "Who Gentrifies Low Income Neighborhoods?" NBER Working Paper No. 14036, May 2008.

13 While this appeared to be the most common mechanism for neighborhood change, there are other ways in which neighborhoods can evolve over time. In section VI.B, below, we examine the case of neighborhoods that improved with less turnover in their population.

14 To further investigate the mechanisms through which these changes occur, the project also specified a model with a one year lag for the HMDA variables. This model shows how the effect of the characteristics of the people moving into the neighborhood plays out over time. In particular, the model shows that the effect is strongest in the first year after the home purchase, and declines slightly the year after that. The only exception was the effect of Hispanic borrowers, which increased significantly over the second year.

15 This figure was calculated using Census data, and is based on the percentage of households in 2000 that lived in the same home in 1990.

16 These findings are also consistent with a significant body of literature documenting the impact of increasing numbers of racial minorities on neighborhood composition and on property values. The general dynamic identified in this literature is that white prejudice leads to a decline in demand among the majority white population, resulting in a decline in housing values. At the same time, the new demand for housing by the in-moving racial minority does not push up prices enough to completely offset this decline. For a discussion of these phenomena see, e.g., Xavier De Souza Briggs, Joe T. Darden & Angela Aidala, "In the Wake of Desegregation: Early Impacts of Scattered-site Public Housing on Neighborhoods in Yonkers", New York. *Journal of the American Planning Association* 65(1): 27-49 (1999).

17 Due to the overall lack of strong findings (with the exceptions noted above), the project focused primarily on a more specialized analysis of specific neighborhood segments (presented in Chapter VI), on a different way to think about neighborhoods and neighborhood development (Chapter VIII), and on developing new tools to enable much more customized and ongoing analysis of particular places (Chapters VII and IX).

18 See Margot Lutzenhiser and Noelwah R. Netusil, "The Effect of Open Space on a Home's Sale Price," *Contemporary Economic Policy* 19(3): 291-298 (2001).

19 See Sarah Nicholls and John L. Crompton, "The Impact of Greenways on Property Values: Evidence from Austin, Texas," *Journal of Leisure Research* 37(3): 321-341 (2005).

20 See John L. Crompton, "The Impact of Parks on Property Values: A Review of the Empirical Evidence," *Journal of Leisure Research* 33(1): 1-31 (2001).

21 This factor was computed as follows: the number of employees by zip code for each MSA was split into 15 equal quantiles. The zip codes in the top quantile were then used to identify the sub-centers. If zip codes in the top quantile were adjacent to each other, they were combined to form one subcenter. Once all the subcenters were identified within an MSA, the project identified their centroids and use the coordinates to calculate the distance between the centroid of each subcenter and the centroid of each census tract in that city.

22 Regional amenities were defined by the project as major regional attractions, such as stadiums, large parks and zoos, concert venues and amusement parks. The data was collected using a variety of sources,

including tourist guides and other internet resources.

23 Several amenities that are expected to have a negative effect nearby but a positive effect a bit further out displayed this pattern (no effect on their own tract and positive effect on neighboring tracts). This is likely due to the fact that the negative effect on the closest surrounding properties and the positive effect on properties further away but still within the same tract might wash out, resulting in a non-significant effect in the tract as a whole. Conversely, in neighboring tracts, there is no negative effect counteracting the positive, resulting in an overall positive effect for the tract as a whole.

24 The negative quantity effect within the tract could also be due to the fact that transit stops are located in areas that tend to be more built out to begin with, and so have less room for new development.

25 See David Bowes and Keith Ihlanfeldt, "Identifying the Impacts of Rail Transit Stations on Residential Property Values," *Journal of Urban Economics,* Elsevier, vol. 50(1), pages 1-25 (2001).

26 See David Bowes and Keith Ihlanfeldt, "Identifying the Impacts of Rail Transit Stations on Residential Property Values," *Journal of Urban Economics,* Elsevier, vol. 50(1), pages 1-25 (2001); and Daniel McMillen and John McDonald, "Reaction of House Prices to a New Rapid Transit Line: Chicago's Midway Line, 1983-1999," *Real Estate Economics* 32(3): 463-486 (2004).

27 The 1999-2004 models also included additional categories that seemed particularly relevant, including drycleaners, bookstores and hardware stores.

28 The fact that supermarkets proved positive and significant across the entire sample is consistent with this explanation, as grocery stores might be the most "universal" type of retail: everybody needs to shop for food, and does so frequently. Moreover, while there is clear variation in the quality of supermarkets, it is hard to imagine a supermarket that can be considered a negative amenity for the surrounding community.

29 The quality of public schools was measured in terms of student-teacher ratios and test scores. Student-teacher ratio, which is the only indicator that is available for the entire time period, is a highly imperfect metric and was dropped in the final iterations of the models. Test score is usually considered a better metric, but was only available for more recent year and could only be included in the 1999-2004 model.

30 See, e.g. K. J. Hayes and L. L. Taylor, "Neighborhood school characteristics: What signals quality to homebuyers?" *Economic and Financial Policy Review,* Federal Reserve Bank of Dallas, QIV:2-9 (1996); and Sandra E. Black, "Measuring the Value of Better Schools," Economic Policy Review, Federal Reserve Bank of New York, March: 87-94 (1998).

31 In the absence of information on attendance zones, the project focused on elementary schools since high schools tend to draw more students from outside their neighborhood.

32 As in the case of other amenities, though, this effect was primarily related to social service agencies located in neighboring tracts, rather than in the tract itself. This is likely due to the fact that some social services also have negative externalities associated with their operations that affect their immediate surroundings.

33 See, e.g., Lance Freeman & Hilary Botein, "Subsidized Housing and Neighborhood Impacts: A Theoretical Discussion and Review of the Evidence," *Journal of Planning Literature* 16(3): 359– 378 (2002).

34 In some instances, the effect within the tract was actually positive, though not statistically significant. This could be due to high collinearity between the in-tract and neighboring tract values.

35 See, e.g., Ingrid Ellen and Ioan Voicu, *The Impact of Low Income Housing Tax Credit Housing on Surrounding Neighborhoods: Evidence from New York City.* New York University, Furman Center for Real Estate and Urban Policy, New York City, NY, (2007).

36 This analysis is cited in Section IX as an example of how the "Impact Analyst" tool developed by the project could be (and in this case was, in a separate project) applied.

37 See, e.g., Dan Immergluck and Geoff Smith. "Measuring the Effect of Subprime Lending on Neighborhood Foreclosures: Evidence from Chicago." *Urban Affairs Review.* 2005; John L. Goodman Jr. and

Joseph B. Nichols. "Does FHA increase home ownership or just accelerate it?. Journal of Housing Economics. 1997; and Calvin Bradford, "Financing Home Ownership: The Federal Role in Neighborhood Decline." Urban Affairs Review. 1979.

38 Income diversity is measured here using the coefficient of variation (standard deviation over mean income).

39 As mentioned above, the tables in Appendix H enable a complete comparison of the magnitude of the effects across all of the factors tested by the models.

40 In real world terms, this means that adding one transit stop in nearby tracts can lead to a 1.6% increase in quality adjusted housing values.

41 This algorithm starts with the full regression model specification, and then tests one factor at the time, allowing its effect to vary non-linearly. More information on this methodology can be found at http://www-stat.stanford.edu/software/gam/index.html.

42 The chart below shows the effect of supermarkets in nearby census tracts, while the model results reported above refer to the effect of having a supermarket within the tract. This effect could not be directly estimated through GAM because the variable does not have enough unique values.

43 In the current real estate market climate, these findings provide a major opportunity for strategic investment. As a consequence of the housing crisis, the areas that are most attractive because of their location are now very affordable: this creates the opportunity for comprehensive revitalization strategies in these neighborhoods that can lay the foundations for the next wave of investments in a way that balances revitalization and preservation of diversity and affordability.

## VI. Drivers of Change in Lower Income Neighborhoods

The analysis of drivers of change across all neighborhoods presented in the previous Chapter identified some important big picture mechanisms and key factors that seem to matter everywhere. However, it also revealed that there are few "silver bullets:" the extent to which neighborhoods are varied and specialized means that different places are likely to respond to different factors.

In light of these results, the project conducted more narrowly focused analysis, centered primarily on the types of communities and patterns of change that seemed most relevant to community and economic development practice. In particular, this "specialized" analysis focused on three subsets of neighborhoods: low income neighborhoods that experienced significant reinvestment; low income neighborhoods that improved while retaining their original population; and immigrant communities. For each of these segments, the project investigated the drivers of change specific to that type of neighborhood and pattern of change.

It is worth noting that the baseline data, metrics and models developed by the project enable investigating many different types of important questions, and the ones presented here are just a few that seemed of particular interest. In this vein, this set of work should be viewed as an illustration of how the models and metrics developed by the project can be applied to specific subsets of neighborhoods and further our understanding of their dynamics, enabling more informed targeting of investment and development interventions.

## A. Drivers of Convergence in Lower Income Neighborhoods

**Question:**
*Why did some communities experience rapid appreciation, "catching up" to wealthier neighborhoods, while others lagged behind?*

**Findings:**
*Strong evidence suggests convergence is more likely:*
- Closer to the Central Business District
- In neighborhoods with more turnover in their population
- Near communities with more social capital (as measured by the presence of civic, social, fraternal, political, religious and other membership associations)

*Moderate Evidence Favors:*
- Supermarkets, art galleries and restaurants nearby
- Transit Nearby
- Income Diversity

**Implications:**
Prioritize and tailor development interventions based on the likelihood that a neighborhood will converge, devoting more resources to communities that have fewer chances of "catching up" on their own. In particular, investments that improve social capital, consumption amenities and access to transit might help bring more market activity to areas that are less likely to converge.

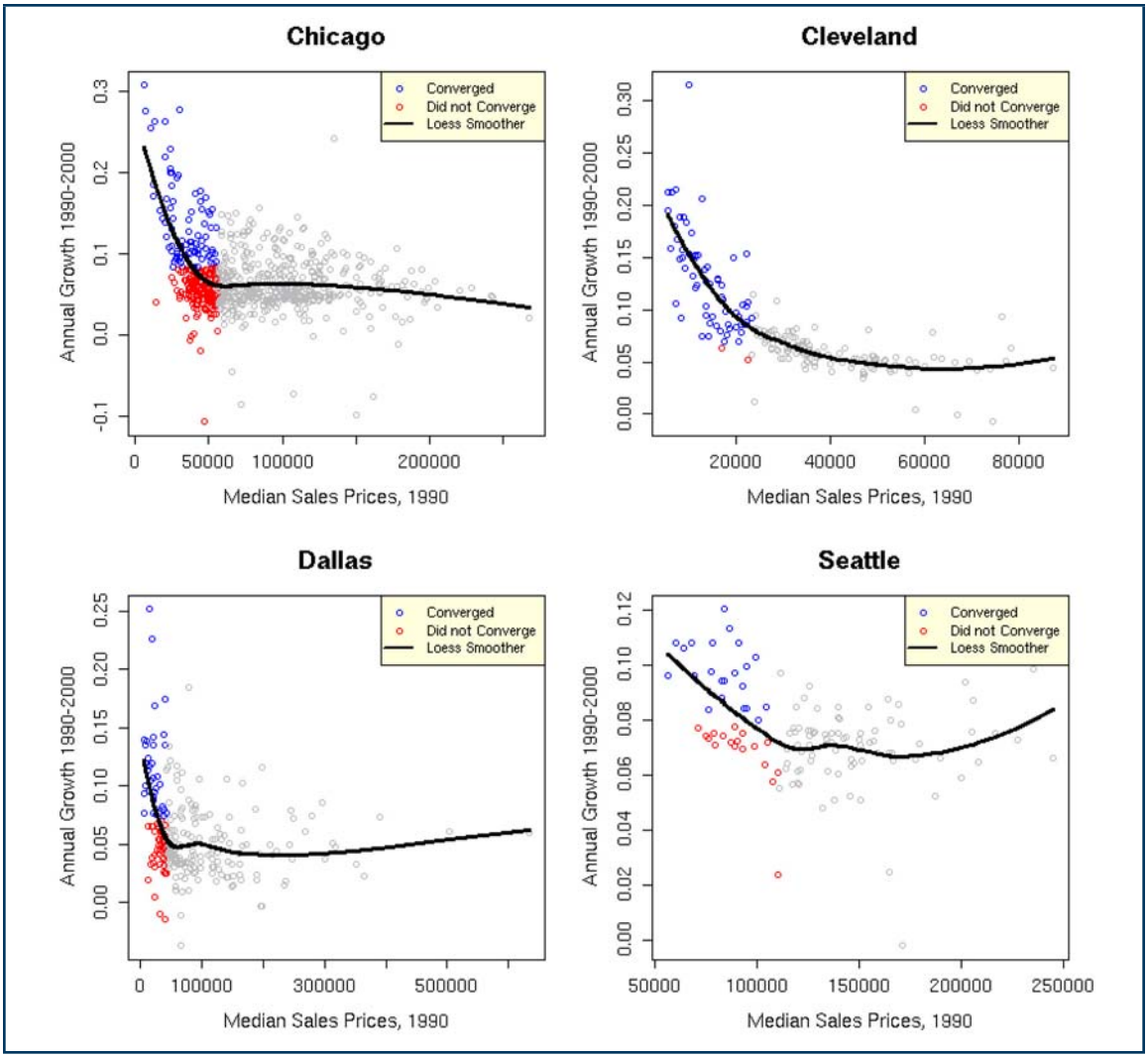
One of the important findings from the analysis of neighborhood change presented in Chapter IV is that, over time, neighborhoods that started out with lower housing values tend to "catch up" to places with higher values.[1] This finding suggests that market forces will naturally tend to bring about improvement in some communities, as underinvested areas attract investment, even in the absence of specific economic development interventions. At the same time, though, we observed that a number of poor neighborhoods did not follow this pattern, and instead started poor and remained poor throughout the study period. This raises two important questions: (1) can the project predict which neighborhoods are more likely to catch up without interventions, so development investors and practitioners can concentrate their resources on the neighborhoods that won't catch up on their own; and (2) what drivers might particularly make a difference in some of the neighborhoods that need interventions?

### *1 Methodology*

In order to address these questions, the project team first identified all of the disadvantaged neighborhoods at the beginning of the study period, and then built a model to estimate what factors caused some of them to converge (i.e. to appreciate faster than wealthier communities) over time.

The analysis thus focused on neighborhoods that started out with lower housing values, defined in particular as having 1990 median sales prices lower than the 33rd percentile of sales prices in their city. Convergence was then defined as a growth rate in median sales prices exceeding the 80th percentile for the city.[2] As in the case of the analysis presented in section IV.B, median values were used instead of the RSI because the concept of convergence refers more narrowly to investment patterns (rather than overall neighborhood improvement). Overall real estate investment is best reflected in median prices, since they include rehab activity and new construction, in addition to appreciation of existing units. However, it is worth noting that most neighborhoods that converged based on this definition also converged in terms of quality-adjusted home prices, indicating that these locations were in fact becoming more desirable.

Even though the convergence finding did not apply to the city of Dallas as a whole, several neighborhoods in Dallas fit these criteria and were thus included in the analysis. On the other hand, neighborhoods in Cleveland were excluded from the sample, due to the fact that nearly all Cleveland neighborhoods with lower housing values in 1990 converged (as shown in the figure below), suggesting the presence of a Cleveland-specific effect that would make the results more difficult to interpret.[3]




The table below summarizes the initial prices and appreciation rates for converging and non-converging neighborhoods.

| Category | # Tracts | Median 1990 | Year over Year Growth | Median 2000 | 2000/1990 multiplier |
|---|---|---|---|---|---|
| Converged | 141 | $36,000 | 10.8% | $100,000 | 2.8 |
| Did Not Converge | 230 | $42,000 | 5.4% | $71,000 | 1.7 |

After selecting the sample, the project sought to identify which neighborhood characteristics in 1990 led to convergence over the following decade.[4] This was done using a combination of logistic regression and a LASSO estimation procedure.

The logistic regression model was specified using a binary dependent variable indicating neighborhood convergence between 1990 and 2000 (as defined above), and the same set of

1990 independent variables used for the decennial models in the overall drivers analysis, including data on demographic characteristics, business presence, access to transit, public and subsidized housing, and so forth.

The LASSO (Least Absolute Shrinkage and Selection Operator) method is a regression estimation approach that offers several attractive properties complementing a standard regression estimate. In particular, this approach can be used as a variable selection procedure that may provide more stable estimates than traditional stepwise selection methods.[5] LASSO provides more interpretable models, as well as an outlier detection method that can identify and remove observations with large impact on the regression,[6] yielding more robust model results.[7] In general, this methodology is particularly useful for investigating questions related to community development: in identifying the drivers of neighborhood change, one is confronted with limited data and myriad possibilities in terms of what might matter. LASSO provides a way to address this challenge by effectively narrowing down the field of "potential candidates" to the factors that are most likely to make a difference.[8]

In summary, the modeling procedure used for this analysis was as follows:

1) Estimate the model using the Lasso procedure. The "best" variables are those in the model selected by the GCV.
2) Remove any observations within the sample that correspond to dummy variables selected in the model.
3) Estimate the model again using the Lasso procedure, this time with outliers removed. The coefficients obtained are the final Lasso coefficients.
4) Run 50 bootstrap replications of Step (3), keeping track of the frequency of variables from each "best model".
5) Estimate coefficients using ordinary logistic regression using the "best variables" selected from Steps (3) and (4).

Following this procedure, variables that test statistically significant in the ordinary logit model, are selected in Step (3), and occur frequently in Step (4) are labeled as having "strong evidence for convergence." Variables that satisfy some but not all of these criteria are labeled as either having "moderate" or "weak" evidence.

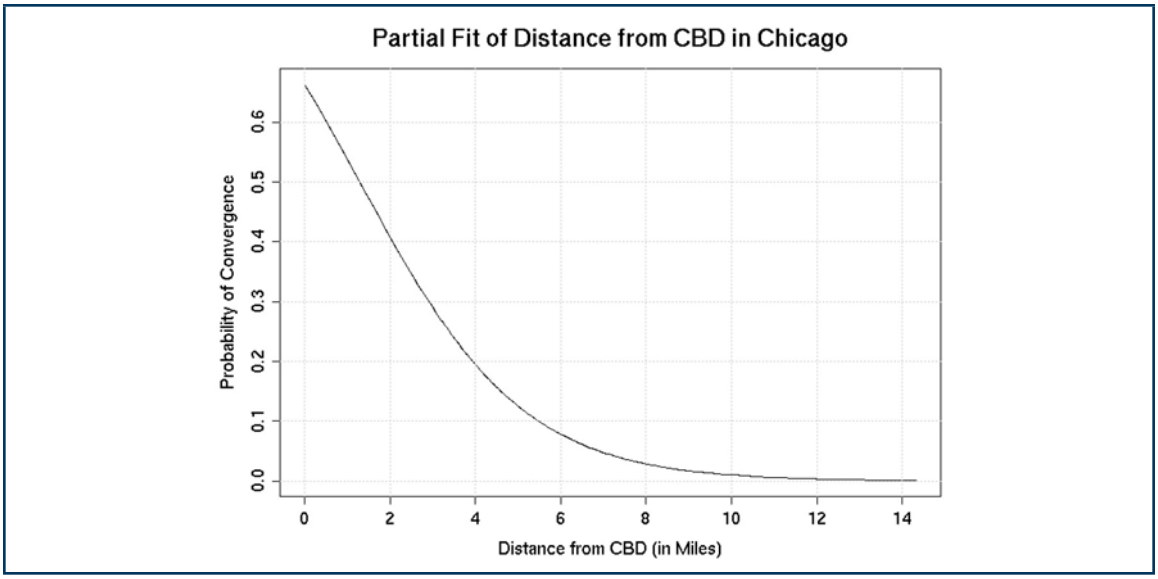
### *2 Findings*

The table below summarizes the model findings, highlighting the factors that seem to lead to high appreciation in low income neighborhoods. Given that the analysis was based on the combination of two different methods (logistic and Lasso regressions), the table reports a summary of the effects found in both models.[9]

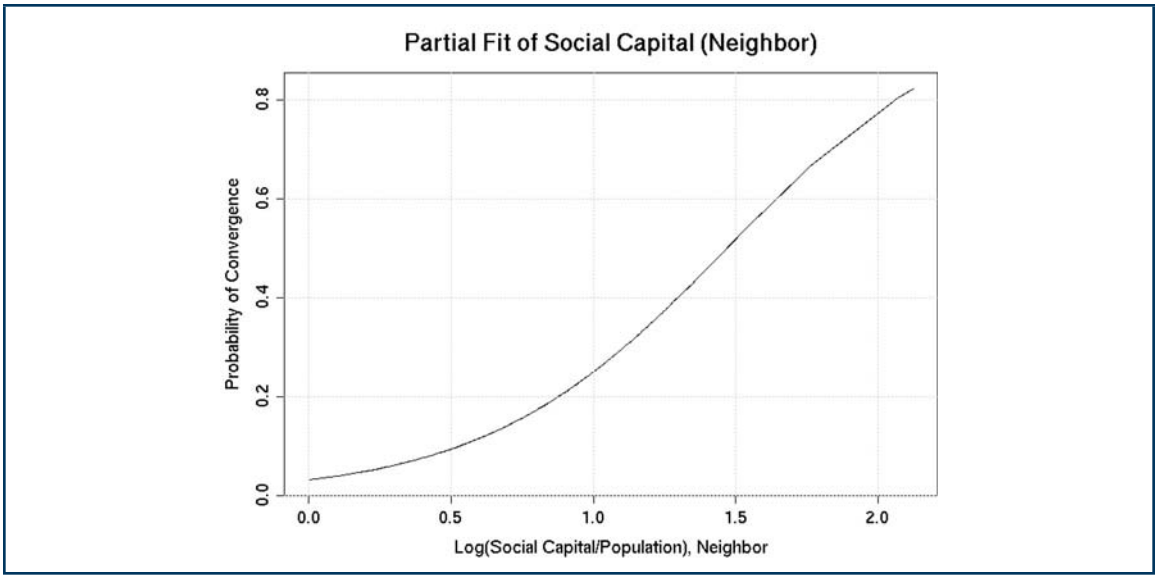
| | Logistic Regression | | | Lasso Estimates | |
|---|---|---|---|---|---|
| **Variable** | **Coefficient** | **Std. Error** | **p-value** | **Sign** | **# Bootstrap Replications (out of 50)** |
| Intercept | 0.77619 | 2.30481 | 0.736 | + | 50 |
| Geography | | | | | |
| CBD Distance: Chicago | -0.52380 | 0.11633 | 0.000 | - | 50 |
| CBD Distance: Dallas | -0.23649 | 0.09403 | 0.012 | - | 25 |
| Housing | | | | | |
| % Units Owner-Occupied | -3.98200 | 1.27140 | 0.002 | - | 48 |
| % Housing single family detached (Neighbor) | -2.50559 | 1.60457 | 0.118 | - | 24 |
| % Households Lived in Same House over 10 years (Neighbor) | -3.40084 | 3.19171 | 0.287 | - | 18 |
| Average number of Rooms per House (Neighbor) | -0.04201 | 0.44107 | 0.924 | - | 27 |
| Social Interactions | | | | | |
| Social Capital (Neighbor) | 2.34083 | 0.78561 | 0.003 | + | 49 |
| Mean/Median Income Ratio | 1.00322 | 0.69272 | 0.148 | + | 29 |
| Poverty rate (Neighbor) | 0.34653 | 1.98248 | 0.861 | + | 28 |
| % High School dropout * % dropout < 50% | -0.39298 | 0.87677 | 0.654 | N/A | 19 |
| Amenities | | | | | |
| Supermarkets | 0.95079 | 0.41486 | 0.022 | + | 25 |
| Nearby Transit | 0.66021 | 0.43065 | 0.125 | + | 21 |
| Nearby Art Galleries | 0.33819 | 0.37480 | 0.367 | + | 39 |
| Nearby Eating Establishments | 0.38908 | 0.71680 | 0.587 | + | 36 |

Factors that are significant in the logistic regression and consistently display strong effects in the Lasso model are considered the best predictors of convergence. In particular, the models provided strong evidence for the following effects:

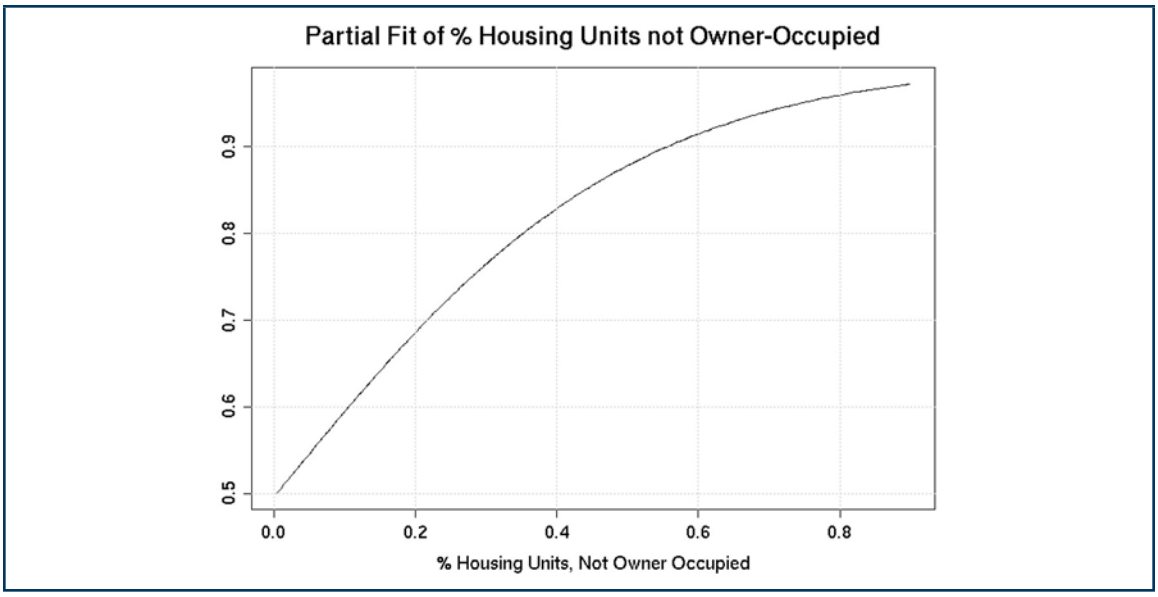
- **Negative Effect of Distance from Central Business District:** consistent with the overall drivers analysis, which showed how proximity to the CBD was an important driver of growth, convergence was more likely in neighborhoods closer to downtown, as illustrated in the partial fit plot below.[10]




- **Positive Effect of Social Capital in Neighboring Tracts:** neighborhoods surrounded by areas with high social capital (as defined by the presence of civic and social associations) were more likely to converge.




- **Effect of Housing Tenure:** Homeownership rate has a strong negative effect in the models, indicating that neighborhoods with a higher percentage of renters were more likely to converge. The Lasso models also consistently surfaced two other factors closely related to homeownership rates: the percentage of residents that had lived in the neighborhood for over 10 years, and the percentage of single family homes. Both of these factors had a negative effect on the likelihood that a neighborhood would converge.




The models also provided moderate evidence on the effects of an additional set of variables. These are considered marginally significant as they displayed significant effects under one regression scheme, but marginal or not significant effects under the other. These factors include:

- **Consumption Amenities:** the presence of supermarkets, restaurants and art galleries (either in the neighborhood or nearby) increases the likelihood that a neighborhood will converge.
- **Proximity to Transit:** the number of transit stops in adjacent communities might increase the likelihood of convergence.
- **Income Diversity:** neighborhoods with more income diversity (as measured by the ratio between mean and median income) seemed to be more likely to converge. Preliminary analysis of this factor in Chicago[11] suggests that this effect might be particularly pronounced in neighborhoods further from the central business district.

In addition to what factors have significant effects, it is also important to evaluate how well the models work overall. This can be done by testing the outcome that the model would predict for a given neighborhood against what actually happened. Formally, this can be measured using the ROC (Receiver Operating Characteristic) curve and its AUC (Area Under Curve) score. An AUC score between 0.9 and 1 indicates an excellent fit, 0.8 to 0.9 is good, 0.7 to 0.8 is fair, 0.6 to 0.7 is poor, and a fit below 0.6 means that the model has no explanatory power. For the convergence model, the AUC score was approximately 0.89. An analysis of the ROC curve for this model shows that, for instance, the model would correctly identify 60% of converging tracts as converging while predicting only 10% of non-converging tracts as converging.

### *3 Interpretation and Implications*

The convergence findings confirm some of the themes that emerged from the other phases of the work: lower income communities close to downtown experienced rapid change over the past fifteen years, likely propelled by the comeback of central cities and a new preference for living in denser, urban neighborhoods. These findings also reveal that many of the amenities that matter to all neighborhoods (including in particular access to transit and supermarkets) are just as important in lower income areas.[12]

Based on these results, we can now return to the two questions raised at the beginning of this section: whether it is possible to identify neighborhoods that are likely to experience rapid reinvestment and appreciation, and what drivers will make a difference in the ones that are not.

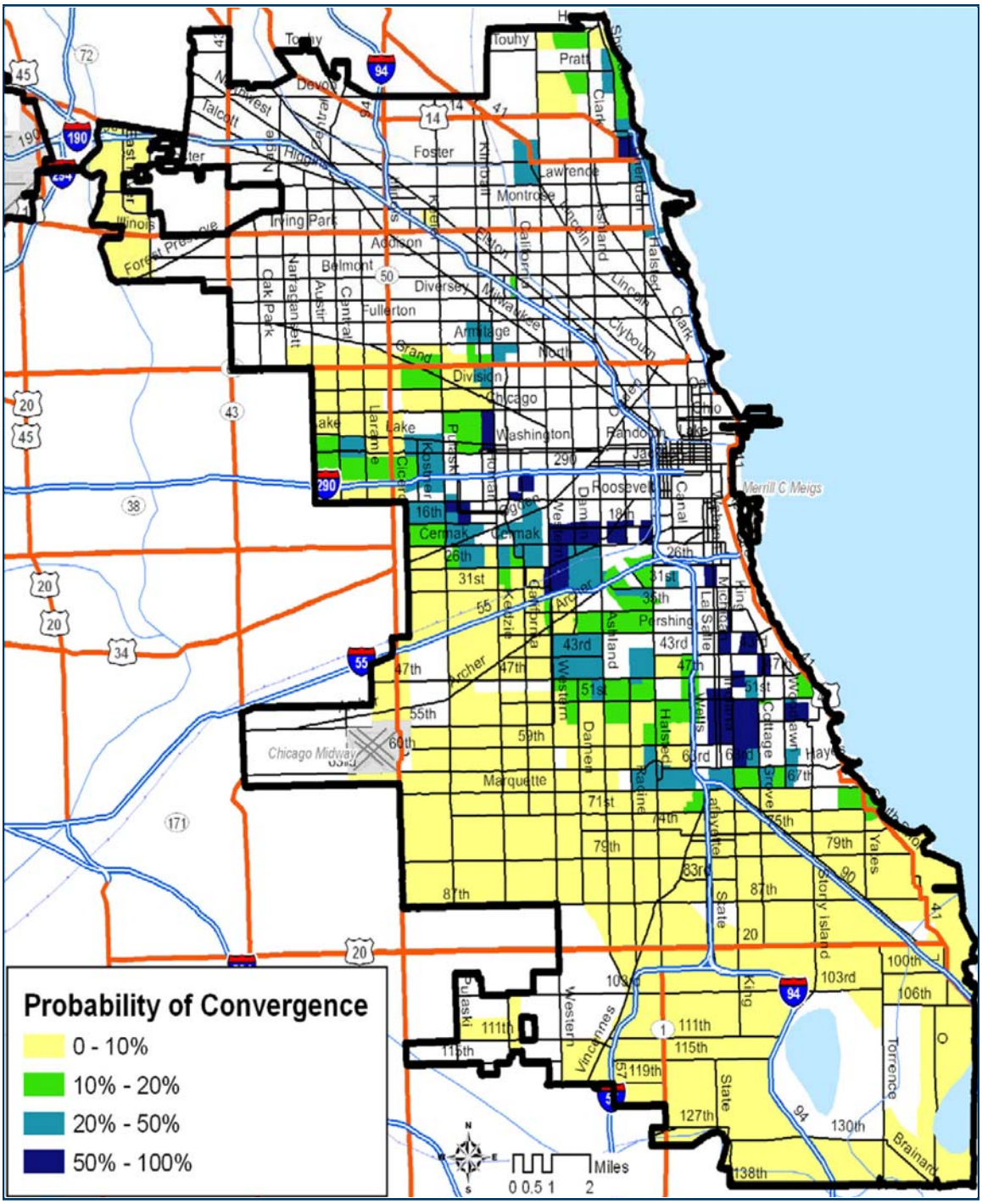
With respect to the first question, the results of the models enable us to trace a profile of the neighborhoods that are more likely to converge: these are primarily areas located closer to downtown and surrounded by communities with high social capital, good access to transit, and good consumption amenities, including in particular supermarkets. These characteristics likely make the converging neighborhoods more attractive to potential in-movers.

Moreover, neighborhoods that are more likely to converge are characterized by lower homeownership rates, fewer long-term residents, and a housing stock composed of a higher proportion of apartment buildings. A possible explanation for the importance of these factors is that communities with these characteristics present greater opportunities for redevelopment: not only are they attractive to potential in-movers, but they have a set of features that lend themselves to real estate investment. Indeed, an analysis of the change in the population and housing stock characteristics of these neighborhoods between 1990 and 2000 indicates that they experienced faster growth in population, greater reductions in vacancy rates and higher levels of new construction than non-converging neighborhoods.[13] In particular, the data suggests that real estate development activity in these neighborhoods focused on construction of new single family homes and townhomes, possibly coupled with teardown or condo conversion of multiunit buildings that were previously occupied by renters.[14] As a result, homeownership in these neighborhoods increased by 11% over the time period (compared to a 1% increase in non-converging neighborhoods), reflecting an inflow of relatively higher income households.

The main implication of this work is that neighborhoods that match this profile are more likely to be "rediscovered" by the market, and experience significant reinvestment even in the absence of targeted development interventions. From a community development standpoint, these areas present very different challenges and opportunities than neighborhoods

that are not likely to converge. For instance, a key concern in these neighborhoods might be how best to manage this kind of change in order to preserve diversity and minimize the displacement of the original neighborhood residents.

The models developed by the project also enable us to identify these neighborhoods before this change occurs, and to plan accordingly. The map below, for instance, shows the neighborhoods in Chicago that are more or less likely to experience the kinds of change described here during the current decade, based on their characteristics as of the year 2000.[15]




These findings have implications for the second question as well, as they identify a set of factors that can make a neighborhood more attractive for investment. Some of these factors in particular lend themselves to development interventions: access to transit, retail presence and social capital all can be influenced by targeted community development strategies. It is likely that improving these neighborhood characteristics would help increase market activity in communities that are otherwise not as likely to converge.

**Application for Practice: Targeting Interventions**

The convergence models have good predictive power. This means that they can be used to estimate the probability that any given neighborhood will undergo rapid appreciation over the next decade, and identify areas that are more likely to "converge" based on their current characteristics. This information can then be used to target different kinds of interventions to these communities – e.g. preservation of affordability – while devoting more resources to the neighborhoods that have fewer chances of catching up on their own.

In sum, community development strategies in lower income neighborhoods should take into account how likely the neighborhood is to undergo rapid redevelopment and appreciation based on its key features. Neighborhoods that fit the profile outlined above (close to downtown, surrounded by places with good transit and retail amenities) should focus primarily on preserving diversity and managing a change that is likely to occur regardless of what happens within the neighborhood itself. On the other hand, neighborhoods that do not have these characteristics could seek to "jumpstart" or increase market activity by focusing on the areas that can make them more attractive to potential in-movers and lead to neighborhood reinvestment (access to transit, consumption amenities, social capital).

It should be noted, however, that not all of the "non-converging" neighborhoods might need or respond to the same kind of interventions. It is possible, for instance, that neighborhoods located further from downtown, with higher homeownership rates and more single family homes, have quite different dynamics and respond to different drivers of change. For instance, they could be attractive to different demographics that seek different kinds of amenities. The Typology results, presented in the next chapter, will help shed more light on this matter, and provide the foundation for this kind of more nuanced analysis of drivers of change for specific neighborhood types.

Moreover, the findings on the effects of homeownership and turnover rates (coupled with the mobility findings in the overall Drivers models) suggest that the kind of rapid appreciation often associated with convergence is often achieved by significant gentrification and displacement, which might not be a desirable outcome from a community development standpoint. The next section will seek to address this issue by investigating what factors can lead to neighborhood improvement without major displacement of its population.

## B. Improvement in Place

**Question:**
*What factors characterized neighborhoods that improved without major changes in their population?*

**Findings:**
Improvement with low turnover is associated with:

- High homeownership
- Low vacancy rates
- Access to transit
- Presence of employment services and reduction in unemployment

**Implications:**
Workforce strategies, coupled with interventions that improve access to jobs and increase homeownership, are key to improving neighborhoods without displacement.

One of the key findings of the project is the extent to which neighborhood dynamics are defined by mobility. At a juncture in which the movement of people back to cities is fueling redevelopment in many urban neighborhoods, mobility creates significant opportunities for the residents of those communities, but also poses some challenges related to gentrification and displacement.

In fact, the goal of community development interventions has often been to help people in place, valuing the role of stability (rather than mobility) in building connections, engagement and social capital to effect change, and in ensuring that, when change takes place, neighborhood residents can benefit from it. From this standpoint, then, it would be particularly useful to take a closer look at those communities where people and place outcomes align – neighborhoods in which improvement of the place went along with improvement in the lives of its original residents.

The project thus set out to identify the characteristics that distinguish neighborhoods that improve with and without displacement, investigating what factors can lead to "improvement in place" for a neighborhood and its residents. In order to address these questions, the project looked more closely at the low income neighborhoods that improved the most, and sought to distinguish between the places that also experienced a high turnover in their population from the ones that were able to retain many of their original residents. It then developed a set of models to identify the factors that lead to improvement without displacement.

### *1 Methodology*

In order to identify the features of neighborhoods that improved without displacement, the

project team identified three distinct groups of neighborhoods that started out with low housing values: a group that did not improve, a group that improved with displacement, and a group that improved "in place" (i.e. without displacement). The analysis then compared the neighborhoods that improved in place to the other two groups, asking in effect two related questions:

1) Of the neighborhoods that improved, why did some retain their original population while others did not?
2) Of the neighborhoods that retained their population, why did some improve while others did not?

By answering these two questions, we can identify factors (at least among the ones we can measure) that account for improvement without displacement.

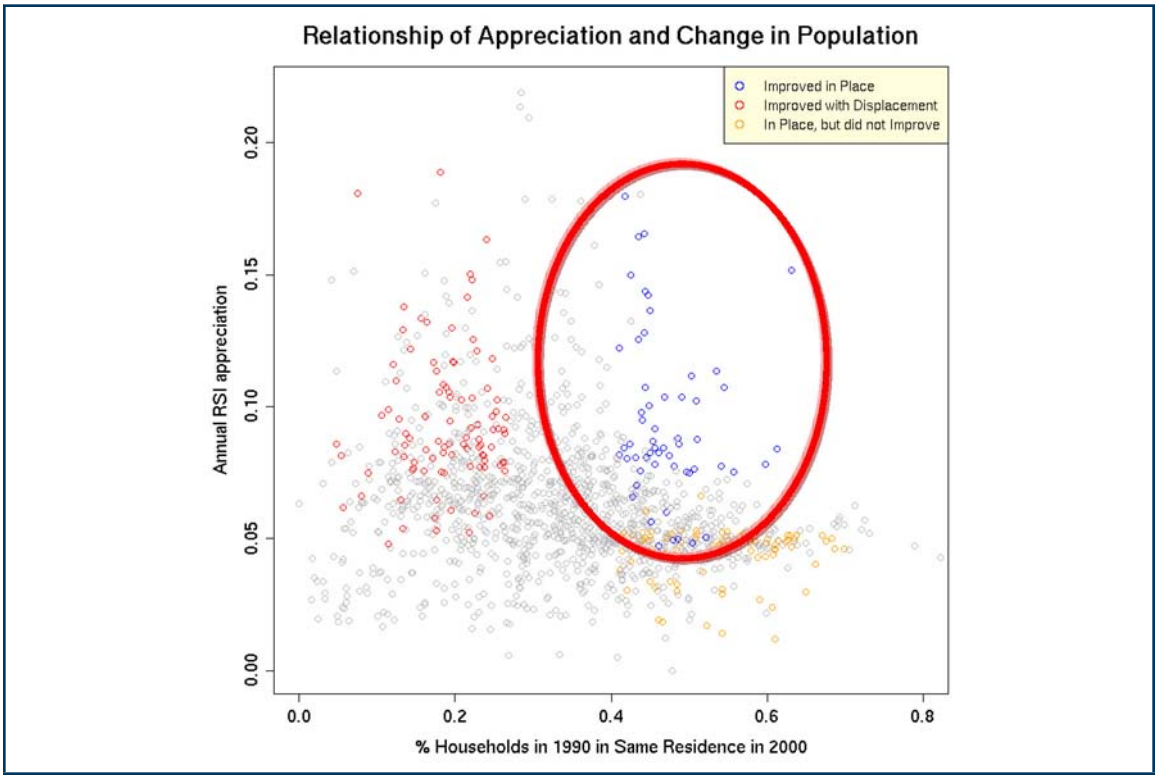
The sample was selected based on neighborhoods that started out with lower housing values, defined in particular as having 1990 median sales prices lower than the 50th percentile of sales prices in their city. Although the starting set of neighborhoods is conceptually similar to the sample used in the convergence analysis, the 50th percentile was used rather than the 33rd percentile in order to ensure adequate sample size.

Within this set of lower income neighborhoods, improvement in place was defined based on two variables: whether a neighborhood improved or not was specified in terms of appreciation using the DNT Repeat Sales Index, and whether a neighborhood retained its original population was specified using the Census variable that identifies how many people in a tract lived in the same residence 10 years earlier. The value of this variable for the year 2000 was then normalized by the tract population in 1990, to measure the percentage of people in 1990 that would remain in the same residence ten years later. This variable is labeled "InPlace2000" in the figures below.[16]

The comparison groups were then formed using 33rd percentile cutoffs for these two variables for each neighborhood relative to its city, in order to account for regional differences in appreciation rates:

| | **Bottom ⅓ InPlace2000** | **Top ⅓ InPlace2000** |
|---|---|---|
| **Top ⅓ RSI Appreciation** | Improved with Displacement | Improved in Place |
| **Bottom ⅓ RSI Appreciation** | Omitted for this analysis | In Place, but did not improve |

The following scatterplot shows where each comparison group falls in relation to the two variables. The red circle highlights the area of the graph with the group of neighborhoods that improved without displacement.[17]




Two sets of models were then used to investigate the drivers of change for neighborhoods that improve in place. The first set of models was developed using Lasso and logistic regression with the same methodology as in the convergence analysis, regressing the likelihood of improving in place between 1990 and 2000 on initial conditions in 1990. The second set of models used a random effects specification (similar to the 1994/2004 time series model from the overall drivers analysis) on the subset of neighborhoods that retained most of their residents, to estimate what drivers of change lead to higher appreciation within this group.[18]

The key difference between these two models is that the logistic regression measures the effect of initial conditions on change in the subsequent period, while the time series model measures the effect of change in the independent variables on change in the outcome variable in the following year. Take for instance public housing: the logistic regression model estimates the effect of having a certain number of public housing units in a tract in 1990 on the likelihood that the tract would improve in place between 1990 and 2000. The time series model, on the other hand, would estimate the effect of a change in the number of public housing units in year 1 on appreciation in year 2 throughout the period between 1994 and 2000. Moreover, while the logistic regression model uses a binary dependent variable with

a categorical outcome (e.g. either "improved" or "did not improve"), the time series model uses actual RSI appreciation.

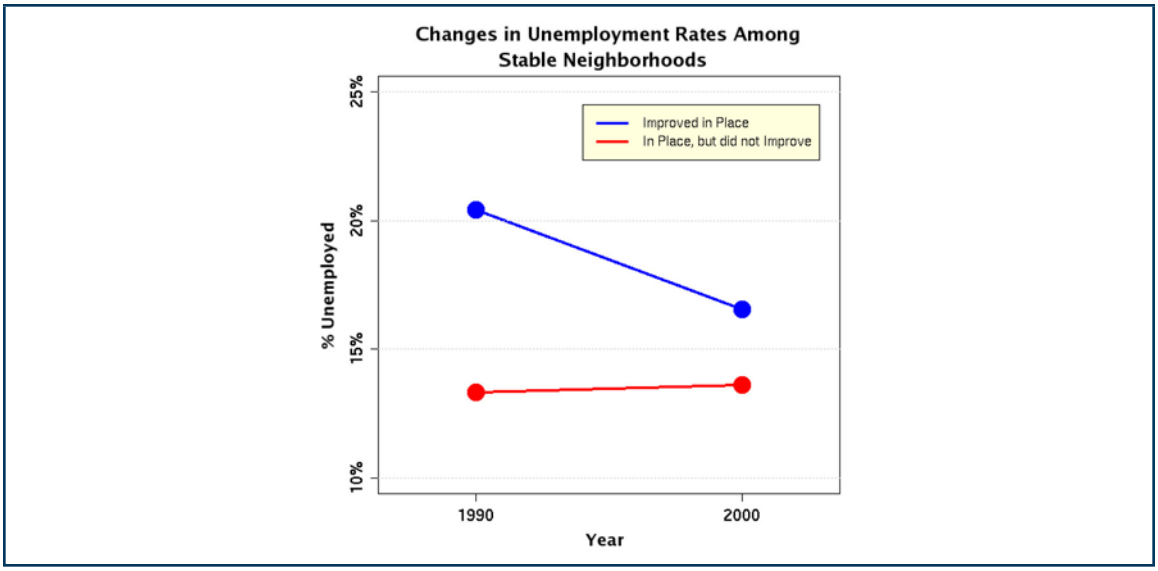
### *2 Findings*

As in the case of the convergence analysis, **the logistic regression models proved quite powerful in predicting improvement in place.** The AUC score was over 0.97 in the case of the model on all improving neighborhoods (estimating the likelihood that they would retain their original residents), and approximately 0.93 for the model on all stable neighborhood (estimating the likelihood that they would experience significant appreciation). The time series model also had good explanatory power, with an R squared of approximately 64%. The results of the logistic regression models are summarized below, while the full output of the time series model is reported in Appendix H.

| **Model 1:** Of the neighborhoods that appreciated the most, which ones were more likely to retain their original population? | | | | | |
|---|---|---|---|---|---|
| | **Logistic Regression** | | | **Lasso Estimates** | |
| **Variable** | **Coefficient** | **Std. Error** | **p-value** | **Sign of Coefficient** | **# Bootstrap Replications (out of 50)** |
| Intercept | -3.796 | 2.331 | 0.103 | - | 50 |
| Demographics | | | | | |
| % African American | 3.346 | 2.306 | 0.147 | + | 45 |
| % African American (Neighbor) | 5.118 | 2.791 | 0.067 | + | 31 |
| Housing | | | | | |
| % Units Owner-Occupied | 7.302 | 4.805 | 0.129 | + | 47 |
| % Housing single family detached | 11.115 | 5.298 | 0.036 | + | 41 |
| % Vacant units | -38.573 | 13.682 | 0.005 | - | 43 |
| Population Density | -1.980 | 1.046 | 0.058 | - | 23 |
| LIHTC Housing | -3.701 | 1.926 | 0.055 | - | 25 |
| Amenities | | | | | |
| Transit stops (Neighbor) | 2.728 | 1.109 | 0.014 | + | 24 |

| **Model 2:** Of the neighborhoods that retained their original population, which ones were more likely to appreciate? | | | | | |
|---|---|---|---|---|---|
| | **Logistic Regression** | | | **Lasso Estimates** | |
| **Variable** | **Coefficient** | **Std. Error** | **p-value** | **Sign of Coefficient** | **# Bootstrap Replications (out of 50)** |
| Intercept | -2.730 | 5.374 | 0.611 | - | 50 |
| Geography | | | | | |
| CBD Distance: Chicago | -0.356 | 0.114 | 0.002 | - | 49 |
| City: Seattle | 5.611 | 2.255 | 0.013 | + | 16 |
| Demographics | | | | | |
| % Age 19 to 34 | 18.225 | 9.602 | 0.058 | + | 31 |
| % Age 35 to 64 | -14.963 | 8.799 | 0.089 | - | 35 |
| Housing | | | | | |
| % Units Renter Occupied | 3.606 | 2.700 | 0.182 | + | 27 |
| Median housing value (in K) | -0.043 | 0.027 | 0.115 | NA | 5 |
| % Housing built last decade | -18.985 | 6.312 | 0.003 | - | 16 |
| Social Indicators | | | | | |
| Unemployment rate | 13.448 | 5.648 | 0.017 | + | 31 |
| Mean/median income ratio | 1.888 | 2.194 | 0.390 | + | 25 |
| Amenities | | | | | |
| Social capital (Neighbor) | 0.728 | 1.279 | 0.569 | + | 15 |
| Transit stops (Neighbor) | 0.967 | 0.832 | 0.245 | + | 20 |

From an economic development standpoint, one of the most relevant findings from this set of models is the importance of employment. **Among the neighborhoods that improved while retaining their residents, the ones that were more likely to improve started out with higher unemployment rates but experienced the biggest reductions in unemployment.** In particular, places that improved in place had on average a 20.4% unemployment rate in 1990. By 2000, though, unemployment was down to 16.5%. Conversely, the unemployment rate in places that did not improve was lower overall but stayed approximately the same, going from 13.3% in 1990 to 13.6% in 2000.




The time series model run for this same subset of neighborhoods confirmed these findings and also revealed **a positive and significant effect of employment agencies:** neighborhoods that increased the presence of employment services tended to experience faster appreciation.[19]

**Access to transit also proved positive in all models,** confirming the critical importance of this amenity for neighborhood improvement. Having transit stops nearby was positive and significant in the logistic regression model looking at all improving neighborhoods and in the time series model for neighborhoods that retained their population. It was also positive, though not significant, in the logistic regression models looking at the likelihood that neighborhoods that retained their population would improve. As in the case of the other models, the effect was positive for transit stops located in nearby census tracts, but not significant for transit stops in the tract itself.

Consistent with the findings of the Convergence analysis, the models also surfaced a set of variables related to the neighborhood's location and housing stock characteristics. In particular, **among the neighborhoods that improved overall, those with more single family homes, high homeownership rates** (highly correlated with single family homes), **and low vacancy rates were more likely to retain their original population**.[20] The model also recorded a negative and marginally significant effect of population density and LIHTC projects: neighborhoods with higher density and more LIHTC units were more likely to improve with displacement. Both of these variables could be related to the characteristics of the housing stock, as neighborhoods with more apartment buildings are denser and also have the type of housing stock typically targeted by LIHTC projects. Among the neighborhoods that retained their population, the ones further from downtown were less likely to improve, with the exception of Seattle (where, among this subset of neighborhoods, the

ones further from the central business district improved the most). Also, neighborhoods with newer housing stock were less likely to improve, though this could be due to a "supply effect" in the housing market: neighborhoods with more recent increases in the quantity of housing were likely to experience lower appreciation rates in the following period.

The time series model revealed a number of other factors that led to improvement in neighborhoods with low turnover. For the most part, these are similar to the drivers identified by the overall models: distance from downtown, access to transit and consumption amenities (such as art galleries, book stores and hardware stores), either in the tract or nearby. Low Income Housing Tax Credit projects also proved positive for neighborhood appreciation. One factor worth noting, which had a different effect for this subset of neighborhoods, was the percentage of FHA loans, which proved positive for these areas (while it proved negative in the drivers models across all neighborhoods).

### *3 Interpretation and Implications*

The picture that emerges from this analysis is very much in line with some of the basic tenets of economic development: employment and asset accumulation (particularly in the form of homeownership) are critical to improving the conditions of residents and their communities.

The findings on the effects of employment agencies and transit show the importance of connecting people to jobs, both by providing employment services that help people find jobs and by building the transportation infrastructure that enables people to reach those jobs (as well as other amenities in the region). The combination of increased employment and homeownership then can lead to improvement in the neighborhood overall, as residents have more resources to support other neighborhood amenities (e.g. retail), and can contribute to making their communities more attractive. Homeownership is particularly important in this respect for several reasons, well documented in the literature: it enables people to accumulate wealth, it can lead residents to be more invested in their community (both because they are more likely to live there for longer and because they can capitalize on neighborhood improvements that enhance property values), and it makes it more likely that residents will benefit from neighborhood improvement rather than being displaced as the neighborhood becomes more desirable and housing values appreciate.

**Key Implication**

Connecting people to jobs and facilitating asset accumulation in the form of homeownership are critical to improving the neighborhood while minimizing displacement.

Beyond these key observations, the findings confirmed some of the themes that

emerged in the overall models and in the convergence analysis: proximity to downtown and to neighborhoods with good consumption amenities leads to faster appreciation. It is possible that in neighborhoods with more apartment buildings and rental units this translates to large scale rehab, condo conversions and construction of more upscale single family residences, accelerating the process of displacement of the original residents. The fact that denser neighborhoods were more likely to improve with displacement is also consistent with this picture, as these are the areas that have fewer single family homes and more apartment buildings. Moreover, in denser neighborhoods it is more difficult to build new housing, either to accommodate new residents and reduce the upward pressure on the price of existing units, or to increase the affordable housing stock for original residents, leading to greater displacement.

Finally, it is worth pointing out the effect of two factors, both directly related to public policy, that matter in particular to lower income neighborhoods that retained their population: FHA loans and Low Income Housing Tax Credit projects. We have seen how, across all neighborhoods, FHA loans tended to have a negative effect on appreciation. However, particularly in lower income neighborhoods, FHA loans can help families enter homeownership and begin to accumulate assets and wealth, which is particularly important for the wellbeing of these types of communities.[21]

The use of Low Income Housing Tax Credit projects in these communities can be beneficial and favor "improvement in place" in at least two respects: to the extent that the credits are used to rehab blighted properties, this would lead to an overall improvement in the appearance of the neighborhood, and several studies suggest that these kinds of projects translate to higher values for nearby properties.[22] Moreover, they increase the availability of affordable housing for the population that is most vulnerable to displacement, improving their chances of remaining in the neighborhood. In other words, these projects can improve the overall desirability of the neighborhood and directly benefit the homeowners, while at the same time providing the lower income renters with an alternative to displacement.

## C. Drivers of Change in Immigrant Communities

**Question:**
*How do the drivers of change for immigrant communities differ from the ones for other neighborhoods?*

**Findings:**
For the most part, immigrant communities respond to the same drivers of change as all other neighborhoods. However, there are some important nuances:

- Proximity to jobs is more important for these neighborhoods
- Immigrant communities are less vulnerable to subprime lending
- LIHTC projects seem to have a negative impact in these communities.

**Implications:**
Economic development strategies in these neighborhoods should focus less on subprime lending and foreclosure remediation and more on access to jobs. At the same time, more specialized analysis is needed to uncover additional potential differences.

Not all lower income neighborhoods are alike. This statement might seem obvious, but it is all too often forgotten in practice, whether in the context of market analysis for business investment or in the design and implementation of development interventions. Indeed, an important issue in economic development (and one of the key reasons for this project) is enabling funders, businesses and government agencies to better differentiate among different types of lower income neighborhoods, and identify which strategies and investments are more appropriate to each type.

The neighborhood typology presented in the next section is designed to begin addressing this very issue. As a starting point in this more specialized analysis of drivers of neighborhood change, though, we can begin by identifying a particular type of lower income neighborhood and investigating the extent to which change in these communities is driven by different factors.

One type of lower income neighborhood of particular interest to the field is immigrant or "port of entry" communities, as immigration remains a key issue in urban policy. Moreover, these communities often differ from other lower income neighborhoods[23] in terms of ethnicity, culture, and economic characteristics, and might present different types of challenges and opportunities for economic development. The project thus took a closer look at these neighborhoods, and sought to assess the extent to which the drivers of change in these communities differ from those identified overall.[24]

### *1 Methodology*

There are two ways in which immigrant communities might be different from other neighborhoods with respect to their drivers of change:

1) They might follow the same model and drivers of change, but have different values for the factors that matter. For instance, transit stops might matter to immigrant neighborhoods as much as they matter everywhere else, but immigrant communities might happen to have fewer (or more) transit stops than other neighborhoods.
2) The *relationships* between drivers and neighborhood change might actually differ in these neighborhoods: transit stops could actually be more (or less) important in immigrant communities than they are everywhere else.

To sort this out, we first looked at how well the baseline drivers model fit these communities overall, and then identified the factors that had different effects in these neighborhoods.

The first step in this analysis was to identify all of the neighborhoods that had a sizeable immigrant population at the beginning of the study period. Since the goal was to identify the factors that lead to improvement for this type of neighborhood, rather than factors that cause this type of neighborhood to change and become a different type, only the places that still had a large immigrant population at the end of the study period were retained for the analysis.

In particular, the project selected communities in which at least 25% of residents were foreign born in 1990 and that did not have more than a 10% change in the number of foreign born residents between 1990 and 2000.[25] These thresholds were established to ensure that the sample would be large enough to conduct the analysis.

The project then used the fixed-effect version of the baseline 1994-2004 time series model to identify the most important drivers of change in these communities. The analysis proceeded in two steps: first, regression diagnostics were calculated to evaluate how well the overall model fits the immigrant community sample.[26] This test is designed to answer the threshold question of whether these communities follow the same basic model as every other neighborhood (case 1 above), or whether they are in fact fundamentally different from all other neigh-

**Application for Practice: Targeting Interventions**

The methodology described in this section, combined with the baseline models developed by the project, is a powerful way to assess the difference in drivers of change for any subset of neighborhoods that might be of interest to practitioners, enabling more targeted investments and development interventions.

borhoods in terms of their drivers of change (case 2 above).

After this initial exploration, the model was modified by including interaction terms between each independent variable and a dummy variable indicating whether a census tract is an immigrant community. A joint (Chow) test of significance within the appropriate regression was used to test if all interaction terms are equal to zero, and the interactions were individually tested for significance using Bonferroni-corrected p-values. This analysis is designed to identify which drivers of change matter more or less in immigrant communities than in all other neighborhoods.[27]

### *2 Findings*

Before presenting the model findings, it is useful to provide a more complete description of the communities that were selected for this analysis, including in particular the extent to which they differ from other lower income neighborhoods.

While these communities have below average incomes and housing values, residents tend to be better off than in the communities considered for the analysis in the previous two sections: they have slightly higher incomes, are in better financial standing (as measured by credit lines past due and ratio of balance to credit limit), and are more likely to be employed. Crime rates are also lower than in the other neighborhoods. Though most of these communities are primarily Hispanic, there are significant exceptions: 28% have a majority non-Hispanic White population and 8% are mostly Asian. The housing stock tends to be slightly older than average, composed mostly of rental units in apartment buildings, with low vacancy rates. These neighborhoods are also characterized by higher population density and a much higher concentration of retail and service establishments.

Despite these differences, the base model fits these communities fairly well, suggesting that the **overall the drivers of change in immigrant neighborhoods are similar to the drivers of change in all other neighborhoods.** There are some differences, though: when the baseline model is applied to immigrant communities, the mean fixed-error component is -0.1164.[28] In other words, the appreciation predicted by the model for these neighborhoods is consistently higher than the actual appreciation, suggesting that something in these communities is causing them to appreciate less than other neighborhoods with similar values in the drivers of change measured by the model.

In order to identify what these factors are, the project estimated a model adding interaction terms with a variable indicating whether each neighborhood is an immigrant community. If the coefficients on the interaction terms are significantly different from the coefficients on the non-interacted variables, it means that that factor has a different effect on immigrant communities than it does everywhere else.

This model surfaced three factors in particular that could account for the differences in model fit: sub-prime lending, number of jobs in the closest zip code, and LIHTC developments. The coefficients are summarized in the table below:

| Variable | Coefficient | Standard Error | p-value |
|---|---|---|---|
| Subprime loans as % of total home purchase loans | 0.07209 | 0.00666 | 0.00 |
| Interaction | -0.08530 | 0.02900 | 0.16 |
| Share of city employment located in closest zip code | -0.08552 | 0.01903 | 0.00 |
| Interaction | 0.36974 | 0.10787 | 0.03 |
| LIHTC units as % of total units | -0.00838 | 0.01050 | 0.43 |
| Interaction | -0.17203 | 0.04381 | 0.00 |
| | | | |
| Year 2002 dummy | 0.44515 | 0.00559 | 0.00 |
| Interaction | 0.08052 | 0.01775 | 0.00 |
| Year 2003 dummy | 0.50259 | 0.00579 | 0.00 |
| Interaction | 0.11352 | 0.01845 | 0.00 |
| Year 2004 dummy | 0.56391 | 0.00651 | 0.00 |
| Interaction | 0.13129 | 0.02088 | 0.00 |
| | | | |
| All interaction terms | | | 0.00 |
| R2 of interacted model | 0.8644 | | |

**In the model run on all neighborhoods, subprime lending has an initial positive and significant effect on appreciation. However, it had no effect on immigrant communities.** The project also took a preliminary look at how the effects vary over time, and found that, unlike in all other neighborhoods (where the effects of subprime loans became negative in subsequent years), in immigrant communities they remained non-significant.

Conversely, the concentration of employment (or business activity) around the neighborhood is negative (though not significant) for all neighborhoods but positive for immigrant communities: when business presence increases around these neighborhoods, prices tend to increase, whereas when the same happens in other areas, prices tend to either remain the same or decrease. Finally, Low Income Housing Tax Credit projects, which are not significant in the overall sample, are negative and significant for immigrant neighborhoods.

The remaining factors estimated in the baseline model (including demographics, retail and

services, access to transit, etc.) had the same effects in immigrant communities as they had everywhere else.

### *3. Interpretation and Implications*

Before discussing these findings, it is important to stress that this analysis has at least two important limitations, and should be considered a preliminary exploration of these issues. The first limitation is that it groups together all immigrant communities, while there might be significant differences in their dynamics based on ethnicity, country of origin, and other neighborhood characteristics. Moreover, data limitations prevented us from testing the impact of more specific factors for these neighborhoods, such as factors related to the integration of the foreign born population into the mainstream economy, including for example availability of ESL classes, specialized employment services, and access to credit.[29]

At the same time, the analysis did reveal some useful observations regarding the drivers of change in immigrant communities, starting with the fact that, based on the factors that we were able to test in the models, **for the most part immigrant communities appear to respond to the same drivers of change as all other neighborhoods.**

There are, however, some exceptions that might warrant further exploration. In particular, the finding concerning the different impact of employment opportunities nearby indicates that proximity to jobs is particularly important for the immigrant population that lives in these communities, and should be a key area of focus for development interventions.[30] The findings and implications related to the effects of sub-prime lending and LIHTC units are less clear, and would benefit from additional analysis.

*Endnotes for Chapter VI*

1 As explained in Section IV.B, economic theory refers to this phenomenon as "convergence," observing that, over time, places that are less developed will grow faster, as capital and investments flow to areas where they are underutilized.

2 These cut-offs were selected with the goal of identifying clear differences in neighborhood conditions and outcomes while at the same time preserving sufficient sample size for the analysis.

3 Exploratory regression models suggest that this effect would not be captured in any of the variables available for the analysis.

4 This approach is similar to the decennial models used for the overall drivers analysis. The main difference is that in this case the outcome variable is the occurrence of convergence, rather than change in price, between 1990 and 2000.

5 See Tibshirani, R. (1996) *Regression Shrinkage and Selection via the Lasso.* Journal of the Royal Statistical Society, Vol. 58, No. 1, pp. 267-288.

6 See McCann, L., Welsch, R.E. (2007) *Robust variable selection using least angle regression and elemental sampling.* Computational Statistics and Data Analysis, Vol. 52, pp. 249-257.

7 Both properties are relevant to this particular model: variable selection is useful because the model considers a large number of independent variables; and outlier detection can help identify neighborhoods that either are outliers with respect to independent variable data or that have unstable estimates for the dependent variable, which may occur even when prices are smoothed.

8 In brief, and as it applies to the analysis described here, Lasso performs subset selection in the following way. If the matrix of independent variables in the logistic regression model has $p$ rows and $q$ columns, Lasso provides a sequence of models with $1,2,\ldots,min(p,q)$ predictors. The generalized cross-validation score (GCV) is calculated for each model in the sequence, and the model with the lowest GCV score is used as the "best" model. The predictors in this best model are then used as the "best predictors." Outliers are identified in a similar method using the GCV but on a modified specification using a dummy variable identity matrix with the same number of rows and columns as the matrix of independent variables in the original model. As an additional step, the bootstrap procedure was used on the lasso estimates to obtain alternative regression estimates. Bootstrapping was implemented using repeated row-sampling and recording the frequency of each variable selected by the lasso estimate in each bootstrap sample.

9 Because the estimates from both procedures tell a similar story, the logistic estimates are used for the final results.

10 A partial fit plot shows the effect of an independent variable (in this case distance from downtown) on the dependent variable (in this case the probability of convergence) while controlling for all the other variables in the model by setting them to their mean values.

11 Interactions were tested using the MARS (Multivariate Adaptive Regression Splines) methodology on all univariate estimates and bivariate interactions. In brief, MARS is a generalization of linear regression that automatically tests for variable non-linearities and interactions. More information can be found at http://www.salfordsystems.com/mars.php.

12 It is also possible that the overall model results are driven by this subset of neighborhoods, in which case the similar findings would be a function of overlapping samples rather than genuine similarities among neighborhoods. However, the subset of neighborhoods considered for this analysis is small and distinct enough that this is not likely to be the case.

13 In particular, population increased by 8% in converging neighborhoods and by 3% in non-converging neighborhoods, and vacancy rates decreased by 36% in converging neighborhoods and by 24% in non-converging neighborhoods.

14 This trend is suggested by an overall reduction in the total number of housing units, coupled with a 6% increase in the number of detached single family units and a 29% increase in the number of attached single family units (compared to a 4% and 2% increase respectively in non-converging neighborhoods).

15 To validate the model prediction, we can then look at actual appreciation rates between 2000 and 2006: of the tracts that had an estimated probability of convergence of 50% or higher, all but one were in fact converging as of 2006. Conversely, only about 44% of the tracts with a probability of convergence between 0 and 5% were converging over the same period.

16 This variable is likely to undercount the percentage of people who stayed in the same neighborhood, because it does not take into account people who changed residence but remained in the community.

17 The scatterplot includes all neighborhoods, while the analysis only focused on those with low housing values at the beginning of the study period. For this reason, not all the dots are color-coded as belonging to one of the three groups used in the models.

18 To facilitate comparisons with the logistic regression models, this model was estimated for the period between 1994 and 2000. Moreover, in order to conserve degrees of freedom given the shorter time series, spatially lagged terms were only included for a selected subset of variables, along the lines of what was done for the 1999-2004 models from the overall drivers analysis.

19 While this is a significant finding, it should not be interpreted as definitive: more analysis is needed to confirm this relationship and better identify the type of employment services provided by these es-

tablishments.

20 It is also worth noting the positive effect of the percent of African American population in this model, which suggests that, among this subset of neighborhoods, African American communities were more likely to retain their original residents.

21 It is also possible, however, that this effect is similar to the sub-prime effect recorded in the overall model. If FHA loans are used to put families in homes they cannot afford, they could over time translate to higher foreclosure rates and hurt, rather than help, the neighborhood and its residents. This question could be explored in a future project by testing for lagged effects, along the lines of what was done for the sub-prime analysis presented above.

22 See, e.g., Ingrid Ellen and Ioan Voicu, *The Impact of Low Income Housing Tax Credit Housing on Surrounding Neighborhoods: Evidence from New York City.* New York University, Furman Center for Real Estate and Urban Policy, New York City, NY, 2007.

23 This is not to imply that all immigrant communities are lower income – just that this analysis focused on this particular segment. For a more nuanced description of immigrant communities, see the Neighborhood Typology described in Chapter VII.

24 It should be noted that this analysis was not designed to look at everything that might drive change in these neighborhoods, as that would require specialized data and more in-depth modeling, beyond the scope the project. Rather, the analysis presented here was designed to see how well the overall drivers of neighborhood change apply to this particular type of neighborhood.

25 The restriction on the change in the percentage of foreign born was applied to ensure that these communities remained relatively stable throughout the study period. Communities with significant increases in the percentage of foreign born residents were likely undergoing other changes throughout the period that would have made it more difficult to interpret the model result. On the other hand, communities that experienced significant decreases in the percentage of foreign born population were likely transitioning to a different type of neighborhood.

26 In particular, a mean statistic of the fixed-error component was used to reveal whether the model tends to accurately predict, over-predict or under-predict appreciation in these neighborhoods.

27 In general, this methodology, combined with the baseline models developed by the project, is a powerful way to assess the difference in drivers of change for any subset of neighborhoods that might be of interest to community and economic development practitioners.

28 The mean error for all other neighborhoods is 0.0130. The mean error for all neighborhoods, including the immigrant neighborhoods, is zero, by construction..

29 Further analysis could test the importance of these factors, as well as differentiate among different types of immigrant communities, to get a more complete picture of the drivers of change for this type of neighborhood.

30 This factor could be more important in these areas because it might be more difficult for immigrants to own a car (and so they rely more on public transportation and tend to avoid long distance commutes), or because immigrants might do best when they can work closer to their communities through employment networks that minimize language and cultural issues. Census data seems to confirm this interpretation, as in immigrant communities a lower percentage of the population drives to work, and commuting times are on average higher than in other neighborhoods. However, further research is needed to uncover the exact reasons for this difference, including looking in more detail at the type of business establishments located in the proximity of these neighborhoods, and comparing the types of jobs offered by those businesses to the occupation mix of neighborhood residents.

## VII. Neighborhood Typology

**What it is:**
The DNT Neighborhood Typology uses hybrid hierarchical clustering to group all neighborhoods in nine broad types and 33 detailed sub-types based on the key factors that have emerged from the analysis of patterns and drivers of neighborhood change. The information contained in the typology can be used to prioritize and target interventions to each neighborhood type.

**Key Features:**
This typology was designed to help inform economic development interventions. As such, it has several distinctive features:

- It is dynamic: it incorporates the project's findings on patterns and drivers of change, and it shows how neighborhood types can transition to other types over time, revealing what can be expected in different neighborhoods.
- It is multi-dimensional: it incorporates many of the factors that proved to make the most difference to the economic performance of neighborhoods. As such, it helps identify the challenges and opportunities in each place.
- It is layered: its hierarchical structure goes from the broadest possible class to the narrowest grouping of neighborhoods that are most similar to each other. This means that it can be used to classify neighborhoods in terms of broad types or more detailed sub-types – but it can also be used to identify, for any given neighborhood, its closest peers.

**Applications:**
The typology has numerous applications for the purposes of economic development, including:

- Tailoring interventions to the needs and opportunities of specific neighborhood types
- Anticipating and managing neighborhood change
- Benchmarking neighborhood performance
- Enabling peer analysis and identification of meaningful best practices
- Facilitating impact analysis by identifying comparable neighborhoods

The Drivers analysis presented in the previous two sections confirmed the degree to which neighborhoods are diverse and specialized. It also showed that different types of neighborhoods are likely to respond to different drivers of change – and thus, more importantly, to different kinds of development interventions. The next logical step, then, is to identify what these distinct neighborhood types might be. In order to achieve this goal, the project devel-

oped a typology of neighborhoods,[1] building on the knowledge of neighborhood dynamics developed through the analysis of patterns and drivers of change.

At a basic level, a typology groups together things that are similar along a set of relevant characteristics. Typologies are useful tools because they help make manageable complex issues: by grouping together communities that are similar to each other along key dimensions, typologies help explore the nuances that define and distinguish among the complex and multidimensional entities known as neighborhoods, enabling meaningful comparisons, facilitating analysis, and revealing patterns and connections. In particular, a neighborhood typology can help inform economic development practice in at least three respects: it helps tailor strategies and interventions to the specific characteristics of each neighborhood; it enables benchmarking the performance of each neighborhood and comparing it to its peers; and it facilitates impact analysis by identifying comparable neighborhoods.

It is not surprising, then, that constructing neighborhood typologies is a popular exercise: one can find almost as many neighborhood typologies around as there are neighborhoods. Of particular interest, The Reinvestment Fund (TRF) developed a typology of the neighborhoods in Philadelphia based on their real estate market characteristics, linking different types of neighborhoods to different types of housing interventions. This typology successfully reduced data on hundreds of thousands of properties to a manageable number of neighborhood types and helped Philadelphia's government prioritize interventions and better target their resources.

Several marketing and data companies have created neighborhood typologies of a sort by developing household segmentations based on consumer patterns, for the purposes of targeting product marketing and store locations. One of the most prominent is the PRIZM segmentation developed by Claritas, Inc., which defines the U.S. market via 66 lifestyle groups that are characterized by different spending patterns. It then classifies neighborhoods based on their composition in terms of these segments. Academics and researchers also have developed numerous typologies of neighborhoods over the years, either as descriptive exercises or for the purpose of analysis of particular phenomena.[2]

In fact, since the output of a typology depends entirely on what factors are used as inputs to create the groups, an infinite number of neighborhood typologies can be created, and none of them is necessarily more "right" or "wrong" than the others. Rather, typologies can only be evaluated in terms of how useful they are for the purposes for which they are developed. In this respect, existing neighborhood typologies have useful applications (and provided important groundwork for this project), but for various reasons do not fully address the broader economic development issues raised here: they are often only local in scope (as in the case of the housing typology in Philadelphia), or are based on only a particular aspect

of neighborhoods because they were designed to address a specific issue (consumer preferences in the case of PRIZM, housing investment in the case of TRF, and so forth). Many of the other existing typologies are simpler descriptive exercises without underlying analytics, and tend to present a static picture not grounded in an analysis of neighborhood dynamics and what drives neighborhood change.

The typology presented here was designed to build upon the neighborhood analysis conducted by the project and help inform a broad range of community and economic development interventions. As such, it has some distinctive features (which we will explore in more detail below) that differentiate it from other neighborhood typologies:

- It is multidimensional and grounded in the analysis of patterns and drivers of neighborhood change, incorporating many of the factors that proved to make the most difference to the economic performance of neighborhoods. As such, the neighborhood types tell us something about the challenges and opportunities in each place.

- It is based on a very diverse set of neighborhoods,[3] and should be immediately applicable beyond the four cities for which it was developed. It also provides a solid foundation to constantly expand and refine the types as time goes by and more cities are added.[4]

- It does not only classify neighborhoods based on their type, but also reveals all of the connections between different types, in a hierarchical structure that goes from the broadest possible class to the narrowest grouping of neighborhoods that are most similar to each other. Practically, this means that the typology can be used to classify neighborhoods in terms of broad types but also to identify, for any given neighborhood, its closest peers.

- Perhaps most important, it is dynamic: it incorporates the findings on patterns and drivers of change presented above and it shows how neighborhood types can transition to other types over time. Therefore, it can be used to help understand what should be expected in any given neighborhood and what interventions might be most appropriate.[5]

The rest of the section provides an overview of how the typology works and of its basic structure, a detailed description of each neighborhood type, a few summary observations on what this information tells us about neighborhoods and their dynamics, and some examples of how the typology can be applied and used to guide economic development interventions. A detailed explanation of the methodology, along with maps and tables for each neighborhood type in the four sample cities, can be found in Appendix J.

## A. Typology Structure: How it Works

**NOTE:** No typology is ever perfect or definitive, and this one is no exception. A typology will always describe some neighborhoods better than others, and will never fully capture the local knowledge of the people who live and work in a community. If it is done well, though, a neighborhood typology can be a useful tool and complement that knowledge by highlighting key challenges and opportunities, and revealing new patterns and connections between different neighborhood types.

The starting point in building a typology is selecting the factors that will be used as determinants of neighborhood type. The project had a very large number of variables at its disposal, and experimented with multiple combinations and methodologies in order to develop a typology that would help target and prioritize economic development interventions.[6] Throughout this process, the variables were selected based on a variety of criteria, including their importance in the models, the availability and reliability of the data, and feedback from experts in each of the four sample cities.[7] The resulting neighborhood typology is based on a set of variables that measure two key dimensions of neighborhoods: (1) the characteristics of the built environment (including for example characteristics of the housing stock, land use patterns, business presence); and (2) the characteristics of the people who live there (such as income, age, household structure and mobility).[8]

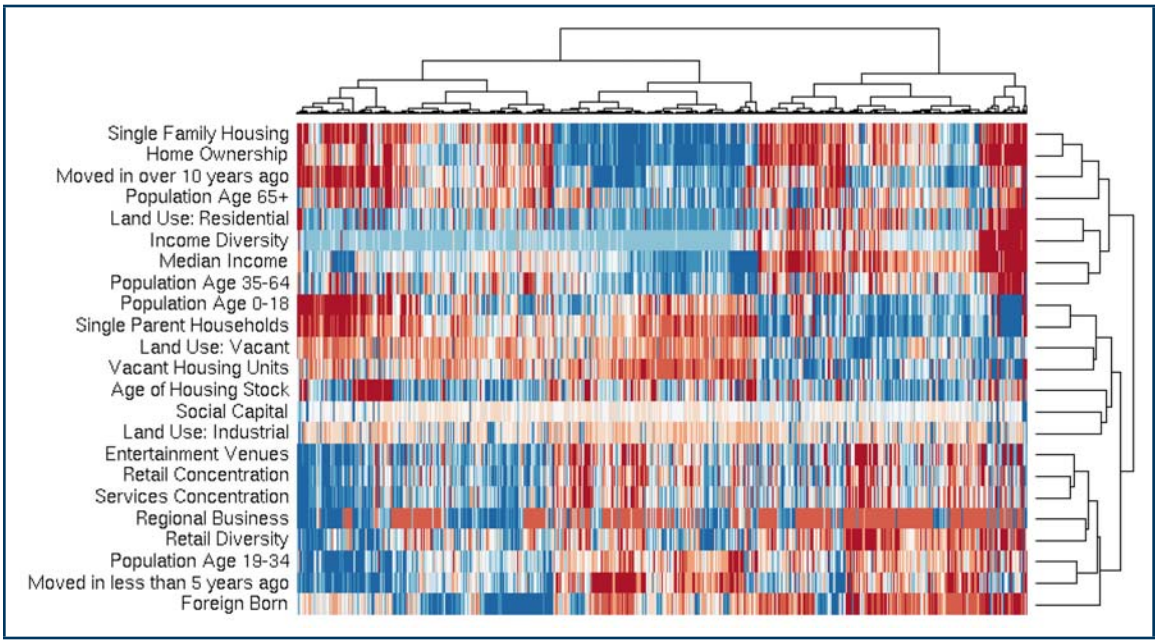
Moreover, for the purposes of this typology, we are interested not only in identifying distinct neighborhood types, but also in how each type changes over time. To this end, each neighborhood is included in the typology twice: once based on its characteristics in 1990 and once based on its characteristics in 2000. This is a new and very important feature of this typology, as typing neighborhoods across time reveals a great deal about their dynamics of change, and enables us to identify which types are more likely to change over time and transition to other types, as discussed in more detail below.

The years 1990 and 2000 were selected for this exercise because they are the ones for which the most data is available. However, to make the results more applicable, when the typology is applied to a particular place (as in the case of the maps presented in section VII.C) each neighborhood is assigned to a type based on the most current data available.

The overall structure of the typology is summarized in the "heat map" below. This technique was first developed as a DNA mapping application in the Genome project, where it was used to examine the ways in which different groups of genes correlate with various physical traits. The same technique is applied here to group neighborhoods according to their score on the 23 different variables selected as key determinants of neighborhood type. What

makes this application particularly useful here is that it works well when multiple factors interact in complex ways, as in the case of the various dimensions that determine neighborhood types.

The map can be interpreted as a grid in which each column is a census tract, and each row is a variable. The score of each tract on the variables listed to the left of the chart is represented by degrees of color, from dark red (very low) to dark blue (very high). The neighborhood types are created by grouping together neighborhoods that tend to have similar scores on the same variables, as evidenced by the "splotches" of red and blue on the map. For instance, the blue area on the bottom left of the map identifies a group of neighborhoods with a high percentage of young adults, high income levels, and a high concentration of retail, services and entertainment venues. Similarly, the blue area at the top of the central section of the map identifies a group of mostly residential neighborhoods characterized by older residents, high homeownership rates, and prevalence of single family homes.




The map also contains two additional important pieces of information. The first is that neighborhoods that are closer together in the chart are more similar than neighborhoods that are further apart. These relationships are summarized in the tree structure on the top of the map. In this sense, this is actually a taxonomy, rather than a typology, of neighborhoods. In fact, it works just like the taxonomy of living organisms in biology, which organizes all living things in a hierarchical structure that goes from the broadest grouping of kingdom (e.g. the Animal kingdom), to phylum, then class, and so forth all the way down to species.

This means that the typology can be used from the "top down" as well as from the "bottom

up". In other words, we can start with the broadest possible grouping of neighborhoods and further refine our types as we move down the tree. Alternately we can start with a particular neighborhood and identify which other neighborhoods are most similar to it. The "top down" approach is useful to surface general findings regarding a particular neighborhood type, such as its likelihood of undergoing particular kinds of change or the types of interventions that are most likely to make a difference. The "bottom up" approach, on the other hand, can be used to see how a particular neighborhood is doing relative to its peers, or to evaluate the impact of a specific intervention.

**Application for Practice: Identifying Comparable Neighborhoods**

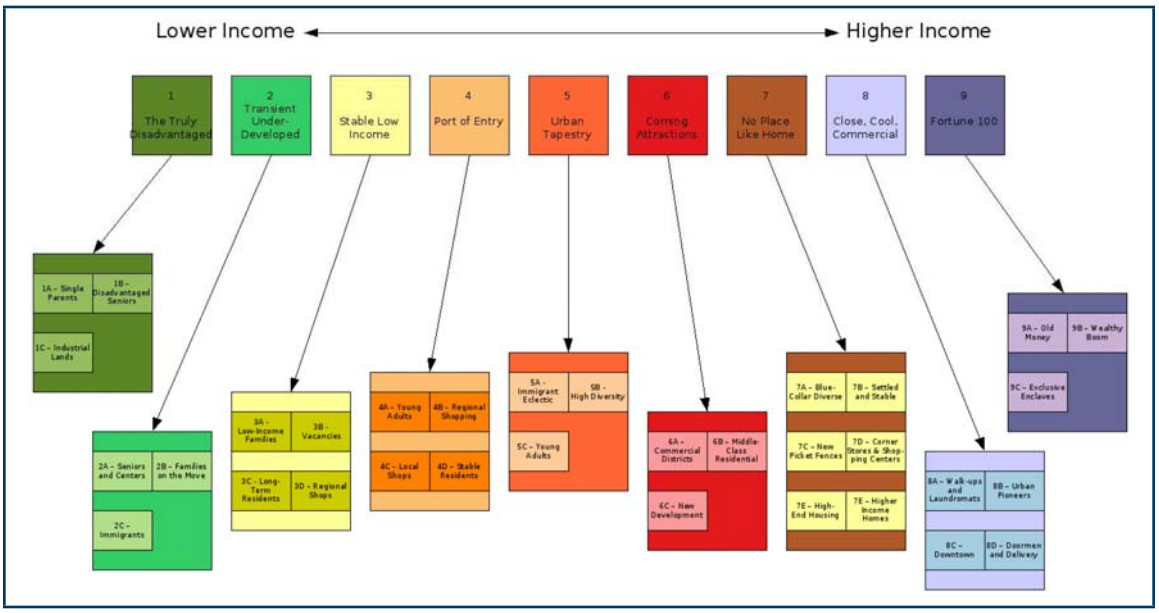
For any given neighborhood, the typology can be used to identify the other neighborhoods that are most similar to it. This feature can be used, among other things, to identify meaningful best practices – examples that are relevant to each neighborhood because they have been successfully implemented in similar places.

The second piece of information is that the same hierarchical structure is applied to the variables that are used to build the taxonomy. Therefore, variables that are closer together in the chart tend to be correlated to each other and have similar values in the same neighborhoods, revealing how the different factors combine to determine neighborhood types. In particular, there are three main groups of variables: the first group has to do with the stability of the neighborhood and its housing stock, and includes the percentage of single family homes, homeownership rates, residential land use and median income. The second group includes a number of indicators typically associated with neighborhood distress: vacancy rates (both in terms of vacant land and vacant housing units), percentage of single parent households, social capital and industrial land use. Finally, the third group has to do with the concentration of retail and services in the neighborhood, which also tends to be associated with the presence of a younger and more mobile population.

### B. Typology Overview

The hierarchical structure of the typology yields a potentially very large number of neighborhood types, as we can keep refining each grouping until we reach the individual neighborhoods at the bottom of the tree. In order to make this information useful and accessible, however, we need to identify a manageable number of distinct neighborhood types, while at the same time preserving enough differentiation between types to see real differences in terms of their characteristics and drivers of change. To achieve this balance, the project focused on two layers of the taxonomy, deriving nine broad neighborhood types which are then further divided into several distinct sub-types.

The chart below provides a synopsis of two key "layers" of the typology, displaying the nine types and 33 sub-types of neighborhoods identified with this system.




The broad neighborhood types are ordered based on their median income and numbered from one to nine. Within each type, the sub-types are ordered based on their median income and assigned a letter. Therefore, Type 1-A ("Single Parents") is the lowest income segment, while Type 9-C ("Exclusive Enclaves") is the wealthiest.[9]

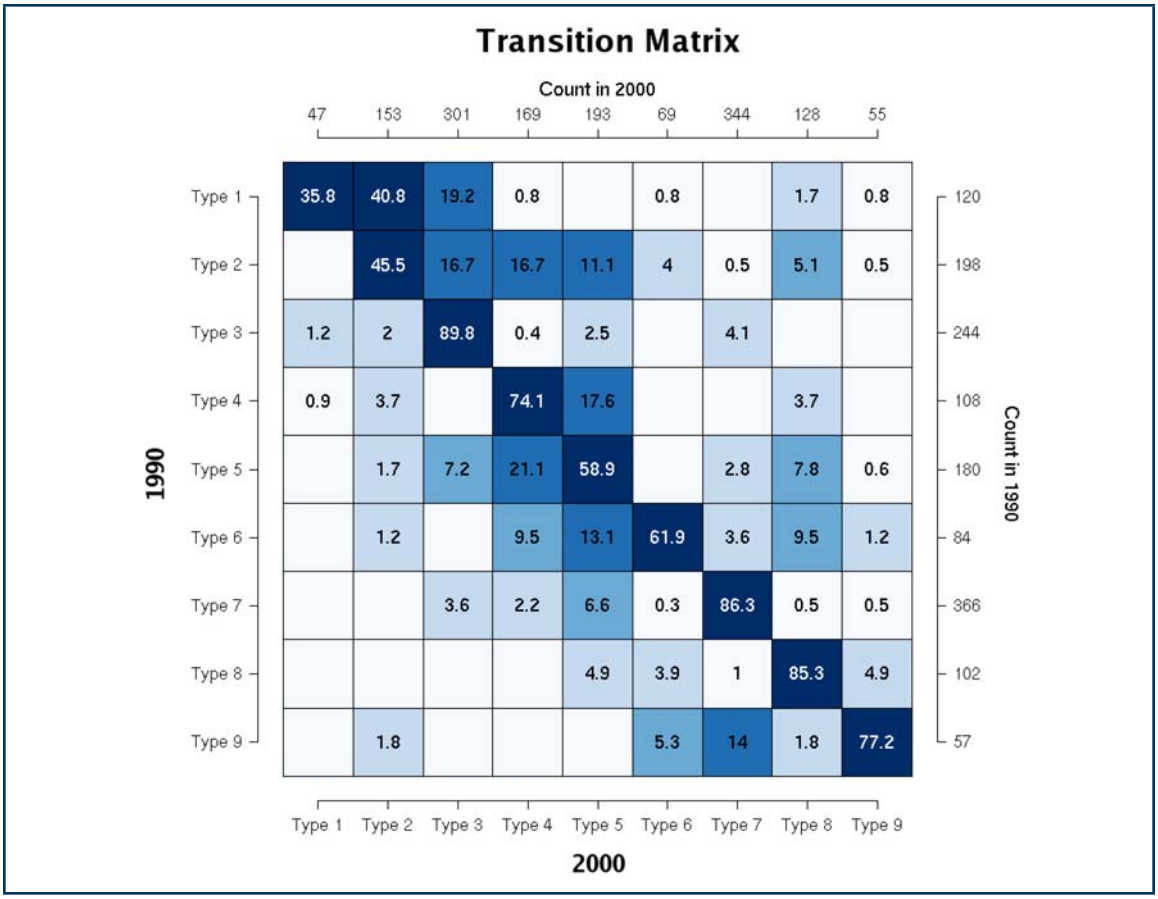
Before providing detailed descriptions of each neighborhood type, it is useful to make a few overarching observations. First, the typology results reveal that different factors tend to define different layers of the taxonomy. Overall, at the highest level, a neighborhood's type appears to be defined primarily by its housing stock, the income of its residents, and the percentage of the population that is foreign born. The next differentiation then happens based on the age of the population (which is likely related to the preferences for different types of neighborhood amenities), land use patterns and business presence.

Second, while only 23 variables were used to construct the typology, many more variables can be used to profile each neighborhood type. For instance, we can describe each type in terms of its location, racial composition, residents' occupations or even foreclosure or crime rates, even though none of these factors were used to define the type in the first place. By and large, the types are well differentiated based on these other descriptive features as well, lending validity to the final classification.[10] For instance, while race was not included as a defining variable, neighborhoods with a distinct racial makeup tended to fall into several distinct neighborhood types.

Similarly, while the typology was constructed by pooling together all neighborhoods in the four cities, not all types are found everywhere. For example, none of the three poorest types are found in Seattle, where incomes are generally higher than in the other three cities. Conversely, the "Coming Attractions" type is found primarily in Dallas and Seattle, and only very few neighborhoods in Chicago (and none in Cleveland) match this profile.

### C. Transitions Between Neighborhood Types

The fact that the Typology is constructed using data from 1990 and 2000 enables us to see the extent to which different types tend to change over time. This information is summarized in the transition matrix below, which shows what percentage of neighborhoods in each type remained the same type ten years later, and, if a neighborhood changed type, what other type of neighborhood it usually became.




Overall, most neighborhoods tend not to change their type within this 10-year period, which is consistent with the observation (reported in Section IV) that neighborhood change is a slow and gradual process. At the same time, though, change does take place, as neighborhoods have on average a 30% probability to change type over ten years. Over longer time

spans, this probability is likely to increase significantly.

However, there are significant differences across neighborhood types. In particular, the low income segments tend to change type more often than the higher income segments: only 35% of neighborhoods in Type 1 ("The Truly Disadvantaged") in 1990 were in the same type ten years later. In fact, more neighborhoods transitioned from Type 1 to Type 2 ("Transient Underdeveloped") than remained the same type. Conversely, less than 20% of the neighborhoods in the three wealthiest income segments changed type between 1990 and 2000. Moreover, neighborhoods tended to more often transition towards higher income segments than the other way around, consistent with the overall improvement in the outlook for central cities that we have observed over this time period. Additional observations pertaining to the transition patterns for each segment are included in the neighborhood profiles reported in the next section.

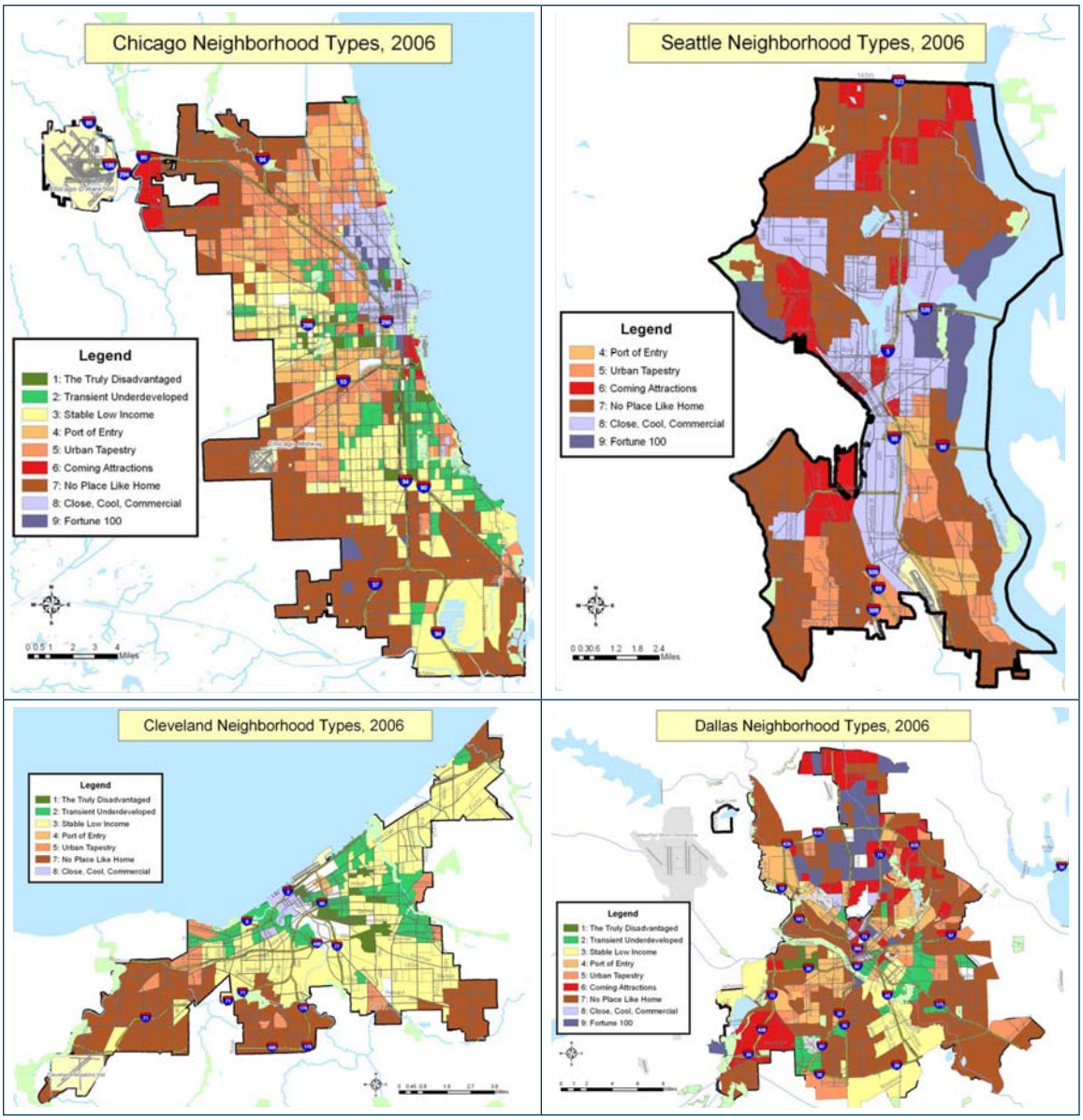
**Application for Practice: Informing Community Visioning**

Knowing what types of neighborhoods are more or less stable, and in what directions they tend to evolve, can prove particularly useful in informing the community visioning process in particular places. For any given neighborhood, the typology can be used to anticipate the different neighborhood types that the community could become as it evolves. This information can then help residents and community based organizations determine which path would be preferred and what interventions might help the neighborhood evolve in the desired direction.

While in many ways this is still a prototype in the early stages of product development, the typology works fairly well for the purposes for which it was created: it identifies distinct neighborhood types that present specific challenges and opportunities; it reveals important facts about the patterns and drivers of change of each type; and it enables the user to identify comparable neighborhoods along the dimensions that matter most for community and economic development.

## D. Neighborhood Profiles

The maps below show the spatial distribution of the broad neighborhood types in the four sample cities, and are followed by a detailed description of each type. Maps of the neighborhood sub-types in each city are reported in Appendix I. While the typology was developed using data from 1990 and 2000, all of the maps assign neighborhoods to types based on the most current data available, and can thus be interpreted as a projection of the typology as of 2006.[11]

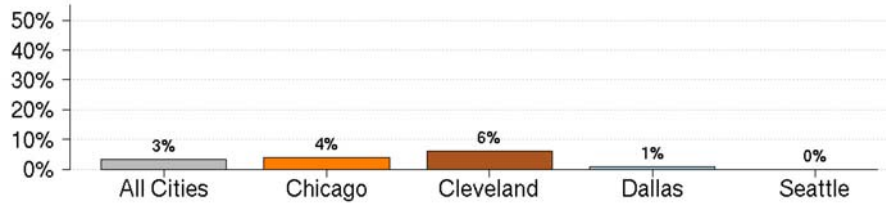



Each neighborhood type is described below. For each segment, the profile includes a high level description of the neighborhood type, followed by a more technical profile with additional details on the factors that characterize that type of neighborhood. The description also includes a set of observations on its dynamics of change (including key implications for economic development) and a summary of the growth trends for the two key metrics used as indicators of neighborhood improvement (RSI and change in quantity of housing units).[12] Finally, the profile includes a chart showing the distribution of the cluster across cities and summary descriptions of each of the sub-types in which the broad type can be divided.

It should be noted that these profiles are based on average values across the entire segment. Since no segment is perfectly homogeneous, it is possible for any given neighborhood to

differ significantly from the group with respect to a few factors, and thus to be not accurately characterized by the type profile.[13] Wherever possible, the profiles note the extent to which some of the characteristics of the group overall might not apply to a subset of neighborhoods within that group.[14]

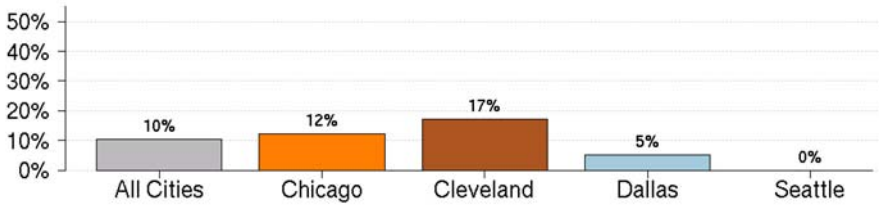
| Type 1: The Truly Disadvantaged | |
|---|---|
| **Highlights** | Neighborhoods in Type 1 struggle with poverty, crime, and unemployment. Streets lined with vacant lots, public housing projects and industrial infrastructure are the physical realities of these communities; children and their single parents, along with seniors, make up the majority of their population, which is mostly African American. Many residents hold no high school diploma, and unemployment rates are several times higher than the national average. Most residents are employed in service or sales occupations. Businesses and social infrastructure in these neighborhoods are lacking, but their proximity to the city's Central Business District and the presence of developable land create opportunities for reinvestment. |
| **Detailed Profile** | This is the poorest of all neighborhood types, with an average median household income of just under $10,000.[15] Moreover, there is very little income diversity: incomes are concentrated in the lower end of the spectrum to a much greater extent than in the other lower income neighborhood types. The population is primarily African American, and composed of children, seniors, and very few adults between the age of 35 and 64. A large percentage of the residents live in public housing.<br><br>Other socio-economic indicators are consistent with the profile of an economically distressed neighborhood. The mean unemployment rate is 35%, and 49% of adults do not have a high school diploma. On average, about 36% of households are single parent households. Homicide, violent and property crime rates are, on average, the highest among all clusters.<br><br>A look into the physical characteristics of these neighborhoods reveals indicators of significant disinvestment and distress as well. The percentage of vacant parcels is the highest among all clusters (on average 22% of land parcels are vacant), and only about a third of the parcels are residential. Furthermore, many of the housing units that exist are vacant (average rate is 21%). Business presence is very low, and the diversity of business types is the lowest of all clusters. However, this is one of the most heterogeneous clusters, and individual neighborhoods within it might differ from this description with respect to particular dimensions. |

| Type 1: The Truly Disadvantaged | |
|---|---|
| **Dynamics of Change** | Most neighborhoods in this cluster underwent a change in neighborhood type between 1990 and 2000: about 41% of neighborhoods transitioned into cluster 2, and 19% of neighborhoods transitioned into cluster 3. In a few cases, neighborhoods transitioned into one of the high income clusters, due to significant redevelopment and influx of higher income residents.<br><br>Given the fact that housing values in these neighborhoods are low, and that they are located close to the central business district, they are good candidates for reinvestment. Indeed, 79% of neighborhoods in this group grew faster than higher income neighborhoods between 1990 and 2000. Almost all of the Type 1 neighborhoods that changed type transitioned to types 2 or 3, suggesting a gradual path of neighborhood improvement. However, not all of these neighborhoods improved, and some showed signs of further decline, which is unusual over the time period considered by the project. In fact, this type has the highest concentration of neighborhoods that experienced the "neighborhood decline" pattern of change identified in the Evolution analysis. |
| **Growth Trends** | As we have seen, many of these neighborhoods experienced very high growth rates and transitioned to other types between 1990 and 2000. Even the ones that did not transition for the most part experienced significant appreciation: on average, the RSI had the second fastest growth rate of all clusters, appreciating 29 percentage points faster than the city average between 1990 and 2000 and 8 percentage points faster between 2000 and 2006.<br><br>This cluster had below average growth (-2%) in the number of residential parcels between 1990 and 2000. However, development activity picked up significantly between 2000 and 2005, when this group grew by 14% (the fastest growth rate among all clusters). Much of this growth can likely be attributed to HOPE VI projects, and particularly, in Chicago, to the Chicago Housing Authority's Plan for Transformation, which brought about significant development activity in many Type 1 neighborhoods in the city starting in 1999. |
| **Presence by City (2000)** |  |

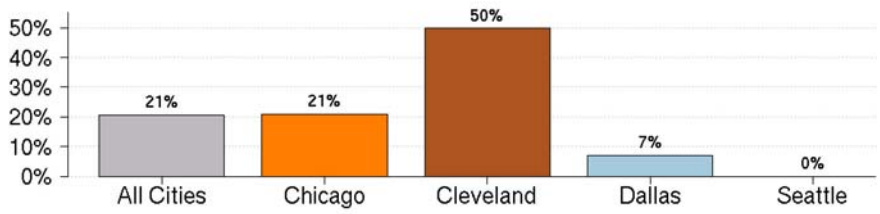
| Type 1: The Truly Disadvantaged | |
|---|---|
| **The Truly Disadvantaged: Sub-types** | |
| **Type 1-A: Single Parents** | Type 1-A includes about half of the neighborhoods in cluster 1, and is characterized by a high proportion of children, as well as lower income levels, higher unemployment, and lower levels of business presence, indicating that these neighborhoods are somewhat more distressed than the cluster as a whole. These neighborhoods also have the highest concentration of public housing across all clusters and sub-clusters. |
| **Type 1-B: Disadvantaged Seniors** | This type is characterized particularly by a high proportion of adults age 35 and older (relative to the other Type 1 neighborhoods), and particularly seniors. Socioeconomic indicators are slightly more positive than in sub-type 1-A. |
| **Type 1-C: Industrial Lands** | Type 1-C is a small fraction of Type 1, and includes Census tracts which are primarily non-residential. |

| Type 2: Transient Underdeveloped | |
|---|---|
| **Highlights** | Moving trucks and vacancy signs exemplify this type of neighborhood. Frequently close to the city center, Type 2 neighborhoods have quick turnover in their residents. Very few people own their homes, and residents tend to live in apartments as opposed to single family housing. Most of the residents are employed, but Type 2 neighborhoods have high crime rates and very little diversity in businesses. Proximity to the city center, low property values and vacant land make this neighborhood cluster susceptible to improvement with some degree of displacement. |
| **Detailed Profile** | Neighborhood Type 2 represents a low income segment with high levels of rental housing and resident turnover. Only 18% of households are homeowners, and median incomes average around $20,900. As in the case of "The Truly Disadvantaged" neighborhood type, incomes are typically concentrated in the lower end of the spectrum.<br><br>This type includes residents of all age groups and racial identities, but for the most part they tend to sort into different neighborhoods. Socio-economic indicators in general reveal signs of economic and social distress: 20% of residents are unemployed, and 41% of adults do not have a high school diploma. Crime rates are also very high.<br><br>Type 2 neighborhoods are typically located near the central business district, and have a diverse mix of land uses, with lower than average percentages of residential land, above average vacant land, but also a fair amount of commercial and industrial parcels. Retail and service business diversity, however, remains low. |

| Type 2: Transient Underdeveloped | |
|---|---|
| **Dynamics of Change** | Type 2 is not a particularly stable neighborhood type, as only 46% of these communities in 1990 remained in the same cluster in 2000. Moreover, change in these neighborhoods can lead in many different directions. In particular, of the neighborhoods that changed type, 17% transitioned into Type 3 ("Stable Low Income"), 17% transitioned into Type 4 ("Port of Entry"), 11% transitioned into Type 5 ("Urban Tapestry"), 4% transitioned into Type 6 ("Coming Attractions"), and 5% transitioned into Type 8 ("Close, Cool, Commercial"). As in the case of Type 1 neighborhoods, some of these communities also showed signs of decline over the time period.<br><br>*When Type 2 communities transition to higher income types, most of the change seems to be fueled by redevelopment and is often associated with displacement,* as the high proportion of low income renters that live in these neighborhoods are particularly vulnerable in this respect.<br><br>The high variability in transition types suggests that *these neighborhoods are amenable to very different types of development.* At the same time, different sub-types tended to evolve in different directions. For instance, neighborhoods in Type 2-B are most likely to transition to Type 3 ("Stable Low Income"), likely due to their demographic characteristics. Similarly, neighborhoods in Type 2-C, which are already characterized by a significant presence of immigrant population, are more likely to become "Port of Entry" communities by transitioning to Type 4. |
| **Growth Trends** | Given their proximity to downtown and housing stock characteristics, these neighborhoods tend to be good candidates for convergence. Indeed, these communities had the highest RSI growth rate, increasing by 41 percentage points over the city average between 1990 and 2000, and by 14 percentage points over the city average between 2000 and 2006.<br><br>While appreciation rates in this cluster were high across the board, only the Type 2 neighborhoods that transitioned to other types experienced the greatest changes in quantity. While Type 2 neighborhoods that remained Type 2 typically trailed the city in terms of residential real estate development, the ones that changed type grew in housing quantity 4 percentage points faster than the city as a whole between 1990 and 2000, and 5 percentage points faster between 2000 and 2005. |

| Type 2: Transient Underdeveloped | |
|---|---|
| **Presence by City (as of 2000)** |  |
| **Transient Underdeveloped: Sub-Types** | |
| **Type 2-A: Seniors and Centers** | Neighborhoods in Type 2-A tend to have an older population, with an average of 22% of residents over 65. They also tend to have higher amounts of social capital, as measured by the presence of civic, social, political, religious, business and other membership associations. |
| **Type 2-B: Families on the Move** | Neighborhoods in Type 2-B have a high proportion of children, though 27% of households are led by a single parent. These communities tend to be predominantly African American, and have the least amount of racial diversity within this type. These neighborhoods transitioned primarily to Type 3 ("Stable Low Income"). |
| **Type 2-C: Immigrants** | These neighborhoods tend to have a higher percentage of foreign born residents, and a greater amount of racial diversity. Many families live in these neighborhoods as well, but levels of single parent households are lower than in Type 2-B. |

| Type 3: Stable Low Income | |
|---|---|
| **Highlights** | Modest, single family homes and well-worn city blocks provide the backdrop to stable communities in Type 3. The residents of these neighborhoods, primarily African American, often own their single family homes and find employment in a wide variety of occupations: a resident is as likely to hold a white collar job as a job in the service sector, in sales, or in a factory. These neighborhoods lack business and service amenities, but their residents get by – even if it is sometimes a struggle on a median income of $23,800 – and over half of them live in the neighborhood for more than 10 years. High crime and foreclosure rates are two outstanding challenges for this type of neighborhood. |
| **Detailed Profile** | Neighborhoods in this segment tend to be lower income communities with relatively high levels of home ownership and resident stability. However, other socioeconomic indicators point to potential difficulties in the residents' lives: unemployment is relatively high at 19%, about 38% of adults do not have a high school diploma, and median income levels are fairly low at $23,800. Many families find homes within these neighborhoods, but typically 23% of households are led by a single parent. Indicators of financial distress such as balance to credit limit ratios and foreclosure rates are also among the highest of all clusters.<br><br>These neighborhoods tend to be highly residential, with very little business presence. Many of them also have relatively high concentrations of vacant land. Still, resident stability is very high, as on average, 44% of households have lived in the same home for over ten years. |
| **Dynamics of Change** | Type 3 is one of the most stable neighborhood types, as 90% of neighborhoods that were in Type 3 in 1990 were in the same cluster in 2000. Of the remaining neighborhoods, 4% transitioned into Type 7 ("No Place like Home"), 3% transitioned into Type 5 ("New Development"), and 2% transitioned into Type 2 ("Transient Underdeveloped").<br><br>*Overall, these neighborhoods are more likely to improve without displacement.* Among the key factors that distinguished places that improved in this sub-group are higher proportions of young adults (age 19 to 34), a relative reduction in unemployment rates over time, and better access to transit stops, consistent with the "improvement in place" models presented in Section VI. Moreover, higher home ownership rates in these neighborhoods may have been an important factor for resident retention when compared to the few neighborhoods in this subgroup that improved but with displacement. |

| Type 3: Stable Low Income | |
|---|---|
| **Growth Trends** | On average, these communities tended to perform slightly better than the city as a whole, as the RSI for this group increased 5 percentage points faster than the citywide rate between 1990 and 2000, and 6 percentage points faster between between 2000 and 2006.<br><br>At the same time, this cluster had below average growth rates in the quantity of housing over the same period, likely because the characteristics of the housing stock in these neighborhoods do not lend themselves to the large scale redevelopment activity that sometimes takes place in the other lower income neighborhood types. On average, neighborhoods increased at a rate 9 percentage points slower than the city as a whole between 1990 and 2000, and trailed the city by 4 percentage points between 2000 and 2006. |
| **Presence by City (2000)** |  |
| **Stable Low Income: Sub-Types** | |
| **Type 3-A: Low Income Families** | Neighborhoods in Type 3-A tend to have a higher proportion of families with children. Unemployment levels are higher than average at 24%, and median incomes tend to be lower at $20,200. |
| **Type 3-B: Vacancies** | Neighborhoods in Type 3-B tend to be less developed, and have lower levels of residences and businesses. These neighborhoods tend to have more social capital, but also have the highest crime rates within Type 3. |
| **Type 3-C: Long-Term Residents** | This is the most stable of all sub-types, as 52% of households remained in the same home for over 10 years. Home ownership rates and the percentage of single family homes are highest within this cluster, but so are foreclosure rates. |
| **Type 3-D: Regional Shops** | As a whole, Sub-cluster 3-D tends to be more developed, and has a relatively higher business presence, particularly large stores. Its demographic profile is similar to type 3-A, though with slightly higher incomes and a larger presence of seniors. |

| Type 4: Port of Entry | |
|---|---|
| **Highlights** | Blocks animated by a variety of businesses and residents' native languages make up the neighborhoods of Cluster 4. Most of Type 4 neighborhoods have a Hispanic majority, though these communities can also be enclaves of Asian and European immigrants. Almost half of neighborhood residents were born outside the United States, and many are raising families in these parts of the city with little crime and well-used space. Many residents move from their homes—few of which are single-family dwellings—after a few years, but may stay in the neighborhood. Residents have slightly lower-than-average incomes, but unemployment is less than 10%, and two parents are present in most households with children. |
| **Detailed Profile** | Neighborhoods in this cluster represent the bulk of the "immigrant communities" in the typology, with 45% of their population being foreign born. Although most of these neighborhoods are primarily Hispanic, there are a few that are majority non-Hispanic White or Asian (particularly in Seattle).<br><br>Cluster 4 lies on the line between low and moderate income clusters ($32,000 household income on average), but its socioeconomic indicators are more similar to the mid- to higher- income clusters than to the lower income groups. In particular, these neighborhoods are characterized by lower unemployment rates, lower percentages of single parent households, and greater income diversity. Resident mobility is relatively high, consistent with the "port of entry" character of these communities.<br><br>Employment in these neighborhoods tends to be concentrated in a few specific occupations, more so than in other neighborhood types. About 24% of adults in the labor force are employed in production and transport occupations, and 12% of residents are employed in the construction sector, both of which are the highest rates among all clusters. Conversely, the proportion of residents in professional, sales and office occupations are considerably lower than in the other mid- to high- income clusters. This is consistent with the fact that, on average, 47% of adults do not have a high school diploma.<br><br>Business presence is among the highest of all clusters. However, the types of businesses that characterize these communities vary greatly within this cluster, with some neighborhoods having a greater presence of local shops, while others have a greater concentration of large business establishments. |

## Type 4: Port of Entry

**Dynamics of Change**

Type 4 is a moderately stable type, as 74% of these neighborhoods in 1990 remained in the same cluster by 2000. At the same time, however, about 18% transitioned into Type 5 ("Urban Tapestry"), 4% transitioned into Type 2 ("Transient Underdeveloped"), and 4% transitioned into Type 8 ("Close, Cool and Commercial"). Different sub-types are more likely to transition to different clusters, though, as discussed in more detail below.

Gentrification appears to be a driving force behind the transition of some of these neighborhoods to higher income clusters. Features such as the cluster's overall proximity to downtown, lower housing values and retail amenities may be contributing factors. In some instances this change is more gradual, and these neighborhoods transition to "Urban Tapestry" communities; in other cases the process is more rapid and these communities transition to the "Close, Cool and Commercial" neighborhood type.

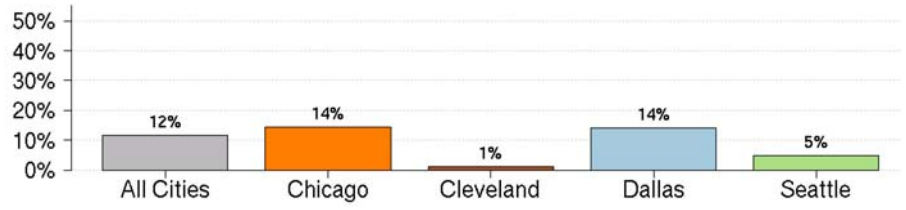
In neighborhoods that remain largely immigrant communities, *an important driver of improvement is the presence of employment opportunities nearby, as proximity to jobs is particularly important for the immigrant population that lives in these neighborhoods.*

**Growth Trends**

On average, the RSI had the third fastest growth rate between 1990 and 2000, increasing 17 percentage points faster than the city as a whole, and the fourth fastest growth rate between 2000 and 2006, increasing by 5 percentage points over the citywide rate.

Growth rates in the quantity of housing units were slightly below average between 1990 and 2000 (-3%), and above average between 2000 and 2005 (3%).

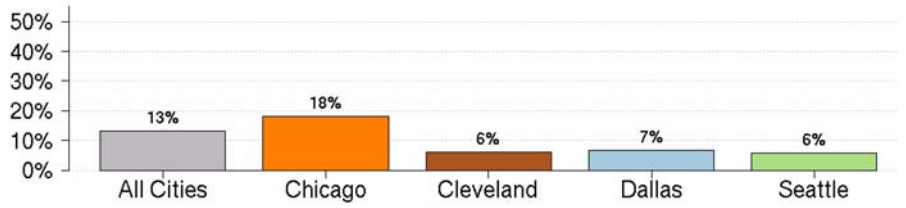
**Presence by City (2000)**



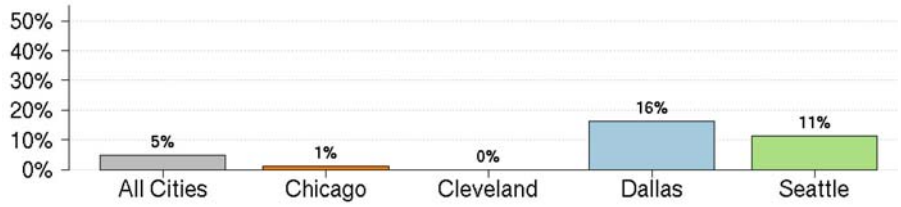
| Type 4: Port of Entry | |
|---|---|
| **Port of Entry: Sub-Types** | |
| **Type 4-A: Young Adults** | Neighborhoods in Type 4-A are inhabited by a younger, more mobile population. About 78% of the population has changed residences over the past five years, compared to 60% for the overall cluster, while only 12% have lived in the same home for over ten years. Residents are also less likely to have a high school diploma, and about 39% have jobs in construction, production or transportation occupations. An above-average percentage of the land is vacant, and business presence is lower than the average for this cluster, suggesting that as a whole, this sub-type is less developed than the other Port of Entry neighborhoods. Despite the high mobility of its residents, this group does not often change type. |
| **Type 4-B: Regional Shopping** | Neighborhoods in Type 4-B are characterized by the presence of larger businesses and have the highest concentration of retail within the "Port of Entry" type. These neighborhoods are more likely to transition to higher income clusters, perhaps due to lower crime rates, a high concentration of retail amenities and entertainment venues, and proximity to downtown. |
| **Type 4-C: Local Shops** | These communities are characterized by the presence of smaller, local businesses. As in the case of Type 4-B, these neighborhoods are more likely to transition to higher income clusters. |
| **Type 4-D: Stable Residents** | Type 4-D typically includes older, more established communities. About 30% of the housing stock is composed of single family homes, and 39% of households own their unit. Median incomes are higher, and residents enjoy the greatest diversity of business types within this cluster. Consistent with the more stable character of these communities, this sub-type is much less likely to transition to other neighborhood types. |

| Type 5: Urban Tapestry | |
|---|---|
| **Highlights** | These neighborhoods tend to be "eclectic" areas that harbor a wide variety of people and businesses. Indeed, the features that define Type 5 neighborhoods are the ethnic diversity of the population —White, Hispanic and, to a lesser extent, African American — and a healthy diversity in business types. Most of the land is residential and little is left vacant. Residents tend to live in older housing and many own their single family homes. Almost half of them have some kind of advanced education and many work in professional occupations. |
| **Detailed Profile** | It is not a coincidence that Type 5 falls in the middle of the nine neighborhood groups identified by this typology. In many ways, this group represents a "middle ground" moderate income cluster. While the cluster as a whole does not have any outstanding features that distinguish it from the average, it is home to some of the most diverse neighborhoods in the city. In a few instances, this cluster also includes census tracts that have very distinct and different areas within their boundaries, separated by barriers such as hills, rivers or freeways.<br><br>The average household income is $37,300, which is close to the average across all neighborhood types. Racial diversity is among the highest across all clusters, although there are significant differences between the individual sub-types. Unemployment rates are low, and about 50% of adults have either a BA or advanced degrees. Crime rates are also relatively low.<br><br>Neighborhoods in this cluster are usually located mid-way between downtown and the city limits. Most of the neighborhoods are built out, with a moderate proportion of single family homes and moderate amounts of business concentration. At the same time, existing housing structures are among the oldest in the city. |

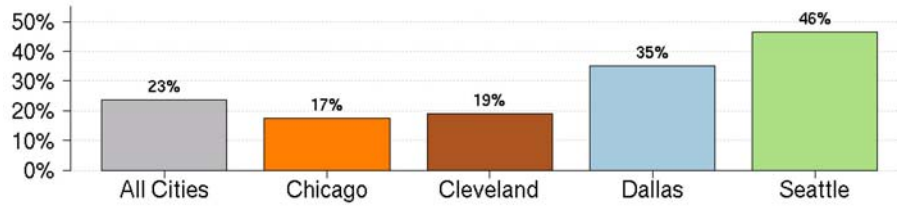
| Type 5: Urban Tapestry | |
|---|---|
| **Dynamics of Change** | Type 5 is relatively unstable. Between 1990 and 2000, only 59% of Type 5 neighborhoods remained in the same type, while 21% transitioned into Type 4 ("Port of Entry"), 8% transitioned into Type 8 ("Close, Cool and Commercial"), and 7% transitioned into Type 3 ("Stable Low Income"). Note that this is consistent with the mechanism of change being the movement of people, as the direction of the change is related to the characteristics of the new movers into the neighborhood, as a transition into Type 3 indicates an influx of lower income population, a transition into Type 4 indicates an influx of foreign born population, and a transition into Type 8 indicates a higher income population.<br><br>In fact, it is possible that this group includes many communities that are in a transitional state between two different neighborhood types. For instance, it is possible that neighborhoods transitioning from Type 2 to Type 8 go through a phase in which they would match the profile of Type 5. It is also possible that Type 5 neighborhoods harbor the lower income residents that are displaced when areas closer to downtown gentrify. For instance, when "Transient Underdeveloped" or "Port of Entry" neighborhoods experience rapid gentrification, it is possible that many of the original residents of those communities are pushed a bit further away, and find a new home in Type 5 neighborhoods. As a result, these communities might then tend to transition to Types 3 and 4.<br><br>If the neighborhood is in transition, the characteristics of the sub-type to which it belongs may give indications of the direction of future change. For example, neighborhoods in Sub-type 5-A, which tends to have a higher immigrant population, are 2.5 times more likely to transition into Type 4 than any other group. Neighborhoods in Sub-type 5-C, on the other hand, which tend to have more young adults and higher turnover, are much more likely to transition into Type 8. Neighborhoods in Sub-type 5-B are more mixed, and most likely to transition into Types 3 and 4. |
| **Growth Trends** | The RSI in these communities tended to have a below average growth rate between 1990 and 2000, trailing the city average by 12 percentage points, and to appreciated in par with the city between 2000 and 2006.<br><br>Change in quantity of housing in these communities moved in the opposite direction, as they grew 2 percentage points faster than the city between 1990 and 2000, and on par with the city between 2000 and 2005. |

| Type 5: Urban Tapestry | |
|---|---|
| **Presence by City (2000)** |  |
| **Urban Tapestry: Sub-Types** | |
| **Type 5-A: Immigrant Eclectic** | Neighborhoods in Type 5-A are areas with a higher immigrant population, more families, and a housing stock characterized by a higher percentage of single family homes. |
| **Type 5-B: High Diversity** | Neighborhoods in Type 5-B are areas with a modest number of families, more single family homes, and a greater presence of larger retail establishments. |
| **Type 5-C: Young Adults** | These neighborhoods tend to have more young adults employed in professional and managerial occupations and higher resident turnover. These neighborhoods also have a higher percentage of rental housing units. |

| Type 6: Coming Attractions | |
|---|---|
| **Highlights** | Usually built within the last 20 years, the neighborhoods in Cluster 6 attract a racially diverse mix of residents between the ages of 19 and 34, for the most part employed in professional occupations. These neighborhoods are typically further from the Central Business District and most residents have lived in them for less than 5 years. Median incomes are just under $40,000, but highly diverse businesses pop up and stay in the neighborhoods, providing services and entertainment for the residents. |
| **Detailed Profile** | Neighborhoods in this cluster can be characterized as "new developments." The average age of the housing stock in these neighborhoods, which are located primarily in Dallas and Seattle, is only 19 years. At the same time, business presence within these newer communities is fairly high, and the diversity of business types is among the highest among all clusters. The types of housing and overall levels of business presence, however, can vary greatly within this group.<br><br>The population in these neighborhoods is typically characterized by a high percentage of young adults and a low percentage of children. Incomes are moderate, but residents tend to be well educated, as 70% have at least a high school diploma. About 95% of the work force is employed, with 53% holding professional occupations. Racial diversity is also relatively high across most of these neighborhoods. |
| **Dynamics of Change** | "Coming Attractions" is a fairly unstable type. Since it is largely defined by being a "new development," as the housing stock ages and the community becomes more established these neighborhoods transition into other clusters.<br><br>Between 1990 and 2000, about 62% of Type 6 neighborhoods remained in the same cluster, while 13% transitioned into Type 5 ("Urban tapestry"), 10% transitioned into Type 4 ("Port of Entry"), and 10% transitioned into Type 8 ("Close, Cool and Commercial"). The high diversity of types that these neighborhoods evolve into suggests that this may be a more "transient" neighborhood type. In this sense, it might include "young" neighborhoods that are still quite malleable, and then evolve in different directions as their characteristics become more well-defined. *These neighborhoods present opportunities for "early stage" interventions that help move the neighborhood in the desired direction.* |

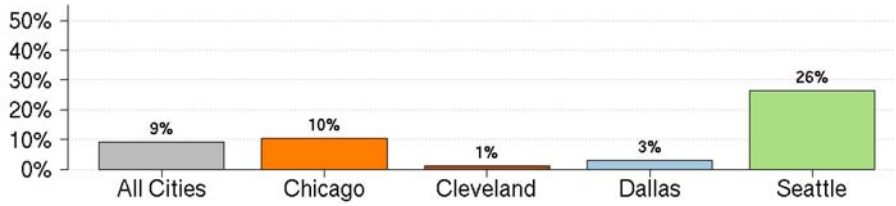
| Type 6: Coming Attractions | |
|---|---|
| **Growth Trends** | On average, the RSI had a below average growth rate over both time periods, increasing at a rate below the city average by 16 percentage points between 1990 and 2000, and by 3 percentage points between 2000 and 2006.<br><br>In terms of the change in residential parcels, this cluster grew 12 percentage points faster than the city as a whole between 1990 and 2000 (the highest growth rate over this time period), and 2 percentage points faster between 2000 and 2005. This very fast growth in quantity of housing might help explain the lower appreciation rates, which might have been dampened by a supply effect. |
| **Presence by City (2000)** |  |
| **Coming Attractions: Sub-Types** | |
| **Type 6-A: Commercial Districts** | These neighborhoods are characterized in large part by their mixed land use: about 30% of the land is commercial (compared to 16% for the cluster as a whole), and retail concentrations are the highest within the cluster. Entertainment venues are particularly common. These neighborhoods also tend to be located closer to downtown, and the housing stock is composed mostly of rental units. |
| **Type 6-B: Middle Class Residential** | Neighborhoods in Type 6-B tend to have very high levels of residential land use (about 85%), an older population, and lower turnover rates. They also have higher levels of home ownership and single family housing stock. Crime rates are higher than in the rest of the cluster. |
| **Type 6-C: New Development** | Neighborhoods in this sub-cluster are the newest of the new developments, as the average age of the housing stock is only 16 years. Business presence is relatively low, and some of these neighborhoods have larger plots of undeveloped or industrial land. |

| Type 7: No Place Like Home | |
|---|---|
| **Highlights** | Characterized by a distinct "suburban" feel, neighborhoods in Type 7 are populated with single family homes close to the city limits. While these communities are far from being huge estates and white-picket-fence suburbs, city residents of Type 7 live their lives comfortably on moderate to high incomes, and enjoy low crime rates. A nearly equal spread across age groups points to parents raising families in these neighborhoods, and even some retirees staying there after their nests are empty. However, residents probably go elsewhere for shopping and entertainment: "No Place like Home" neighborhoods are mostly residential, with very low concentrations and diversity of retail and services. In fact, these appear to be stable bedroom communities, as most residents have stayed in the same house for 10 years or more. |
| **Detailed Profile** | Neighborhoods in Type 7 tend to be located further away from the central business district, and are characterized primarily by their high home ownership rates (69% of households own their home) and large share of single-family homes (71% of the housing stock is composed of single family detached units).<br><br>A diverse resident base inhabits these highly residential communities. While the average median income is $45,000 overall, there is a high degree of variation, as median incomes in the neighborhoods that make up this cluster range from the low $30,000s to the upper $50,000s. Racial composition varies as well, although not all neighborhoods within this group are racially diverse. This is a fairly heterogeneous group in terms of age: some communities have more families with children and some have more senior residents. Overall, however, all age groups are represented within these neighborhoods.<br><br>These neighborhoods are remarkably stable, with an average of 48% of residents who have lived in the same home for over ten years - the lowest turnover rate among all clusters.<br><br>The majority of Type 7 neighborhoods are built out, have high residential land use and relatively low business presence. While a small portion of neighborhoods in this cluster are recent developments, most neighborhoods tend to have an older housing stock.<br><br>The key challenge faced by these communities is foreclosures, as they have the second highest foreclosure rates of all clusters. |

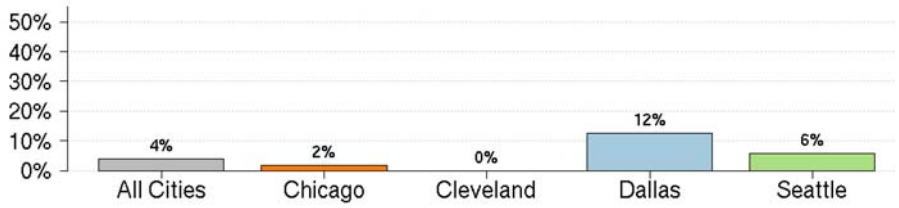
| Type 7: No Place Like Home | |
|---|---|
| **Dynamics of Change** | Type 7 is a highly stable type, due to very low residential turnover and high home ownership rates. Between 1990 and 2000, about 86% of Type 7 neighborhoods remained in Type 7, while 7% transitioned into Type 6 ("Coming Attractions"), and 4% transitioned into Type 3 ("Stable Low Income").<br><br>Overall, the lower income neighborhoods within this type were less likely to improve, but when they did they also managed to retain most of their original residents. None of these neighborhoods experienced improvement with significant displacement, likely due to the high homeownership rates.<br><br>Improvement rates also differed among sub-types. In particular, neighborhoods in sub-type 7-A were much more likely to improve than neighborhoods in sub-type 7-B. |
| **Growth Trends** | Type 7 had the slowest growth rates overall, perhaps consistent with the very stable character of these communities.<br><br>On average, the RSI trailed the city average by 28 percentage points between 1990 and 2000, and by 6 percentage points between 2000 and 2006. In terms of the change in residential parcels, this cluster trailed the city by approximately 4 percentage points throughout the period. |
| **Presence by City (as of 2000)** |  |

| Type 7: No Place Like Home | |
|---|---|
| **No Place Like Home: Sub-Types** | |
| **Type 7-A: Blue Collar Diverse** | Neighborhoods in this subset of Type 7 tend to have lower incomes than the median for this type and a higher proportion of families with children. These communities typically have a great deal of racial diversity, as they are on average 42% Hispanic, 27% Black and 28% White. |
| **Type 7-B: Settled and Stable** | These are the most stable neighborhoods within this type, as 60% of households have lived in the same residence for over 10 years. These neighborhoods are also typically not racially diverse, as they tend to have a large majority of either White or African American residents. |
| **Type 7-C: New Picket Fences** | Neighborhoods in Type 7-C are typically new developments. The mean age of the housing stock is only 17 years, 30% of the land typically remains undeveloped and business presence is also very low. Still, of the land that is developed, about 64% of housing units are single family detached, and 60% of households are owners, figures just slightly below the cluster averages. Along with Type 7-F, these neighborhoods tend to be located furthest from the central business district. |
| **Type 7-D: Corner Stores and Shopping Centers** | Neighborhoods in Type 7-D stand out for their high levels of retail diversity and business presence, an unusual trait for neighborhoods in this cluster. |
| **Type 7-E: High End Housing** | Neighborhoods in Type 7-E have higher than average median household incomes ($52,800) and residential land use levels. However, in comparison to the cluster average, these neighborhoods tend to have a slightly more mixed housing stock, as only 61% are single family homes and 59% of households are owners. |
| **Type 7-F: Higher Income Homes** | Neighborhoods in Type 7-E have the highest average median household incomes ($57,000) and residential land use levels within the "No Place Like Home" cluster. Moreover, about 81% of housing units are single family detached, and 79% of households are owners. Along with Type 7-C, these neighborhoods tend to be located furthest from the central business district. |

| Type 8: Close, Cool and Commercial | |
|---|---|
| **Highlights** | Young professionals in these neighborhoods come home to their rented, high-end apartments close to the central business district. Few children frequent the streets in these communities, but the population of 19-34-year-olds enjoys a high diversity and concentration of service, retail, and entertainment businesses. These neighborhoods are not especially diverse in either race or earnings. Almost all residents have some kind of post-high school education, and most work in professional occupations. Few people own their homes, and though these neighborhoods are attractive in both location and amenities, less than a quarter of the population has stayed in them for more than 10 years. |
| **Detailed Profile** | Type 8 broadly represents the "young professional" (some might say "yuppie") neighborhoods: on average, 48% of residents are between the ages of 19 and 34, and children make up less than 10% of the population. This highly mobile resident base is also highly educated, and 67% of adults work in professional occupations. Median incomes are, for the most part, moderate to high, and the average level for all neighborhoods in the cluster is $52,000. These neighborhoods are usually majority White and racial diversity is low.<br><br>Many of these neighborhoods are located near downtown, and, in fact, include downtown areas as well. These are very dense communities, with very few vacancies, and typically have the highest levels of consumption amenities and social capital across all clusters. The majority of housing units are rental, but pockets of single family detached housing are also present. |
| **Dynamics of Change** | Despite the high mobility of its residents, Type 8 tends to be a very stable neighborhood, as 85% of neighborhoods that were in this cluster in 1990 remained in the same cluster by 2000. This suggest that these tend to be "stage of life" communities that serve a function for a particular segment of the population, which then moves on to other areas.<br><br>Of the neighborhoods that changed clusters, about 5% transitioned into Type 5 ("Urban Tapestry"), 5% into Type 9 ("Fortune 100"), and 4% into Type 6 ("Coming Attractions"). |

| Type 8: Close, Cool and Commercial | |
|---|---|
| **Growth Trends** | On average, the RSI had a below average growth rate, trailing the city by 10 percentage points between 1990 and 2000, and by 19 percentage points between 2000 and 2006.<br><br>On the other hand, this cluster experienced a great deal of real estate development, growing in housing quantity 26 percentage points faster than the city as a whole between 1990 and 2000, and 3 percentage points faster between 2000 and 2005. |
| **Presence by City (2000)** |  |
| **Close, Cool and Commercial: Sub-Types** | |
| **Type 8-A: Walk-Ups and Laundromats** | These neighborhoods tend to have more lower incomes families, and a higher proportion of single family housing stock. They are typically located further away from the central business district, and tend to have an older housing stock. |
| **Type 8-B: Urban Pioneers** | Neighborhoods in Type 8-B tend to be very close to downtown, and have a very low proportion of families with children. Land use is more mixed, with very high business presence and some industrial land. |
| **Type 8-C: Downtown** | These neighborhoods constitute the central business districts, and have the highest levels of business presence among all clusters or sub-clusters. Thus, they are primarily not residential areas. If there are housing units they tend to be rentals, with high vacancy rates and high residential turnover. |
| **Type 8-D: Doormen and Delivery** | These are the most affluent areas within Type 8: median incomes are $67,000 (compared to $52,000 for the overall cluster), and education levels and the percentage of professional and managerial occupations are very high. Like Sub-type 8-A, these communities are typically located further away from the central business district than the cluster overall, and tend to be more established communities with an older housing stock. |

| Type 9: Fortune 100 | |
|---|---|
| **Highlights** | This type is characterized by expensive single family homes, wealthy homeowners and few business enterprises. With a median income around $100,000, residents of these neighborhoods are mostly professionals with advanced degrees. Low crime rates and long term residential stability make these neighborhoods exclusive and desirable to those who can afford to live in them. The exclusivity of these areas is also evident in the lack of diversity it creates: over 80% of the residents are white and there is little income diversity. |
| **Detailed Profile** | This type includes some of the wealthiest neighborhoods in the city, with a median household income of $100,000. Residents of these neighborhoods tend to be older: typically, 45% of residents are between age 35 and 64 (the highest concentration of all clusters), while only 18% are between age 19 and 34 (the lowest concentration of all clusters). These neighborhoods are also home to many families with children, as 23% of the population is less than 18 years old.<br><br>Socio-economic indicators are, not surprisingly, very positive. Educational attainment is the highest among all clusters, and the unemployment rate is only 3%, lowest among all clusters. Credit indicators such as ratio of balance to credit limit and foreclosure rates are the lowest among all clusters. Residents are mostly employed in white collar jobs, as 71% work in professional occupations.<br><br>About 77% of households are homeowners, and 74% of housing units are single family detached, both highest among all clusters. Variation in housing type exists across these neighborhoods, however, as some communities tend to be located closer to the central business district and have more rental housing and a greater amount of consumption amenities, while others are located further away from the central city, are more built out, and have an older housing stock. |
| **Dynamics of Change** | "Fortune 100" is a moderately stable type, as 76% of neighborhoods in this cluster in 1990 remained in the same cluster by 2000. Of the neighborhoods that changed type, about 14% experienced a decline in incomes, transitioning into Type 7 ("No Place Like Home"). |

| Type 9: Fortune 100 | |
|---|---|
| **Growth Trends** | Not surprisingly, these communities had relatively slower appreciation rates over both time periods: the RSI grew at a rate that was 4 percentage points lower than the city as a whole between 1990 and 2000, and 5 percentage points lower between 2000 and 2006.<br><br>In terms of the change in residential parcels, this cluster grew slightly faster than citywide rate between 1990 and 2000, but grew at a rate 4 percentage point slower than the city between 2000 and 2005. |
| **Presence by City (as of 2000)** |  |
| **Fortune 100: Sub-Types** | |
| **Type 9-A: Old Money** | Neighborhoods in Type 9-A tend to be further away from the city center, and have older residents, older homes, and greater stability. These areas are also characterized by a very low percentage of vacant parcels and a housing stock composed primarily of single family homes. |
| **Type 9-B: Wealthy Boom** | These neighborhoods are quite different from the rest of Type 9: they have younger residents, higher turnover, and a more diverse housing stock, including a higher proportion of renters. These neighborhoods tend to be located closer to the central business district, and have a higher concentration of retail and service establishments. |
| **Type 9-C: Exclusive Enclaves** | Neighborhoods in Type 9-C have the greatest concentration of high income residents. Many neighborhoods in this group are composed of a relatively new housing stock, with a significant percentage of land parcels that are still undeveloped. |

## E. Summary Observations

After profiling each type, and before turning to the practical applications of the typology, it might be useful to step back and highlight some of the ways in which this information helps integrate the analysis conducted in the other components of the DNT project and further our understanding of neighborhood dynamics.

- First, it confirms that **neighborhoods are highly dynamic entities,** as they frequently change type, even over a relatively short time period.
- Second, it highlights the extent to which neighborhoods (including lower income com-

munities) are differentiated and specialized, and suggests that **different types of neighborhoods perform different functions for their residents.**

- In particular, some neighborhood types seem to be **"stage of life" communities:** these places offer a set of amenities that appeal to people in a certain stage of their lives, after which they move on and locate elsewhere. These neighborhoods will tend to remain the same type despite a high turnover in their population, because the people who leave will be replaced by people with similar characteristics.[16] Other neighborhood types tend to be **places where people "settle down" and spend significant portions of their lives.**[17]

Among other things, this differentiation has implications for the relationship between "people" and "place" based interventions (a subject we return to in Chapter VIII). While the two dimensions are closely intertwined everywhere – people shape the places they live in and place has a powerful influence on people's lives – their relationship might vary based on the type of neighborhood: for instance, in "stage of life" communities, where there is a high turnover in the neighborhood's residents, the relationship between improving the neighborhood and helping its residents is different than in communities where there is more resident stability.

A related observation has to do with the importance of homeownership, which has been highlighted in the Drivers analysis as well. The Typology results show how homeownership is a powerful factor both in characterizing neighborhood type and in determining its likely evolution. Neighborhood types characterized by higher homeownership rates tend to be more stable overall (both in the sense that their residents move less frequently and that the neighborhood does not change type as much), and less likely to improve with displacement.

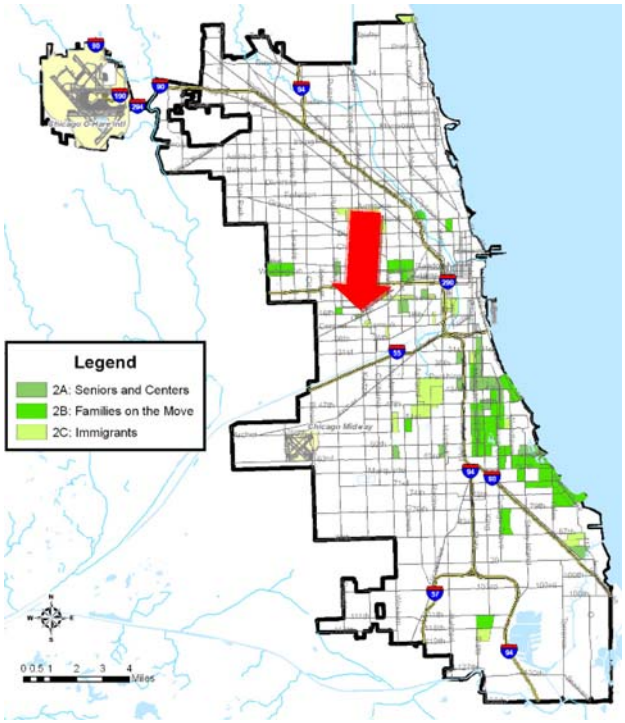
The typology also confirmed a set of themes that had already emerged in the evolution and drivers analysis, related to the appreciation and redevelopment of lower income neighborhoods and to the overall improvement in the outlook for cities over this time period. At the same time, the disproportionate concentration of neighborhood decline patterns in the two lowest income segments (Types 1 and 2) reveals that there are important exceptions, and confirms the importance of targeting investment to the places that need it the most.[18]

## F. Applying the Typology

As we mentioned at the beginning of this chapter, the typology can be used in a variety of ways. The examples below illustrate a few ways it can help prioritize interventions in different neighborhoods.[19]

As a first step, the typology can be used to examine neighborhood performance. Identifying neighborhoods that have the same overall characteristics ensures that comparisons

actually make sense. For instance, a neighborhood can use the typology to compare its growth rates to those of the other neighborhoods in the same sub-type, and see whether it is doing as well as could be expected. Consider, for example, a census tract in the North Lawndale neighborhood on the West Side of Chicago, highlighted in the map below. This tract belongs to Type 2-A ("Seniors and Centers"). Based on the RSI, the growth rate in this tract between 1990 and 2006 was 33%, which is much lower than the average for its type (approximately 100% over the same period), revealing that this neighborhood is not doing as well as its peers.




The typology can also be used to go much further than this initial diagnostic. In fact, it points at some factors that might be particularly important for each type, and enables us to compare a neighborhood to its peers with respect to those factors, in order to identify priority areas of focus for development interventions.

For instance, having identified a group of peer neighborhoods for the census tract in North Lawndale, we can use the typology to see how this tract is doing on some of the key drivers of neighborhood change for "Stable Low Income" neighborhoods. An initial comparison (summarized in the table below) reveals that this tract is actually trailing its peers on a few important dimensions, including employment, educational attainment and, to a lesser extent, social capital (which are all drivers of improvement in place). This information can then be used to prioritize interventions to address these dimensions in particular.

| | Tract 291800 | Type 2-A, "Seniors and Centers" |
|---|---|---|
| **Change in Value** | **33%** | **100%** |
| Median Income | $18,560 | $17,000 |
| Vacant Units | 29.2% | 19.0% |
| Social Capital | 3.72 | 3.95 |
| Unemployment Rate | 37.0% | 20.9% |
| Turnover (% Moved in Last Five Years) | 55.2% | 30.8% |
| Educational Attainment – No High School Diploma | 69.1% | 42.6% |

The typology can also be used to go one step further and find out how similar neighborhoods have been dealing with these issues. In particular, the typology can be used from the "bottom up" to find out the neighborhoods that are most similar to a particular place (in the case of the North Lawndale neighborhood discussed above, several neighborhoods on the West and South Side of Chicago, as well as some communities in South Dallas), see which ones have successfully dealt with the same development issues (in this case, unemployment and educational attainment), and then identify the interventions that can best be adapted and applied.[20]

An additional important use for the typology is that it can help to think strategically about the trajectory in which a neighborhood is headed and what kind of place its residents would like it to be. Consider for instance neighborhoods in Type 6 ("Coming Attractions"). We know that these areas can evolve in several directions and become very different types of places. By comparing the characteristics of these different types we can identify areas of interventions that would help "push" the neighborhood in the desired direction. For instance, if the residents of a Type 6 neighborhood determined that they would like their community to evolve in the direction of the "Close, Cool and Commercial" neighborhood type, development interventions should focus more on retail development. Conversely, if the desired trajectory is more in the direction of Type 7 ("No Place like Home"), interventions should focus more on housing, homeownership and school quality.

Moreover, the typology can be used to take a more granular and nuanced look at a particular community, targeting interventions to different parts of the area and anticipating the changes that might lie ahead. Take for instance the community area of Chicago Lawn, on the southwest side of Chicago. While people think of this as one neighborhood, there are as many as five distinct neighborhood types and seven distinct sub-types within its boundaries, including "No Place like Home" to the South, "Stable Low Income" to the East, "Urban Tapestry" in the middle and "Port of Entry" to the Northwest.

The pattern of transitions between 1990 and 2000 points to significant changes taking place in this neighborhood, particularly due to an influx of lower income and foreign-born households (in the Eastern and Northwestern portions of the community respectively). These trends are likely to continue (partly due to gentrification and displacement in communities closer to downtown) and to cause the "Urban Tapestry" portion of this community to take on more of the characters of "Port of Entry" and "Stable Low Income" neighborhood types. The information contained in the typology on these different types can also help prioritize interventions, and would suggest focusing in particular on issues related to safety, foreclosures and home ownership in the "Stable Low Income" portions of the neighborhood and access to jobs in the "Port of Entry" sections.

## G. Next Steps: Building on the Typology

The typology provides a powerful tool that enables a new level of neighborhood analysis, and is already being applied to particular places. As this work proceeds, it will provide opportunities to refine the typology and improve its applications by expanding and testing it in new locations.. This information can then be used to "fine-tune" the profiles, and make them more accurate and useful.

The typology could also be expanded in several ways. It would be relatively easy, for instance, to develop a next layer of neighborhood sub-types. This information is already embedded in the hierarchical structure of the typology, and needs to be extracted and made accessible. This would yield a more detailed picture of each type and enable a more granular analysis of particular places.

An additional next step would be, of course, to update the data and track changes in neighborhood type over a longer period of time. This would serve two important purposes: it would ensure that the typology is always relevant and up to date, and it would reveal additional information about patterns of change and transitions between types that could then be incorporated in the type profiles and enhance their value.

Finally, and perhaps most importantly, the typology could be applied to neighborhoods in other cities, and adapted or expanded as necessary. This step would probably be the most valuable in order to increase the applicability and usefulness of the typology. Every time a new neighborhood is added, it enriches the base of information that is used for the typology and increases its accuracy, both in terms of profiling each type and in terms of revealing useful information regarding their patterns and drivers of change. Moreover, while the four cities selected for the analysis encompass a wide variety of neighborhood types, there likely are neighborhoods in other cities that would not fit neatly in any one of them, and might in fact represent entirely new types that are not included in this typology. By adding them

to the sample we would expand the scope of the typology and ensure that it is broadly applicable beyond the four cities for which it was originally constructed.

## *Endnotes for Chapter VII*

1 As in the rest of the project, the unit of analysis used for the typology is the census tract. Any neighborhood can then be defined in terms of the census tracts that it contains.

2 See, e.g., Christine McWayne et al., *Employing Community Data to Investigate Social and Structural Dimensions of Urban Neighborhoods: An Early Childhood Education Example,* The American Journal of Community Psychology (2007), 39:47-60.

3 Recall that the four sample cities used for the analysis were selected in part based upon their diversity of neighborhood types. Indeed, the typology did not surface any types that were unique to one city, confirming its applicability beyond the four cities for which it was constructed. In fact, in recent months the typology has been applied to other cities (including Detroit and Washington, DC) with very positive results: virtually every neighborhood in these additional cities fit within the type identified by the DNT typology, despite the fact that no data from those cities was used to develop it.

4 Ideally, this typology would serve as a foundation that would be expanded over time in two ways: by continually collecting and incorporating updated data and by including neighborhoods in other cities. This process would help refine the profiles and descriptions of each type and related dynamics of change, and would surface new neighborhood types that do not exist in the four sample cities, expanding the applicability of the typology and making it more useful.

5 Ultimately, a detailed analysis of the drivers of change for each neighborhood type will be needed in order to complete this picture. The typology presented here is an important step in this direction, but it should be approached as a "beta" version – a prototype which will be refined and improved as it is applied to particular places.

6 Among other things, the project experimented with a methodology that would classify neighborhoods directly based on their drivers of change – i.e. using the coefficients in the drivers of change models to isolate groups of neighborhoods that would respond to the same type of interventions. While this approach would ensure that the typology serve one of its primary purposes (help target interventions to the types of neighborhoods where they are most likely to be effective), it could not be fully implemented due to an insufficient sample size. If the project is applied to other cities in the future, expanding the number of neighborhoods used as a basis for the analysis, this approach could be resumed and would likely produce powerful results.

7 Each of the several iterations developed before reaching the final one presented here was evaluated not just statistically but against local knowledge as well, based on how well it seemed to group together neighborhoods that are perceived as fundamentally similar by the people who know them best.

8 Race was purposefully omitted as a defining variable despite its importance in the Drivers models. This is due to the fact that race is often associated with other characteristics and circumstances (such as income, employment, and so forth) that, unlike race, are subject to economic development interventions. For the purposes of a typology that is designed to guide economic development interventions, it is thus more useful to include those characteristics as determinants of neighborhood type and then see the extent to which the resulting neighborhood groups are also differentiated in terms of race. In fact, it turns out that many neighborhood types have a distinct makeup in terms of race, even when race is not included as a factor. The project also tried adding race to the other factors it selected as determinants of neighborhood type, and confirmed that this did not significantly change the types already surfaced by the typology.

9 Income is used for the ordering for two reasons: it is a very important outcome from an economic de-

velopment standpoint, and it plays a very important role in determining neighborhood type.

10 The validity of a typology cannot be tested based on differences in the variables that are used for the clustering, as those will by definition be more different across types than within types. However, it is possible to test the validity of a typology based on differences in variables that were not used for the clustering. To the extent that those variables are well differentiated across types (as was the case for this typology), this provides an indication that the clustering surfaced truly distinct neighborhood types.

11 This projection was done as follows: first, the project compiled the most current data available for each neighborhood in the sample (2006 for the business variables, 2005 for the land use variables, and 2000 for most of the demographic variables). It then calculated the weighted Euclidean distances from all the 1990 and 2000 observations that were used in the typology. Each neighborhood was then assigned to the type of the 1990 or 2000 neighborhood that had the lowest distance.

12 As revealed by the Evolution analysis presented in Section IV, these two indicators often move in opposite directions, and should be expected to diverge for many neighborhood types. For obvious reasons, this analysis could only be applied to the neighborhoods that did not change type between 1990 and 2000

13 However, across the 23 factors included as determinants of neighborhood type, each neighborhood is in fact more similar to the other neighborhoods in its group than to any other neighborhood in the sample.

14 For instance, neighborhoods in Type 4 ("Port of Entry") are on average 66% Hispanic. However, Port of Entry neighborhoods in Seattle (as well as several communities in Chicago) tend to have a much higher percentage of residents of Asian origins.

15 All income figures are adjusted for inflation and expressed in constant year 2000 dollars.

16 This seems to be the case, for instance, of Port of Entry communities, where immigrants might settle when they first come into the country, take advantage of the resources and connections provided by the neighborhood to find jobs and start their lives in a new country, and eventually, as their economic situation improves, they will move out, perhaps looking for bigger houses, or better schools for their children. As they move out, they are replaced by other immigrants arriving into the country. Another (though very different) example is the "Close, Cool and Commercial" neighborhoods, which offer a set of amenities that appeal to young adults with some disposable income, perhaps before they are ready to start a family, purchase a home, and "settle down" in a different type of community.

17 Types 3 ("Stable Low Income"), 7 ("No Place like Home") and 9 ("Fortune 100") seem to fall into this category.

18 The foreclosure crisis that has plagued many urban neighborhoods over the past three years is likely to have an impact on these trends, but it should not affect the validity of the typology in general, as it is highly unlikely that it would give rise to entirely new types of neighborhoods that are currently not included. What might be affected, though, is the attribution of specific neighborhoods to particular types. It is also likely that, over time, some of the neighborhoods that are hit the hardest will tend to transition "down" to types that have a similar built environment but are worse off from a socioeconomic standpoint. In particular, the foreclosure data shows that the neighborhoods that are most likely to be impacted are types 3 and 7. We would expect that the type 7 neighborhoods that are hit the hardest might transition over time to types 3 (lower incomes, higher vacancy rates), and that among neighborhoods that were already type 3 we might observe a greater concentration in sub-type 3B (higher vacancies). It is also possible that some of the Type 3 neighborhoods that are hit the hardest might transition to type 2 (lower income, more turnover, more rental, more vacant land), particularly to the extent that foreclosure remediation interventions include extensive demolition coupled with development of some multi-unit apartment buildings.

19 The typology can also be used, in combination with a set of other tools, to more broadly develop ongoing neighborhood assessments and strategic design of interventions, as well as impact monitoring and market analysis. Additional examples of these applications are illustrated in Chapter IX.

20 These comparisons can also be drawn across time: a neighborhood today could find other neighborhoods that were in the same situation in 1990, and see what those neighborhoods did and how they evolved.

## VIII. Bringing it All Together

The research and analysis conducted by the DNT project has generated a large amount of information on the dynamics of neighborhood change, and revealed many insights into the patterns of neighborhood evolution, the drivers of neighborhood change, and the characteristics of different types of urban communities. Having described all of these "trees" in the previous sections of this report, it is now time to step back and take a look at the forest: **what does this all mean for community and economic development?**

Ultimately, what emerges from the work of the DNT project is that we need to fundamentally reframe how we understand neighborhoods and approach development, and so offer a different theory for what neighborhoods are, how they can be analyzed, and how one can figure out what activities will be most effective in a particular place.

This section will thus attempt to do the following;

- Summarize and tie together some of the key findings of the project
- Based on the project's findings, offer a definition of neighborhoods as dynamic entities shaped by larger social, political and economic systems
- Examine the functions that neighborhoods serve within these systems and for their residents
- Explore how this framework can inform the goals and strategies of community and economic development practice.

### A. Neighborhood Dynamics: A Synopsis

First, neighborhoods need to be understood "in context." As Jane Jacobs pointed out forty years ago, "we must first of all drop any ideal of neighborhoods as self-contained or introverted units."[1] What happens in a neighborhood is partly a function of what happens in neighborhoods around it. More importantly, neighborhood dynamics are shaped by trends at the regional and even national level. We have seen how over one third of neighborhood change across cities can be accounted for by regional trends, and how the effects of many neighborhood-specific factors (such as the presence of transit stops, for instance) play out across neighborhood boundaries.

These forces, which operate at a much larger scale than the neighborhood itself, affect the flows of people and investment, which are the primary mechanisms of neighborhood change. The best example over the time period examined by the project is the comeback of central cities: after decades of decline in central cities across the country, changes in the economy (ranging from the increasing importance of knowledge factors to rising gas

prices) seem to have caused a shift in preferences towards denser urban environments. This in turn has generated an in-flow of people and investments in urban neighborhoods, which as a consequence have experienced significant change over the past fifteen years.

If the flows of people and investments are the primary mechanisms of neighborhood change, they are in turn affected by a set of neighborhood-specific characteristics which can make a community more or less attractive to different types of in-movers and investors. Overall, the Drivers analysis suggests that movers are attracted to areas that have undervalued housing but are close to downtown jobs and amenities, have good access to transit and consumption amenities (primarily supermarkets), and otherwise sound socioeconomic conditions (including income diversity and low unemployment rates in particular). As we have seen in the analysis of convergence and improvement in place, the characteristics of the neighborhood's housing stock also help shape the patterns of investment and redevelopment: neighborhoods with more apartment buildings, more turnover in their population and higher vacancy rates are more likely to experience larger scale redevelopment than neighborhoods with a predominance of single family homes.

Beyond these broad factors, the drivers of change really vary by neighborhood, as different people seek different combinations of amenities. In fact, the findings of both the Drivers and Typology components of the project confirm the extent to which neighborhoods are highly differentiated and can be classified in terms of distinct types with significant differences in their drivers and dynamics of change.

In particular, based on the interaction between flows of people and investment and neighborhood characteristics, different types of neighborhoods evolve in different ways. For instance, neighborhoods with higher homeownership rates (such as the "Stable Low Income" neighborhood types) are more likely to improve while retaining their original population, while areas with more renters (along the lines of "Transient Underdeveloped" neighborhoods) are more prone to displacement. Moreover, some neighborhood types (such as Type 2, "Transient Underdeveloped," and Type 6, "Coming Attractions"), are more "malleable" than others: they are more likely to become a different type of neighborhood over time, and they are more open-ended in terms of what types they are likely to transition to, probably due to the fact that the real estate characteristics of the neighborhood lend themselves to different kinds of development.

Another key difference between the dynamics of different types of neighborhoods (and good illustration of the extent to which neighborhoods are dynamic and characterized by flows of people and investments) is the distinction between neighborhoods that can be considered "stage of life" communities and neighborhoods in which people tend to settle down and spend a longer part of their lives. Stage of life neighborhoods are areas that offer a set

of amenities that appeal to some demographics in a certain stage of their lives, after which they move on to other places. Examples of these types of neighborhood include port of entry communities and the neighborhoods we have labeled "Close, Cool and Commercial" in the Typology. Mobility is an integral part of the nature of these communities, more so than in any other type of neighborhood. This does not make these neighborhoods any less stable, in the sense that while their population might turn over at a faster pace, it is replaced by residents with similar characteristics, and the key features of the neighborhood tend to remain the same. The areas in which people tend to settle down, on the other hand, include places like neighborhood types 3 ("Stable Low Income"), 7 ("No Place Like Home") and 9 ("Fortune 100"), that have a more stable population, higher homeownership rates, and a housing stock composed by a greater percentage of single family homes.

These findings on neighborhood dynamics have two broad implications for community and economic development:

- **We need a new framework based on a more nuanced view of neighborhoods as highly differentiated, complex and dynamic entities in constant evolution,** influenced by (and in turn influencing) the dynamics of the larger systems that affect the flows of people and investment. This framework should recognize that the goals and strategy for development need to be as nuanced and specialized as neighborhoods are, and tailored to the specific functions that each neighborhood plays in the context of these larger systems.
- **We need much better tools for identifying and developing interventions tailored to the specific circumstances of different places**.

The next section will present some of the tools for neighborhood analysis that have already been developed by the project. The remainder of this section, though, is dedicated to outlining a new framework based on the dynamic view of neighborhoods that has emerged from the project.

## B. Dynamic Neighborhoods: A New Framework for Community and Economic Development

The findings of the project, combined with our experience, lead us to offer a fundamentally new framing for understanding neighborhoods.[2] This framework, illustrated in detail below, can be summarized as follows:

- Neighborhoods are dynamic entities in constant motion, shaped by flows of people and investments coming in and out of their boundaries
- These flows of people and investments are determined by the dynamics of economic,

social and political systems that extend well beyond the neighborhood
- Neighborhoods are thus better understood as complex nodes of activity that arise from the interactions of economic, social and political systems with each other and with the physical environment in a particular place
- In this context, healthy neighborhoods perform a set of key functions: they make the social, political and economic systems work better; and they increase the participation of their residents and organizations in these systems.

This view of neighborhoods has implications (explored in the next section) both for the goals of community and economic development and for the strategies that can be implemented in order to achieve these goals.

### *1 Neighborhoods as Dynamic Entities*

Neighborhoods are always in motion. Traditionally, when people try to assess how their neighborhood is doing, they often take a snapshot of its components: what are the demographic characteristics of the neighborhood, how many housing units are there, what type of businesses operate within its boundaries, and so forth. However, this static snapshot fails to measure what may be the most important aspects of a neighborhood. **Neighborhoods are by their nature dynamic entities in constant motion: people move in and out, businesses open and close, houses are torn down and rebuilt. Even stable neighborhoods are continually renewing their population, business base and housing stock.** Two neighborhoods can have identical housing values, median incomes and other characteristics, but one could be improving and the other failing – because their underlying dynamics may be quite different. These dynamics determine how well a neighborhood is functioning to renew or expand the features that make it an attractive place to live and invest. **If we want to understand how the neighborhood is *doing* – not just *being* – we need to understand its dynamics.**

As we focus on dynamics, we can start with the observation that **neighborhood stability, change and performance are related to the flows of people and money that come into or leave the area.** Neighborhoods decline, for example, as people leave and are not replaced, or local jobs decline and current residents lose income, and as real estate and local businesses fail to attract investment. Conversely, neighborhoods remain stable or improve through the inflow of people and/or through the inflow of money, in the form of residents becoming wealthier or through new investments in the neighborhood. If residents, real estate, businesses, institutions and infrastructure are the basic *components* of neighborhoods, it is the *flow* of people and money that is the primary active mechanism of change in these components. In this sense, people and money are the lifeblood or fuel of neighborhoods: their flow ultimately determines neighborhood health and performance.

Shifting focus from the static components to the flow of people and money, however, is just a useful next step in understanding how neighborhoods work and what drives their success. People and money moving in and out of a neighborhood might be the immediate manifestation of its change, but are themselves the result of underlying dynamics. The flow of money occurs through economic transactions that depend upon factors of production and follow the rules of markets that operate within and outside the neighborhood. Similarly, people choose where to move based on a variety of factors, many of which are external to the neighborhood itself. In order to understand *why* people move in or out, why businesses open or close, and why certain investment decisions are made in some neighborhoods and not others, we need to go beyond the observation that neighborhoods are dynamic entities – **we need to analyze and understand the dynamics of the systems that affect the flows of people and money.**

### *2 Neighborhoods as Part of Larger Systems*

Neighborhoods exist with reference to larger economic, social and political systems operating across varied geographies, nearly always larger than the neighborhood:

- Economic systems are primarily the markets that determine the value of neighborhood assets: the labor market affecting the employment of the neighborhood population, the housing market that determines the value of the neighborhood real estate, the varied markets (from apparel retail to furniture manufacturing) that affect the performance of the businesses in the neighborhood, the financial markets that affect the availability of credit and capital, and so forth.
- Social systems are primarily the active networks of individuals and social institutions (family, religious organizations, sports clubs, schools, etc) in which neighborhood residents participate.
- Political systems are the governing institutions that structure civic participation and deliver government services, as well as create the enabling environment for market activity.

These social, economic and political systems operate and interact within the physical dimension of neighborhoods, which encompasses both the natural and built environment. The operations of these systems are both constrained by the physical environment and help shape it, determining for example what is built where, which houses are renovated and which are left to decay, how much is invested in maintaining and upgrading parks and infrastructure. As a result, the physical environment is constantly changing and, at the same time, has powerful effects on the operations of these systems and on the lives of individuals and organizations.

Ultimately, the flows of people and money in and out of neighborhoods are the outcome of

the dynamics of these larger economic, social and political systems as they interface with the physical dimension. There are many examples of how these systems interact with the physical environment and affect each other in particular places: housing markets affect the performance of local businesses both as part of their operating costs (land being a factor of production) and through their effect on the flows of people moving in and out of the neighborhood (think of the change in the business base in rapidly gentrifying neighborhoods), and at the same time shape the physical environment by determining what is built or torn down and where. Social networks are an important component of where people choose to live, and can impact resident stability and willingness to invest in housing. Social capital affects civic engagement and the delivery of public goods and services: more cohesive communities can be more politically active and organized; more organized neighborhoods, where residents are more vocal and connected, can get more services and public investment.

These complex interactions give rise to a new whole that is greater than the sum of its parts: the neighborhood. As the internal dynamics of these systems play out over space through the actions of individuals and organizations, they give rise to dense nodes of activity at the intersection of economy, society, polity and place which have their own unique characteristics and dynamics and, in turn, influence the larger systems.

In this sense, **neighborhoods are not just physical places – they are primarily webs of relationships and transactions, arising from and continually shaping economic, social and political activity.** In a way, then, neighborhoods are themselves complex adaptive systems[3]: they emerge from the interactions of individuals and organizations reacting to each other and their environment. They are open systems, as they are affected by the internal dynamics of all of the other systems, but they have a life of their own.

### *3 System Dynamics and Neighborhood Performance*

Redefining neighborhoods in these terms enables us to understand what happens in a neighborhood as a function of the dynamics of the larger economic, social and political systems. Each system arises from the actions of individual "agents" (people, businesses, organizations, etc.) according to a set of general operating principles (such as, for instance, "cost minimization" in the economic system). At the aggregate level, these actions result in system dynamics that generate specific outcomes in particular places. A clear example at the moment is the foreclosure crisis, which resulted from the internal dynamics of the financial and real estate markets and is now affecting in a very direct and dramatic way so many neighborhoods across the country.

It is useful at this point to provide some more detailed examples of how this process might work, both to shed more light on the nature and functions of neighborhoods, and to derive

some implications for development practice.[4] Since the DNT project was primarily concerned with the economic dimension, we will focus here on the economic system in particular, but a similar analysis could be performed with respect to the other systems as well.

With respect to the economic dimension of neighborhoods, the flow of people and money is determined by the operations of multiple market systems.[5] Neighborhood residents are employed (or not – determining one critical flow of capital into the neighborhood through incomes) in the context of regional and, increasingly, global labor markets. Real estate is valued (affecting the flow of both people and capital) in the context of regional housing, commercial and industrial real estate markets. Specific retail and service markets affect what businesses operate in the neighborhood, determining the flow of capital in the form of business investments and the kind of consumption amenities available in the neighborhood, which in turn influences the flow of people.

In practice, of course, these systems manifest themselves and arise from individual transactions (people opening businesses, buying goods, deciding where to invest, purchasing their homes, etc.). Therefore, the dynamics that govern market operations play out in space through the actions of individuals, businesses and organizations that interact with each other, engage in some transactions and not others, and make decisions on what and where to buy and produce. Through the combination of these individual actions, market dynamics contribute to shaping neighborhoods and have important effects on the lives of their residents.

In particular, while these markets vary in geographic scope, they share some underlying rules and operations: they are all composed of producers and consumers who seek to make the best use of the resources they have available and whose interactions are both enabled and constrained by the environment in which market activity takes place (including laws and regulations, infrastructure, and the natural environment). At the individual level, producers and consumers have a set of goals and needs: a consumer, for instance, needs to acquire food at an affordable price; a producer needs to sell food for a price that will enable him to make a profit. In order to meet those goals and needs, people engage in a set of transactions, shape their environment, create new products and technologies, and generate wealth. If the system works well, all of the transactions that make economic sense for both parties take place, and the utility of producers and consumers is maximized.

For present purposes, we are interested in the relationship of these market dynamics to neighborhoods. All economic activity obviously takes place somewhere, and the "where" has important implications for how efficiently production, exchange and consumption can occur. The spatial dimension of the economy influences, among other things, transportation and transaction costs, production synergies, and the concentration of demand (often

determining whether there is a market for a particular good).

In this respect, the key characteristic of neighborhoods in relation to the economic systems is spatial proximity: neighborhoods have people living close to each other, businesses operating in the same area, and producers and consumers interacting in close quarters. By virtue of concentrating people and firms, spatial proximity allows producers and consumers to save on transportation costs in all phases of market operations (to acquire inputs, to distribute a product, or to purchase a good or service).

Similarly, spatial proximity enables face to face contact, which reduces transaction costs (particularly measurement costs) for certain types of services. For example, one might buy a paperclip over the internet; but less often choose a lawyer that way. Face to face contact is actually a prerequisite for the exchange of certain goods and services (particularly personal services like barbershops and beauty parlors as well as consumption amenities such as bars and restaurants), which not coincidentally can be found in most neighborhoods. Moreover, face to face contact can facilitate business interactions and increase the rate of innovation, as workers share ideas and information generating what economists call "knowledge spillovers".

Spatial proximity also facilitates repeated interactions and the formation of established personal and business networks. This can increase the level of trust among the parties involved in a market transaction, and over time contribute to reducing the transaction costs associated with evaluating the quality of the goods and making a deal. Networks also facilitate the flow of information, reducing market imperfections and missed opportunities for wealth creation.[6]

In addition to spatial proximity, the built and/or natural environment affects the economic system. For example, location near an interstate or a port affects the operations of the system, as it reduces transportation costs for producers, and might lead to a concentration of light industry. Also, the condition of the housing stock, such as renovations versus abandoned buildings, sends market signals to potential homebuyers and lenders.

The system logic helps us understand, in the context of economic systems, both how neighborhoods differentiate and the "success" or "failure" of certain neighborhoods. At a basic level, neighborhood assets have no value unless they are deployed in the context of market activity. If markets work well, they will find, leverage and deploy the untapped assets that neighborhoods can offer, generating prosperity and bringing resources to the neighborhood (as well as growing the larger market). Sometimes the rules of the economic system might operate to the disadvantage of neighborhoods: for example, when there might be adequate neighborhood consumer demand, but land assembly costs are prohibitively high

for small businesses. Also, if market imperfections arise, neighborhoods might become isolated from the system and left out of the wealth creation process.

An example of the ways in which economic dynamics play out over space and contribute to neighborhood success or failure is provided by the labor market. In theory, employers should be able to evaluate and hire the most qualified people for the job. However, this entails the ability to know who is available (finding costs) and accurately evaluate their skills (measurement costs). The ability of workers and employers to find each other is a function of information that flows through institutions and personal networks, as well as of physical constraints such as transportation costs. The physical dimension of neighborhoods affects both of these labor market mechanisms. In particular, spatial proximity can reduce transportation costs and strengthen the networks through which information flows, by facilitating repeated interactions between prospective employees, employers, and mediating institutions such as employment agencies. If these personal and physical networks do not connect equally all neighborhoods, the human capital resources that neighborhood residents can offer to the labor market might be easily overlooked. Since employment is the primary source of income for most people, this isolation from the labor market can stem the flow of money into the neighborhood and have devastating effects on urban communities.

Economic dynamics related to spatial proximity also help explain how some neighborhoods "specialize" and turn into distinct types, through an iterative process triggered as producers and consumers react to each other's actions and seek to maximize utility. The importance of minimizing costs causes consumers to locate close to the type of services and amenities that they value most. People are less willing to travel a long distance for goods that they purchase more frequently – this is one of the reasons why every neighborhood has a convenience store, but very few neighborhoods have auto dealers. Retailers, in turn, are interested in locating close to the demand for the products they are selling. Consider the example of the Type 8 ("Close, Cool and Commercial") neighborhoods surfaced by the DNT Typology: young people might be attracted to places that have the right housing but also amenities such as bars and restaurants, music stores and coffee shops. At the same time, these businesses are likely to locate where there is a concentration of demand. As multiple businesses of the same type (or of types that target the same niche market) locate in proximity to each other, two things happen: the businesses benefit from agglomeration economies that enhance their profitability, and at the same time they create a "scene" that becomes a catalyst for more of their target customers. The combination of retail in some of these communities gives them a distinct feel and makes them an attractive place to locate for people who value the specific amenities that the neighborhood can offer. A similar process of selection, concentration and specialization occurs to define other types of neighborhoods, including for instance "Port of Entry" communities.

In sum, neighborhood components are part of market systems that span well beyond the neighborhood itself. Neighborhoods play a role within these systems by enhancing their operations through the spatial concentration of people and firms. At the same time, market dynamics shape and affect neighborhoods and their residents, by influencing the flows of people and money and determining which assets get deployed and included in the wealth creation process. Ultimately, the connections and linkages that tie the neighborhood to these larger markets are crucial for the efficient deployment of neighborhood assets and for neighborhood prosperity, as well as for the efficient performance of the system as a whole.

The same type of analysis can be applied to the social and political systems, though we will not go into as much detail here as we did for the economic systems. In brief, social systems are based on the exchange of resources and information (ranging from assistance to companionship to value transmittal) through networks of personal and institutional relationships. Given their nature, and the nature of neighborhoods, social systems necessarily have a great deal to do with shaping neighborhoods and, in turn, are heavily influenced by them: neighborhoods enable the face-to-face contact and repeated interactions that are critical to socialization (including formal education, involvement in religious or other neighborhood organizations, informal peer groups, role models presented by adults in the neighborhood, and so forth), mutual support[7] and social control.[8]

Similarly, every neighborhood is part of larger political systems. Its residents participate to various degrees in the civic life of the neighborhood, the city and the country; they elect local, state and federal government officials; and are the beneficiaries of services and public goods provided by the various levels of government. The political system also enables and shapes market operations. As in the case of the economic system, both political and social systems contribute to shaping the flows of people and money in and out of neighborhoods.

### *4 The Functions of Neighborhoods*

The analysis of system dynamics reveals that, while neighborhoods are shaped by larger social, political and economic systems, they also perform specific functions within these systems. While the functions might vary based on the type of neighborhood, the mechanisms and dynamics through which the neighborhood performs these functions typically revolve around the benefits of spatial proximity, face to face interactions and the common goals that arise among people and organizations from sharing the same physical space. In this sense, **neighborhoods are primarily "incubators of relationships:**[9]" the shared physical space and repeated interactions among neighborhood residents and organizations nurture the emergence of networks, improve business transactions, and generally facilitate the deployment of neighborhood assets by enhancing their connections to larger systems.

Therefore, if neighborhoods perform their functions well, they do two things: **they make social, economic and political systems work better** by reducing transaction costs, increasing productivity, building trust, etc.; and **they increase the participation of residents and organizations in these systems.** By facilitating participation in market activity they expand wealth creation; by increasing participation in social networks they enhance social capital; by improving participation in political systems they lead to empowerment and self governance. **A healthy neighborhood is thus a neighborhood that performs its functions well, connecting its residents to larger economic, social and political systems.**

This definition of a healthy neighborhood is consistent with many of the findings of the DNT project, including the importance of access to transit, proximity to jobs, and the role of income diversity (and by implication the negative effect of concentrated poverty). This view of healthy neighborhoods is also closely related to one of the most compelling and systematic formulations of the meaning of development: the one elaborated by Nobel Prize winner Amartya Sen in his book "Development as Freedom."

In Sen's view, the goal of all development activities (at the local, national and international level) is to expand "capabilities" and "choice." Capability (or "substantive freedom") has to do with the capacity of each individual: their health, their education, their economic means, and so forth. Choice (or "instrumental freedom") refers to the opportunities given to individuals to improve their condition and fulfill their potential: a democratic political system, availability of jobs, social connections are all factors that help individuals make the most of their capabilities. Capability and choice reinforce each other, as individuals that are given more opportunities can also expand their capabilities and vice versa. Moreover, capabilities and choice can be both constitutive and instrumental with respect to development goals: education or wealth, for instance, could be goals in and of themselves, or could be instrumental in achieving other goals. The ultimate goal of development is to provide "substantive freedoms – the capabilities – to choose a life one has reason to value."[10]

This definition of development fits well with the framework outlined above. In the context of the economic, political and social systems described above, the capacity and opportunities of neighborhood residents are primarily a function of their connections within the system. Acting as incubators of relationships (substantive transactions connecting residents and assets to larger systems), **healthy neighborhoods effectively expand the capacities and opportunities of their residents.**

Sen also provides detailed and profound analysis of the inter-connections between the systems, and the extent to which political, social and economic capacities and opportunities are co-dependent. Due to the connections and interactions across systems, achieving capabilities and choice in one system enables the individual to expand capabilities and choice with

respect to other systems as well, generating the iterative process of reinforcement between capability and choice mentioned above. For example, the opportunity of neighborhood residents to improve their education (partly a function of their economic status – capability – and of the availability of affordable schools -choice) would expand their capability with respect to the labor market. Their performance in the labor market in turn would expand their economic capacity and their ability to improve their education.

By enhancing individual participation in the systems, healthy neighborhoods contribute to the achievement of these outcomes. However, this process is by no means automatic. In fact, neighborhoods can also become traps that foster isolation rather than connections, in many cases preventing their residents from fully participating in the operations of the systems.[11] Just like healthy neighborhoods can help their residents increase their capability and choice, dysfunctional neighborhoods aggravate the isolation of their residents, preventing them from fulfilling their potential.

As the people and institutions that constitute a neighborhood interact within and without the neighborhood across multiple systems, the vitality of the neighborhood can be defined both in terms of the strength and quality of these interactions and in terms of the neighborhood's ability to perform its functions within these systems. The richness and diversity of connections enables the neighborhood to be more resilient and better adapt to change and external shocks. The presence of varied and redundant networks within the neighborhood and between the neighborhood and larger systems favors the flow of information and enables neighborhood assets to be fully deployed. Diversity and interaction translate into innovation, and networks and connections facilitate entrepreneurship and the creation of new economic activity. Rich and overlapping connections and relationships in healthy neighborhoods also offer neighborhood residents alternative paths of decision-making and advancement of their individual goals. Healthy neighborhoods also provide a mix of amenities that are commensurate to the people who live there. Above all, healthy neighborhoods are well integrated into their surrounding political, social and economic systems.

### C. Implications for Community and Economic Development Practice

This understanding of neighborhoods as dynamic entities embedded in larger systems has major implications for the goals and approaches to community and economic development. If the goal ultimately is to expand the capacity and opportunities of neighborhood residents, community and economic development should aim at maximizing the connections and transactions that link the neighborhood to the larger systems. For instance, as we focus on developing the assets in our neighborhoods, we need to consider what systems affect the deployment of those assets and in what ways. As the field has become increasingly and productively focused on the assets in our neighborhoods, we need to become more

sophisticated about how their deployment is the byproduct of the interaction of neighborhood factors with market and other systems that go well beyond the neighborhood.

In this sense, the asset-based approach to community development needs to be integrated with a better understanding of the systems and dynamics that translate the assets into value to meet the needs of neighborhood residents. This requires careful analysis of the particular system dynamics which determine deployment of specific assets and to understand how best to build new or better connections, and particularly what neighborhood level factors will enhance system connections. For example, if the problem is lack of housing development, analysis of the real estate market might reveal that disproportionate local costs of land assembly are driving up production costs, and so housing markets can be moved to engage in more transactions in the neighborhood through a land banking program. Similarly, connecting to labor markets might depend upon better local skills certification. Broadly, neighborhood development practitioners are uniquely positioned to acquire specialized knowledge of the local assets and or the local factors which affect system connections and transactions, and to thereby be able to identify leverage points and connections which enhance both neighborhood functioning and system performance.

As we focus on intervening on the systems, we need to be cognizant of their geographic scope and dimension. This means that it might be important to understand what interventions would be most effective at the neighborhood level, as distinct from what should be done at the regional or national level. Since neighborhoods are shaped by the operations of larger systems, in some cases the roots of neighborhood problems lie outside of the neighborhood itself.[12] For instance, unemployment at the neighborhood level could be due to shifts in the regional business base, in which case strategies aimed at strengthening the regional economy might be the best solution. In a sense, then, **the systems we are trying to affect should determine the geography of the intervention, rather than the other way around.**

Moreover, regions and neighborhoods should be approached as symbiotic entities, as the prosperity of a region is inextricably intertwined with the prosperity of its communities. Neighborhood strategies should be based on an understanding of key trends in the region and how the neighborhood can best connect to regional systems. At the same time, regional strategies should focus on leveraging all of the region's assets, without leaving any of the region's neighborhoods behind.[13] In practice, this also means that regional and neighborhood organizations, which operate in different domains and can sometimes have different and even conflicting agendas, would do well to join forces and develop strategic partnerships around linking neighborhood and regional development – since enhancing the connections and transactions between neighborhood assets and regional systems is good for both.

This framework also has important implications for another long-debated issue in the field: the relationship of people- and place-based interventions. This issue is sometimes framed as a choice between two approaches: is it better to help a particular population regardless of where it is located or may move, *or* is it better to focus on improving a particular place, which in turn would benefit the people who live there? In a more traditional, static view, there is an apparent conflict between helping people do better, assuming that they will eventually move somewhere else (leaving the place behind), and focusing on improving a particular place. In fact, if neighborhoods are defined by the interaction of people and place, and understood as constantly in motion, the dynamic is not necessarily one of conflict, but offers the possibility to look for alignment –people and places are closely intertwined. In this respect, a better and more nuanced understanding of different types of neighborhoods and their functions can help design customized strategies that maximize the alignment between these two dimensions and help people and place at the same time.

With respect to specific neighborhood-level interventions, the main implication is that **development approaches would be more effective to the extent that they are tailored to each neighborhood type.** There is a tendency in the community economic development field to implement whatever intervention or approach is "hot" at the moment (community policing one year, affordable housing the next) without sufficient regard to the specific features of each neighborhood. We are oversimplifying, of course, but the point is that when it comes to community economic development, one size does not fit all.

In fact, based on the results of the DNT work, one could imagine an approach to community and economic development more along the lines of "neighborhood business planning" and customer-driven product development, which recognizes both the importance of connecting the neighborhood to larger systems and the need for customized approaches to development in particular places. The strategies then should arise out of understanding the unique assets and opportunities of each place. In the business world, this is what business plans are designed for: a business plan enables a business to think strategically about its position in the market place, its key advantages and challenges, and helps identify the steps that are needed in order to grow and succeed. A similar process could be applied to neighborhoods: given a vision for development, a business planning process could identify a set of defined and measurable goals for the region, the strategies that would be deployed to achieve those goals, and the programs, products and interventions that are required in order to carry out each strategy .In this approach, interventions would be driven by what type of neighborhood you are, what demographics you want to attract to or retain in your neighborhood, and what is the right balance of housing options and amenities that is needed in order to be attractive to that demographic. The first step in this process would be figuring out the current neighborhood type, as that would set the context for what kind of outcomes can be achieved, and for identifying the key challenges and opportunities in achieving those

outcomes.[14] The goal then could be maintaining stability, improvement within type or transitioning to a different type of neighborhood, and that will dictate what kinds of flows of people and investment would lead the community in that direction.

Take for instance a neighborhood that is currently Type 2 ("Transient Underdeveloped"), a low income neighborhood characterized by high vacancy rates, high residential mobility and scarce business presence. A development goal that would make sense for this type of neighborhood would be transitioning to a community more along the lines of "Urban Tapestry" neighborhoods, with a similar housing stock but greater income diversity and more consumption amenities. This would entail mostly "infill" development of the neighborhood's vacant land, targeting a combination of residential and commercial uses, thus creating a mix of consumption amenities that would help the neighborhood diversify its resident base.

The next step would then be identifying the relevant systems that can be leveraged to achieve those outcomes. In the case of consumption amenities, for instance, the relevant system would be the market for retail and services in the region. One could then identify what barriers, if any, currently prevent the system from operating efficiently in the neighborhood. For instance, land assembly costs and lack of accurate market information might be preventing retailers from locating in the community. Finally, interventions could be designed to address those issues – in this case, for example, streamlining the land acquisition processes could facilitate land assembly for commercial development, while developing more accurate information on the neighborhood's unmet demand for retail and services could help attract developers to the community. In sum, community and economic development should follow a much more tailored approach, based on the characteristics of each type of community and on an understanding of the dynamics of the systems (within and outside the neighborhood) that can affect the desired development outcome.

This approach highlights a new role for community development corporations. In addition to focusing on more traditional, real estate-centered development strategies, CDCs could embrace a slightly different function in the neighborhood, acting to help particular communities understand where they are and want to be, and the local leverage points to enhance the relevant system connections and transactions, and then acting as "connectors" between community assets and interests and public and private sector activities, facilitating transactions and increasing the integration of the neighborhood into the larger systems. This entails deploying the deep and specialized knowledge that CDCs have of their communities to develop tailored products that can attract new residents and investment to their communities and at the same time facilitate the participation of current residents and organizations into the broader social and economic systems.

A similar function is often being played with respect to financial markets by CDFIs, which facilitate the flow of capital into the neighborhood by developing products and local conntections better tailored to the assets of particular places or consumers, that reconnect them to the financial mainstream. The integration of social, political and economic systems also suggests the complementarity of market and non-market interventions, reinforcing the need for organizations that can move comfortably across sectors.

Many practitioners, of course, already understand their neighborhoods as dynamic systems nested in larger systems, and have developed varied tools for building particular connections. We hope the framework offered here will help capture and enhance this practice, and that practitioners and others will carry it much further through applications to strengthen varied functions and types of neighborhoods throughout the field. To this end, it is particularly important to enable easier and more routine analysis of the challenges and opportunities presented by particular places, and of what interventions will best enhance the functioning and connectedness of the neighborhood and its residents. So far, this type of analysis has been an expensive proposition for neighborhood organizations, as it was always done as a one-off, customized effort requiring a great deal of time and expertise. What has been missing in the field is a set of more standard tools that would make this type of information more accessible to the people who need it – practitioners and investors making decisions on what development strategies to pursue in particular places.

*Endnotes for Chapter VIII*

1 Jane Jacobs, "The Death and Life of Great American Cities," Vintage Books Edition, New York, NY (1992), p114.

2 These ideas particularly took shape through a series of conversations with Andrew Mooney, Executive Director of LISC in Chicago.

3 These concepts, as well as the analysis that follows are borrowed in part from the domain of complexity theory. Several books have been written on this topic over the years. For a summary of the origins and key concepts of this field, see M. Mitchell Waldrop, "Complexity: The Emerging Science at the Edge of Order and Chaos," Touchstone, New York, NY (1992).

4 We are not pretending to analyze all of the dynamics that shape neighborhoods here, but only trying to create a framework for discussion. If the framework proves useful, future research could productively dig deeper and more systematically analyze specific system interactions and their effect on particular neighborhood dynamics and functions.

5 For a description of market operating principles and their application to neighborhoods and economic development, see Robert Weissbourd and Riccardo Bodini, "Market-Based Community Economic Development," The Brookings Institution Metropolitan Policy Program (March 2005).

6 Information flows play a crucial role in all market operations. On the production side of the market, information affects the ability to acquire the best inputs as well as the rate of technical change (e.g. by affecting how fast an innovation in the production process can spread). On the consumption side of the market, information can influence consumer preferences and their opportunities to earn income. Information is also key to the exchange process, as it affects the ability of buyers and sellers to find each other,

evaluate the quality of the goods, and agree to the terms of the transaction. Markets that function well and achieve their potential are characterized by rich flows of information, while market imperfections often arise from incomplete or asymmetric information. For a more detailed discussion of the role of information in markets, particularly as it relates to neighborhood development, see Robert Weissbourd and Riccardo Bodini, "Using Information Resources to Enhance Urban Markets," …

7 The repeated interactions among residents at the neighborhood level enable the formation and maintenance of a multitude of social networks connecting the people who live there to each other and to the outside world. Through these networks, neighborhood residents have access to many important resources. From borrowing a cup of sugar to childcare, neighbors rely on each other's help in a variety of circumstances.

8 This social function of neighborhoods has to do with the ability of the local community to enforce its own rules and maintain social order. Jane Jacobs provided a powerful description of this role of neighborhoods when she talked about the importance of having "eyes on the street." Healthy neighborhoods provide social control through the cooperation of residents and institutions (as in community policing programs) and of residents among themselves. This function is closely related to socialization, since the safety of the neighborhood also depends on the "culture of place" mentioned above, and on the ability of its residents to set a positive example for the youth.

9 "Relationships" here encompasses much more than personal connections. It refers to all of the active connections through which the dynamics of social, political and economic systems play out – purchasing groceries at the local store; performing a job for an employer; playing on a sports team. Relationship reflects both a specific connection within a larger system and the associated transactions. Because it includes this dynamic or transactional element, relationship captures what the individual and institutional agents do that constitutes the actual, practical operations of the systems.

10 See Amartya Sen, Development as Freedom, Anchor Books, New York, NY (1999), p74.

11 See Xavier DeSouza Briggs, "Traps and Stepping Stones: Neighborhood Dynamics and Family Well-being," KSG Working Paper No. RWP04-13 (March 2004).

12 An extreme example is how the cost of basic inputs of production such as land and labor in places as far away as China can influence the decision to close a manufacturing plant located in a neighborhood here in the United States, with the obvious repercussions on the lives of its residents. Another example is the impact of demographic changes: demographic shifts at the regional or even national level can have major repercussions on neighborhood dynamics. An increase in immigration at the national level can translate to a dramatic change in the landscape of many urban neighborhoods. Similarly, if the city or region are losing population, its neighborhoods will be affected regardless of their internal characteristics, although their internal characteristics might determine the resilience of the neighborhood and the degree to which it will be affected by these external shocks.

13 For a more detailed presentation of these concepts, see Robert Weissbourd, "Strengthening Communities for Regional Prosperity," Living Cities Policy Series (2006).

14 An example of this process, and how it can be conducted using some of the tools already developed by the DNT project, is presented at the end of the Section IX.

## IX. DNT Tools Portfolio

In the private sector, businesses invest a great deal of resources in sophisticated market analysis, and routinely apply state of the art analytic tools to identify investment opportunities and devise commercial strategies. The Dynamic Neighborhood Taxonomy was conceived as a baseline R&D project to begin developing a similar capacity for the community and economic development field: the main goal was to bring a new level of analysis and understanding of neighborhood dynamics, and to begin developing a set of tools that would enable funders, businesses, government and practitioners to more easily and routinely identify the challenges to and opportunities for economic development in particular places.

The research components of the DNT project confirmed the extent to which neighborhoods are differentiated and require specialized analysis to devise the most appropriate types of interventions. What is more important, though, is that the research led to the development of a set of tools that bring a new level of analytic capacity to our field. These tools make up an initial portfolio that can be organized in three broad categories:

1) **Tools for analyzing neighborhood change**, designed to measure neighborhood performance, compare patterns of neighborhood evolution, and anticipate and manage neighborhood change.
2) **Impact measurement tools**, designed to assess and predict the effectiveness of development interventions and better target neighborhood investment.
3) **Segmentation tools**, designed to identify comparable neighborhoods along selected dimensions, facilitate peer analysis and tailor strategies to specific neighborhood types.

This section of the report includes a brief description of the tools developed in each of these categories, detailing what each does, its applications, how it works and an example of how it could be used. A synopsis of the tools and of the uses they were designed for is provided in the table below.

| Category | Question/Goal | Tool |
|---|---|---|
| Analyzing Neighborhood Change | Track neighborhood change and enable investment in inner city real estate markets | RSI |
| | Anticipate and manage neighborhood change | Pattern Search Engine |
| | Track affordability and neighborhood housing mix | Housing Diversity Metric |
| | Granular analysis of neighborhood dynamics and identification of "true" neighborhood boundaries | NeighborScope |
| Impact Measurement Tools | How does the impact of an intervention vary in different places? | Geographically Weighted Regression |
| | How will a specific intervention affect its surrounding area? | Impact Estimator |
| Segmentation Tools | Identify comparable neighborhoods based on drivers of change and other key characteristics | Neighborhood Typology |
| | What neighborhoods are similar along key dimensions (such as crime, health, employment, etc.)? | Custom Typologies |
| | What drivers differentiate neighborhoods with respect to a specific outcome of interest? | Regression Trees |

While most of these tools were developed by the project, some are actually established or emerging techniques and methodologies that are used in other fields, and could be productively applied to economic development issues. All of them have been used and adapted to the analysis of neighborhood dynamics by the DNT project.

It should also be noted that most of the tools described here are still in a "prototype" stage of development: in their current form, they consist of algorithms that can be applied and implemented given the proper data and statistical software. While both the code and the software are open source and publicly available, clearly much more work remains to be done to make these tools easily accessible to their intended end users – community development funders and practitioners, businesses and government leaders. One way to do this, for instance, would be to embed some of these tools in existing websites that already house and make available neighborhood-level information (such as Dataplace or National Neighborhood Indicators Partnership sites in particular cities). Another would be to de-

velop simple, customized software applications. While this work was not within the scope of the Dynamic Neighborhood Taxonomy project, it is our hope that other organizations will want to continue down this path: to use and refine the tools developed so far, to develop new tools, and to help make these resources more easily accessible to the field.

## A. Tools for Analyzing Neighborhood Change

### *1 The DNT Repeat Sales Index: Tracking Change in Neighborhood Markets*

**What it is:**

The Dynamic Neighborhood Taxonomy Repeat Sales Index (DNT RSI) is a baseline indicator of neighborhood performance, enabling highly detailed and robust analysis of how neighborhoods perform over time. In many ways, **this is the single most important output of the project,** as it enables a level of analysis of neighborhood dynamics that is much more granular and powerful than what was available before. Moreover, the RSI is the key "building block" from which many of the other tools presented here are developed.

Repeat sales indices are not new. In fact, they are the leading method used in the private sector to measure trends in the housing market, particularly trends attributable to changing demand for the amenities in the neighborhood. What these indices do, in effect, is separate the appreciation in housing prices that is due to changes in the quality of the actual housing stock from the appreciation that is due to the fact that a particular location is becoming more valuable because more people want to live there. As such, they are powerful indicators of how a neighborhood is doing, and potentially have very useful applications for community development purposes. Until now, however, repeat sales indices had not been used for these purposes, perhaps because they have not been successfully developed and applied at the neighborhood level.

The DNT project developed an innovative methodology, tested through a rigorous cross-validation procedure, to generate a repeat sales index that can be estimated at small levels of geography (including neighborhoods or even smaller, custom-defined, places), and is more robust than the leading repeat sales indicators used in the private sector. This methodology, along with the technical specifications of the index, are illustrated at the end of this section.

**Applications:**

The DNT RSI serves three basic functions:

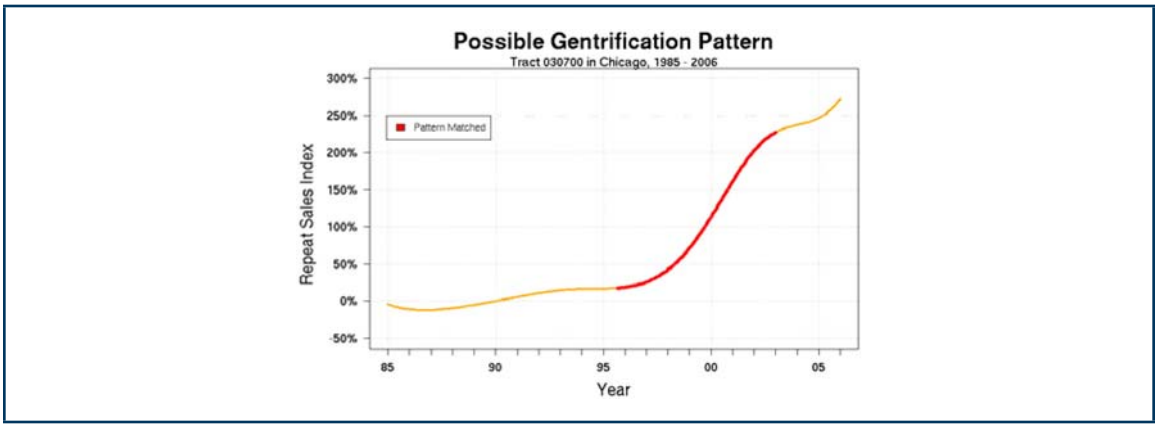
- It **provides a baseline measure of neighborhood performance**, which can be con-

structed for any time period and for any geography;
- It **enables more granular analysis of neighborhood dynamics**.
- In doing so, it also addresses information inefficiencies in neighborhood housing markets, and thus can be used to **identify opportunities for real estate investment** in previously neglected urban areas.
- It **enables and enhances other tools for targeting economic development interventions.** These include tools for analyzing the impact of particular development activities, such as the effect of building a shopping center or of reducing particular types of crime, as well as tools identifying which factors are most important in driving and managing change in different types of neighborhoods, or at different stages of development.

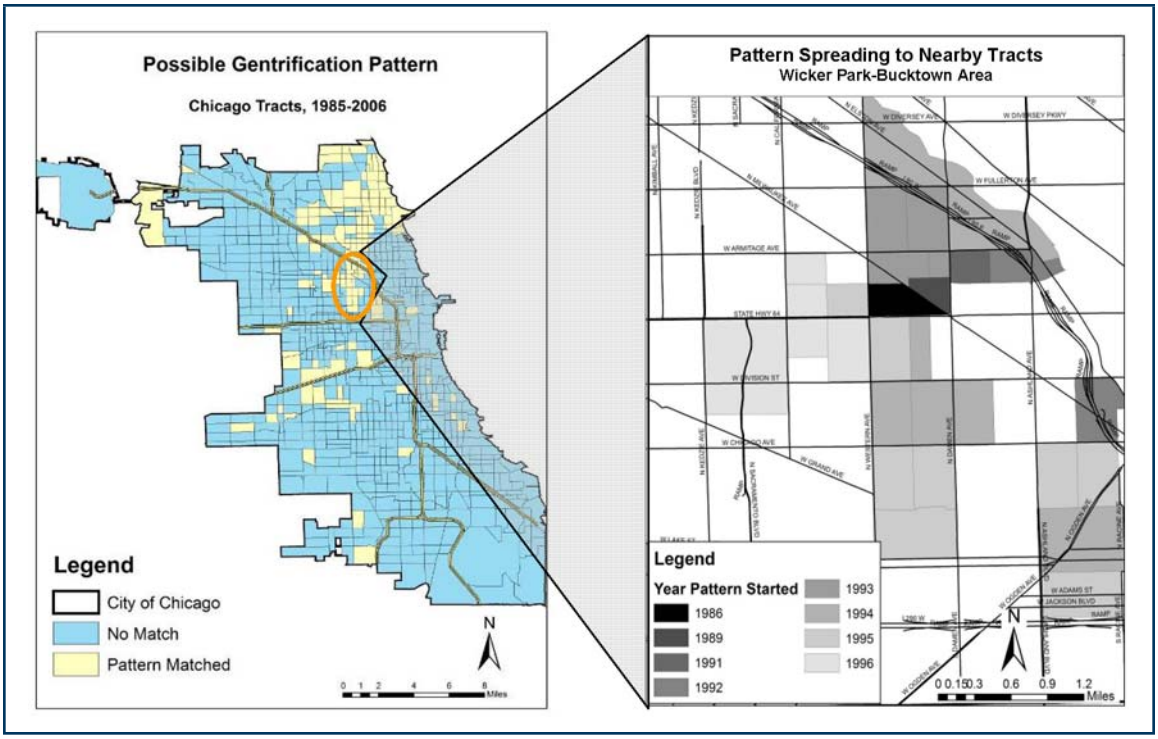
A unique feature of the DNT RSI is that it can be estimated not only for median values, but also to track changes in any segment of the housing market, such as, for instance, changes in the availability of low to moderate income housing. The DNT RSI can also be estimated for geographies of any size or shape. As such, its potential applications go well beyond the ones listed here, and include uses ranging from real estate development site selection to analyzing the connections between neighborhoods and regions.

**Example:**

The DNT RSI can be used to track in great detail a neighborhood's pattern of change, and to compare it to other places of interest. Moreover, in conjunction with the Pattern Search tool, it is possible to find other neighborhoods that have already gone through the same pattern of change, are currently experiencing the pattern or began down that path and then were able to shift patterns. Examination of the factors present in neighborhoods that have undergone similar patterns can help developers and investors anticipate and mange change. For instance, we can identify all neighborhoods that have undergone a similar gentrification pattern, modeled after an actual neighborhood in Chicago.




In this example, the pattern is characterized by a period of relative stability followed by a period of rapid growth, followed by a consolidation period. Among other things, we can look at how long it takes for this pattern to develop, what factors cause it, what kinds of neighborhoods are more likely to undergo this type of change, and how the pattern spreads from one part to the city to another (as depicted in the map below).




**Technical Specifications:**

The DNT RSI is estimated using individual real estate transactions. To control for changes in the quality of the housing stock, the index measures appreciation solely based on repeated sales of the same property over time. The index also includes a temporal smoothing

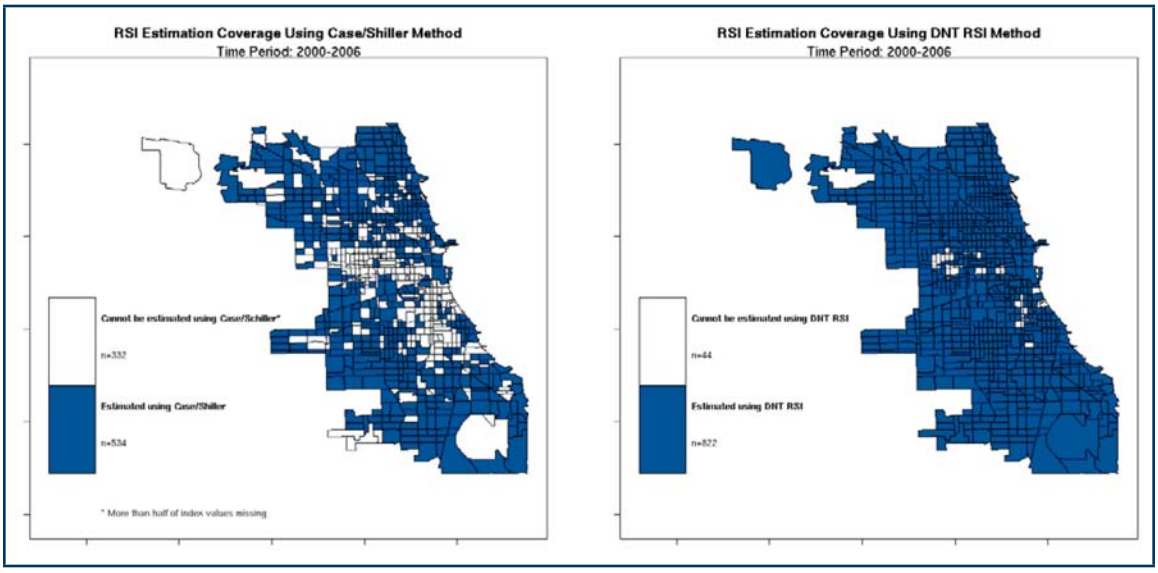
component to track continuous change over time, and a spatial smoothing component to account for fluid neighborhood boundaries and address sample size issues.

Particularly, in estimating changes in a census tract, the DNT RSI takes into account all of the real estate transactions in the neighboring tracts as well, but it gives them a declining weight the further they are from the tract in question. This is consistent with the fact that the housing market does not recognize discrete tract or neighborhood boundaries. Rather, the appreciation of a property is influenced by what happens to the house next door, and a little less by the house down the street, and hardly at all by a house that is several blocks away.

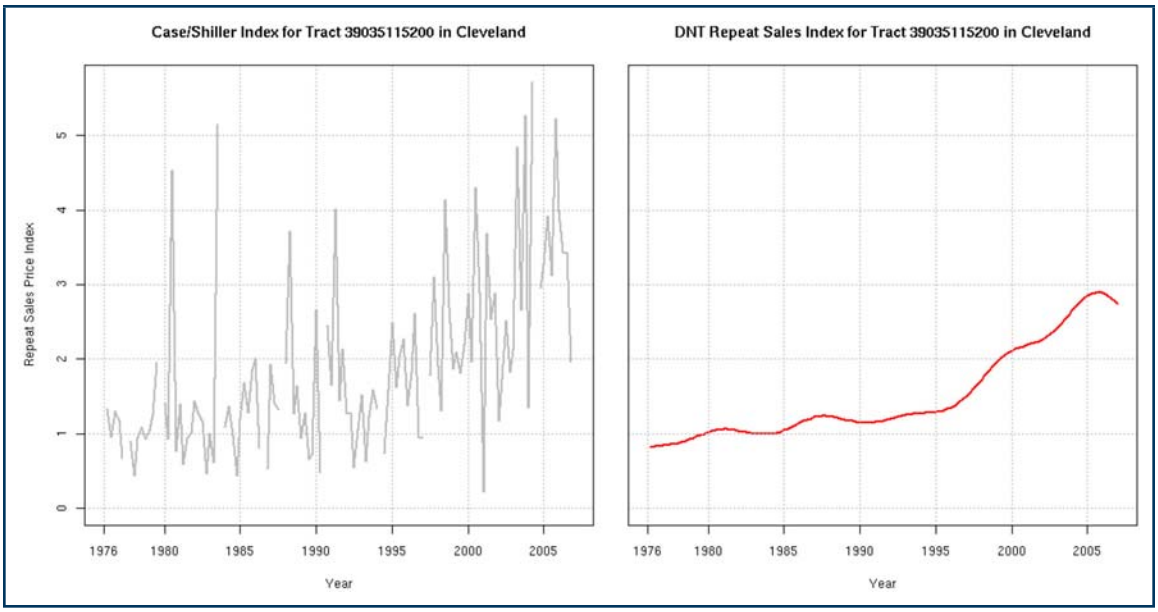
The index is estimated using quantile regression, which makes it more robust to unobserved remodeling activity and enables tracking changes not just in the median, but in any market segment.

The outcome is a metric that works well at small levels of geography and is more robust than traditional repeat sales indices. The figures below compare the DNT RSI to the leading repeat sales indicators used in the private sector, illustrating the advantages it offers over traditional metrics.

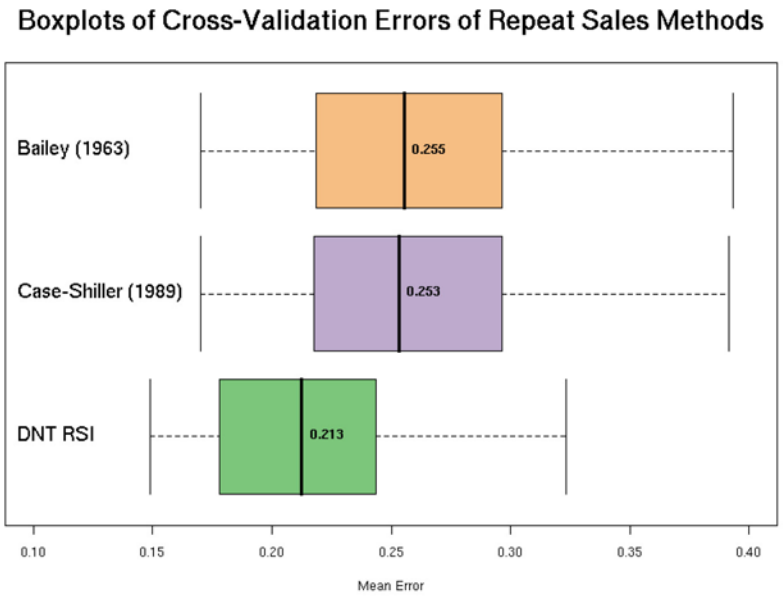
Unlike traditional repeat sales indices, the DNT RSI can be estimated for very small levels of geography. For instance, over the period between 2000 and 2006, ***the DNT RSI can be estimated in close to 300 Chicago Census tracts in which a traditional repeat sales index would not work***.




Even in tracts where both methods can be estimated, ***the DNT RSI is more stable and less noisy, better reflecting actual neighborhood trends.*** This is particularly true in lower income neighborhoods, where lower levels of market activity (and so smaller sample size) negatively affect traditional RSIs.




An extensive cross-validation procedure, comparing the DNT RSI to the two most used traditional repeat sales indices, reveals that ***the DNT RSI is significantly more robust,*** consistently yielding smaller errors when applied to a randomly selected testing sample.




### *2 The DNT Pattern Search Engine: Anticipating Neighborhood Change*

**What it Does:**

For any specified geography, such as a neighborhood, **this tool identifies other neighborhoods that have undergone comparable patterns of change.** Being able to identify and examine other neighborhoods that have evolved in the same way enables practitioners and investors to better anticipate and manage change in their target communities.

**Applications:**

Neighborhoods are dynamic entities, and neighborhood development and investment entail understanding these dynamics in order to identify opportunities and manage neighborhood change.

The ability to track neighborhood change, and particularly to identify neighborhoods that have undergone similar patterns of change, is therefore very important for community development practitioners and investors who want to drive and anticipate change in neighborhoods. However, different types of communities follow distinct patterns of change, making it challenging to find comparable patterns of neighborhood evolution and learn from them. In fact, the field has traditionally lacked capacity to specify, track and clarify the different patterns of neighborhoods change over time.

The Dynamic Neighborhood Taxonomy project has developed a powerful way to track neighborhood change in its Repeat Sales Index tool (RSI). The project also has developed a new methodology – the Pattern Search Engine -- to search for specific patterns based on actual neighborhoods or defined by the user. This enables researchers, practitioners and investors to find areas that have undergone similar change in the past or are undergoing similar change currently.

This tool can be used for a variety of purposes, including:

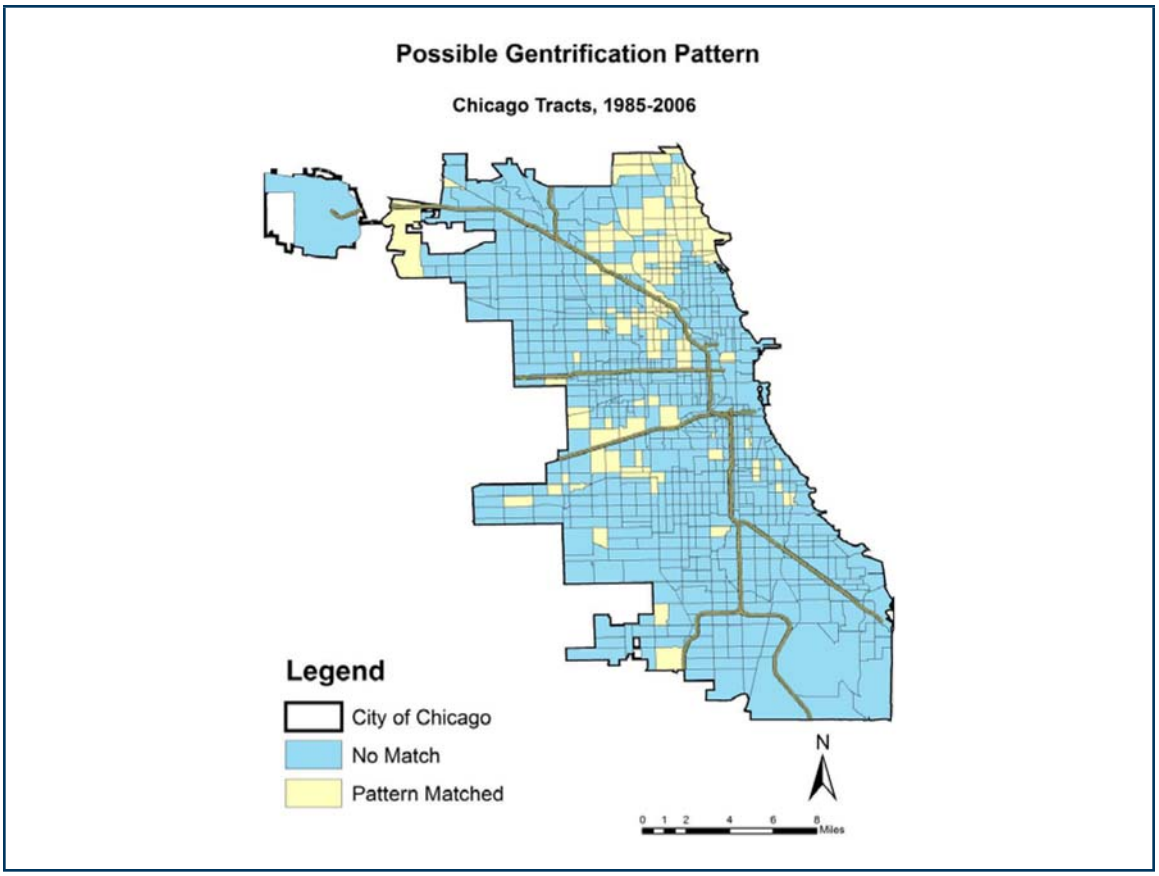
- Identify specific important patterns of change, such as "gentrification," in order analyze their characteristics and drivers;
- Identify what kinds of neighborhoods are more likely to follow a particular pattern;
- Anticipate neighborhood change by finding comparable neighborhoods that have undergone or are undergoing similar change, and anticipating its effects;
- In connection with other tools, understand what factors cause similar neighborhoods to undergo particular patterns of change, and what can be done to favor desirable patterns of change and prevent unwanted ones.

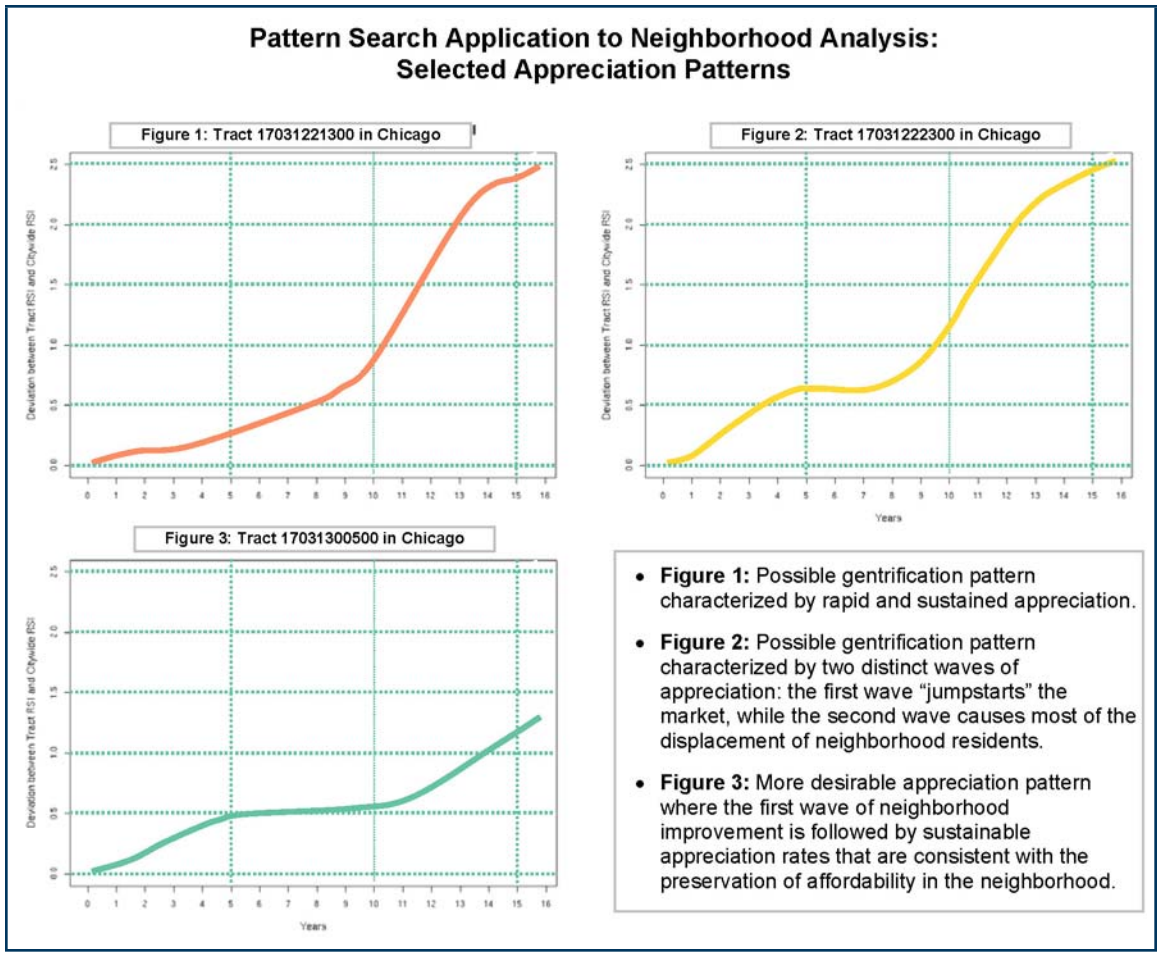
**How it Works:**

The DNT Pattern Search methodology can use either the RSI or other indicators to identify the pattern that a particular neighborhood has followed. The tool then applies a complex search algorithm (based on the derivatives of the curve traced by the index) to identify all of the other neighborhoods that, at any point in time, have followed a similar pattern of change. The results of the search can then be mapped and analyzed to see how many neighborhoods display a particular pattern, how long it took for the pattern to develop, what other characteristics distinguish these neighborhoods, what happened in these communities after this change occurred, and so forth.

**Example:**

The Pattern Search methodology can be used to analyze the drivers of distinct patterns of appreciation. It is possible for instance to identify three distinct appreciation patterns: two that are consistent with different "gentrification" dynamics (depicted in figures one and two below), and one pattern of change that is consistent with steady appreciation without dramatic displacement (figure 3). The Pattern Search engine will then identify all of the tracts that followed patterns similar to these over the past twenty years. This information can be used to understand what factors drive different gentrification patterns, and what can be done to cause neighborhood improvement while at the same time preventing dramatic appreciation and displacement.


Possible Gentrification Pattern
Chicago Tracts, 1985-2006
Legend
City of Chicago
No Match
Pattern Matched
N
0 1 2 4 6 8
Miles




### *3 The DNT Housing Diversity Indicator and Report: Tracking Housing Diversity and Affordability*

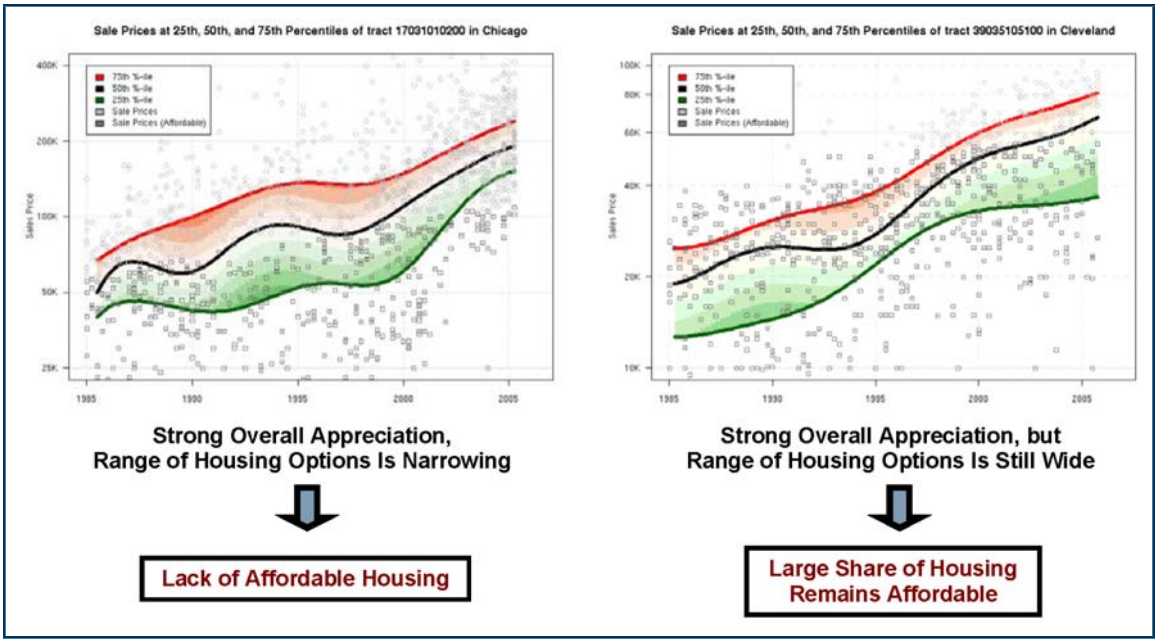
**What it Does:**

**This tool tracks changes in the affordability and mix of the housing stock in a neighborhood,** by looking not only at median home values, but also at how the entire price distribution changes over time.

**Applications:**

The availability of affordable housing is a major concern, as many urban neighborhoods experienced rapid appreciation over the past few years. The common examination of trends in median values alone, however, often misses what is actually happening in these communities. Communities with similar patterns of overall appreciation exhibit very different patterns of preservation of affordability. The figure below illustrates this point by showing two census tracts that had similar appreciation patterns as measured in terms of median

housing values (the black line in the charts). However, two very different things were going on in these two communities with respect to preservation of affordability: as the tract on the left appreciated, the supply of affordable housing units "dried up" and the diversity of housing options in the neighborhood narrowed considerably (as shown by the red and green lines, which track changes in the 75th and 25th percentile of housing prices respectively). Conversely, in the tract on the right appreciation was coupled with the preservation of affordability, and the diversity of housing options in the neighborhood actually increased.



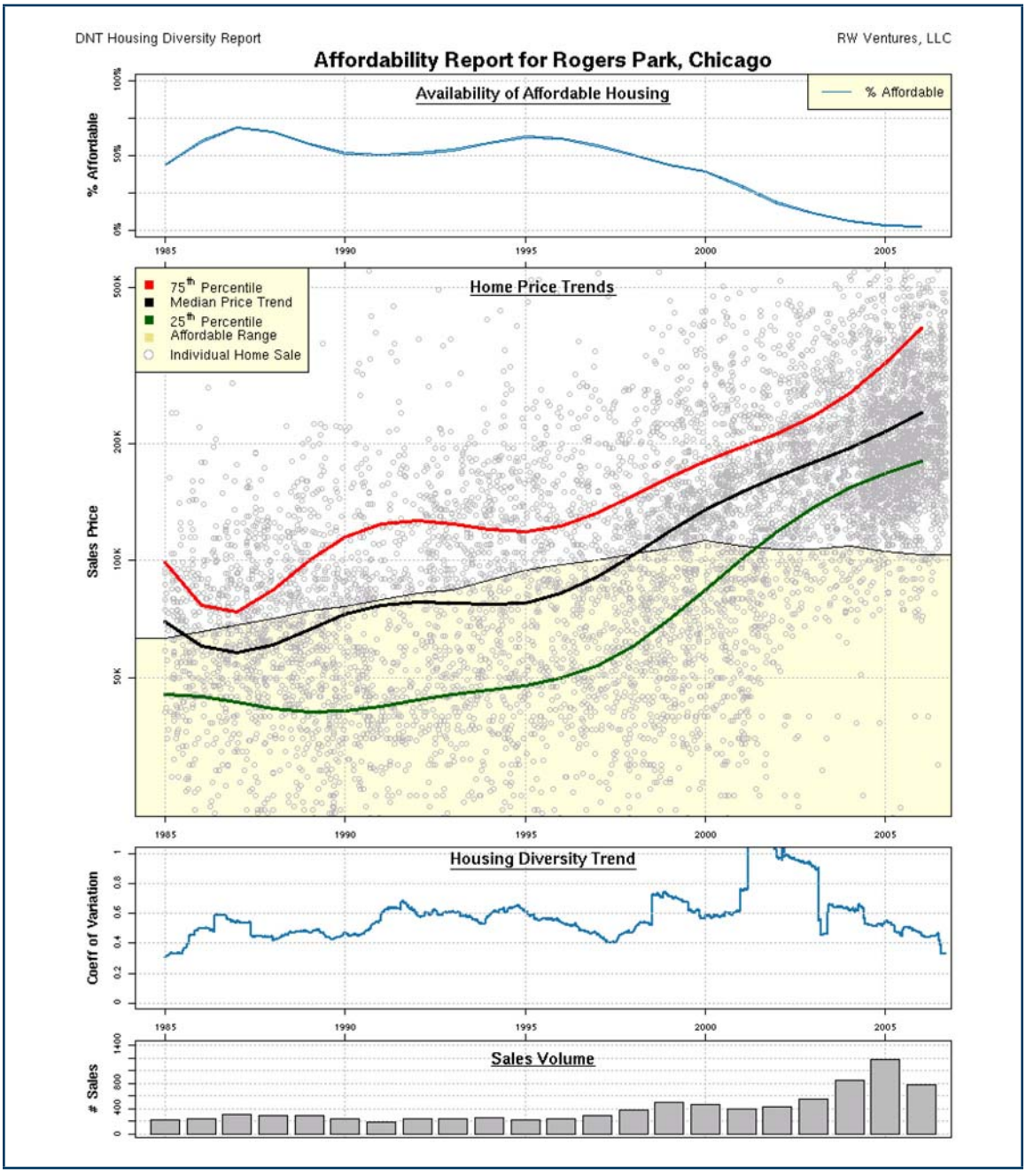

What we really want to know, then, is how the *distribution* of housing prices in a neighborhood changes over time, paying particular attention to the availability of affordable housing options. This innovative tool measures and displays these much more nuanced trends, enabling us to:

- **Track the range of housing options** available in the neighborhood over time;
- **Develop early warnings for possible displacement** (such as in areas where the range of housing option is narrowing);
- **Identify priority areas to target with preservation efforts** (e.g. areas where a portion of the housing stock is still affordable but displays strong appreciation); and
- In combination with other tools, **find neighborhoods that appreciated without loss of affordability,** and then identify the factors and interventions that helped them achieve this kind of change.
- Ultimately, this tool can help achieve the goal of **creating and preserving mixed income communities,** by helping monitor and influence the availability of different housing options in the neighborhood.

**How it Works:**

Based on parcel level real estate transactions data, this tool uses quantile regression and a Fourier smoothing methodology to estimate the appreciation trend of any price segment. This metric can be applied at any level of geography, including custom neighborhood boundaries.

**Sample Housing Diversity Reports:**

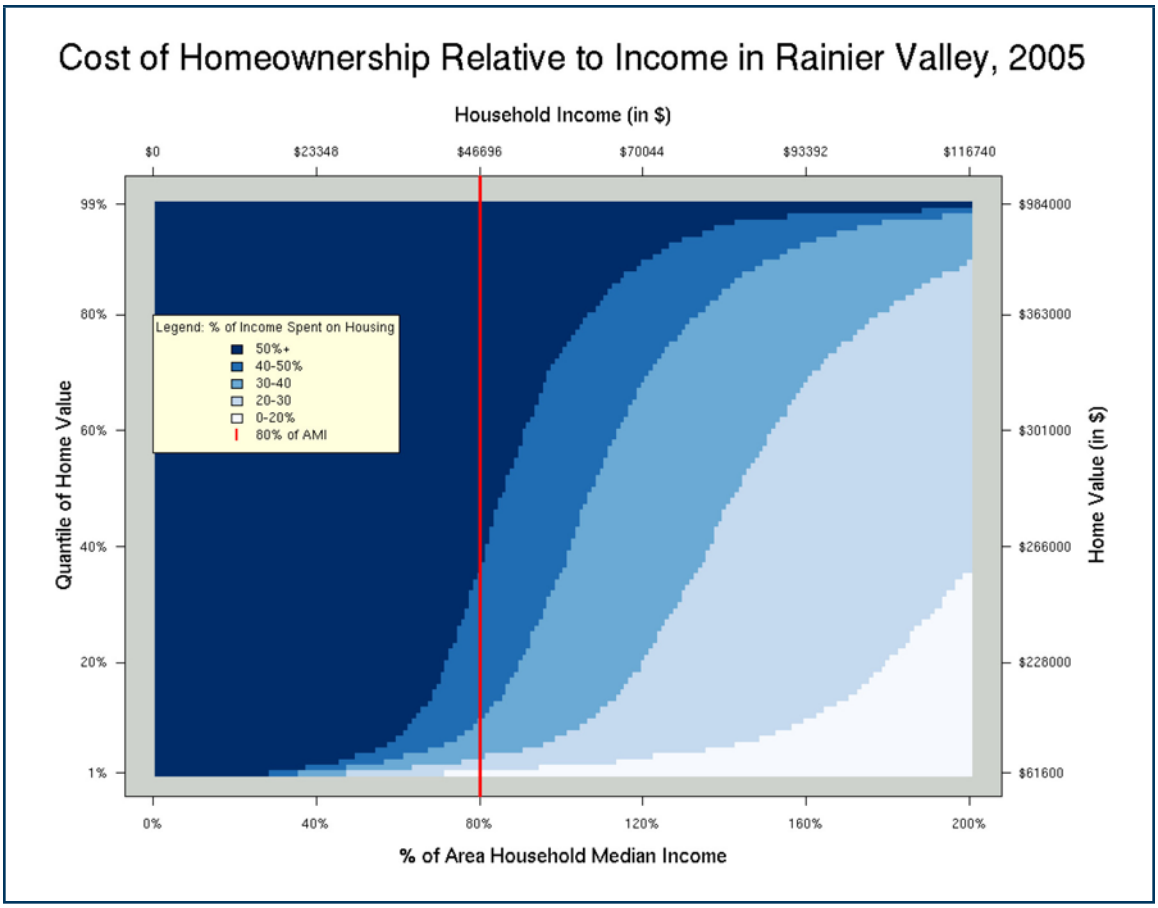


This report is designed to provide, in one snapshot, key pieces of information concerning trends in housing diversity. The trend chart at the top shows how the percentage of affordable housing in the area has changed over time. The second chart displays the trends for the median, 25th and 75th percentiles of the price distribution, including the actual price points of all individual home sales. The chart also highlights the area in which home prices are considered affordable to a household earning 80% of the county median income. The third chart displays how the diversity of housing options in the neighborhood (based on the variation in housing prices) has changed over time. Finally, the bar chart at the bottom shows the overall level of market activity. In areas with very few sales (under 50/year), the metrics in the report should be interpreted more carefully.

The example above displays the information for a community area in Chicago, but the report could be prepared for any geography, including census tracts, block groups, or custom neighborhood boundaries.

As an "add on" to this tool, it is also possible to get a complete snapshot of the affordability levels in a neighborhood for any household and any definition of what is considered affordable. For instance, most affordability definitions are based on two parameters: the household income (typically set at 80% of the area median income, or AMI), and the percentage of income that the household should spend on housing (typically assumed to be 30%). However, one might be concerned with what is affordable to a lower income segment of the population, or consider that households in some markets routinely spend much more that 30% of their income on housing.

Based on the information contained in the affordability report, it is possible to display what percentage of the housing stock is available to any household based on the percentage of its income spent on housing. This information can then be summarized in a graph such as the one below, which shows the availability of affordable housing in the Seattle neighborhood of Rainier Valley in the year 2005.




The shaded areas of the graph show what percentage of the housing stock was available in 2005 based on how much of its income a household was willing to spend on housing. So for instance if a household making 80% of the area's median income (marked as a red line on the X axis of the chart) was willing to spend as much as 50% of its income on housing (dark blue shading color), in 2005 it could afford less than 40% of the homes on the market (Y axis on the chart). If it spent only 30% of its income on housing, less than 10% of the housing stock would be available. Similarly, a household making 60% of AMI and spending 30% of its income on housing could afford less than 5% of the homes in this neighborhood.

### *4 NeighborScope: Uncovering Local Dynamics*

**What it does:**

This tool applies Locally Weighted Regression[1] and cluster analysis to real estate, demographic and business data to enable a much **more granular examination of neighborhood dynamics,** showing what areas share common trends. This creates the capacity to see what areas are affected by the same factors, what the key issues are, and whether development interventions are having the desired impact.

**Applications:**

Neighborhood analysis and development planning efforts typically start with a set of predefined neighborhood boundaries, such as census tracts or standard community areas. However, there is no guarantee that these boundaries actually correspond to areas that share common trends and (most importantly) present a unified set of development challenges and opportunities. In fact, in some instances, looking at these predefined units of analysis might mask important differences in terms of what is actually happening within and across their boundaries.

Rather than relying on predefined neighborhood boundaries, the "NeighborScope" tool uses individual property records to enable a much more granular examination of neighborhood dynamics. This tool can surface dynamics for areas much smaller than a neighborhood as well as effectively allow neighborhoods to "define themselves" by surfacing areas that share common trends. This new way of looking at neighborhoods has several useful applications, including:

- **Better tailor interventions** to areas undergoing different kinds of change
- **Assess appropriate geographic scope of interventions**
- **Guide real estate investment** by providing more accurate market analysis.

**How it works:**

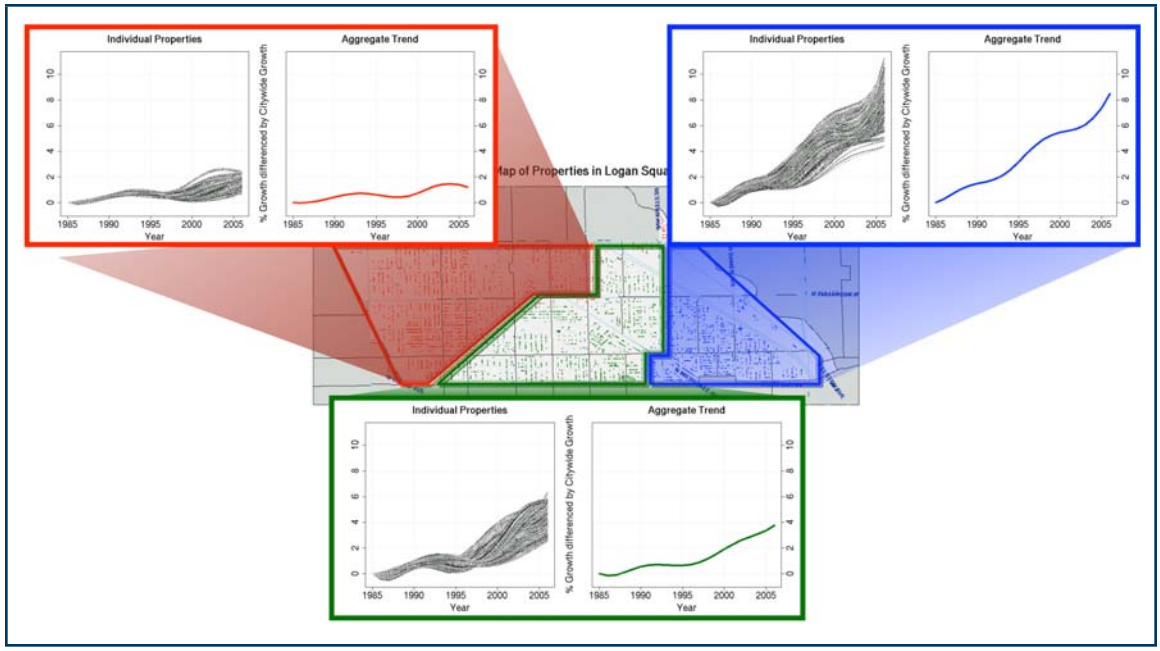
This tool is based on the same basic method used to develop the DNT Repeat Sales Index. However, rather than starting with Census tracts, price trends are estimated for each individual property, taking into account the sales of all the nearby properties, and giving more importance to properties that are closer by. All of the trends at the individual property level are then grouped using a clustering methodology to determine which areas tend to move together and could thus be considered actual "neighborhoods". It is then possible to look at additional dimensions (such as changes in demographics and business presence) to fill out this picture and gain further insights on local dynamics.

**Example:**

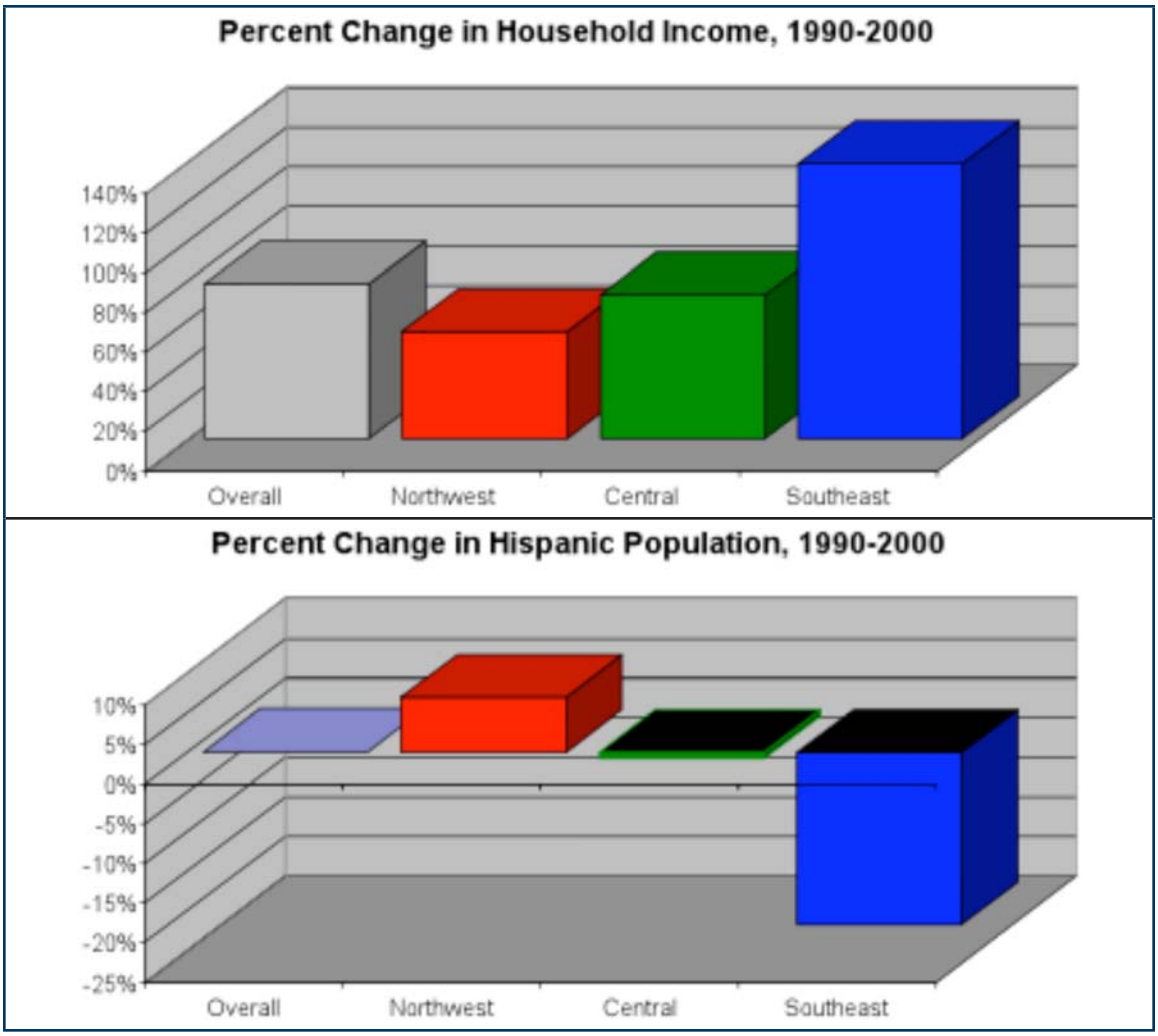
A traditional analysis of a neighborhood would look at a set of indicators across the entire community and draw some conclusions about the challenges and opportunities that the neighborhood presents. For example, an analysis of change in housing values for the Logan Square community area in Chicago would reveal significant appreciation between 1990 and 2006, raising some concerns about possible displacement of the original residents.

However, the reality on the ground is quite different. A "NeighborScope" analysis of this community reveals that there are actually three distinct trends taking place in different parts of the neighborhood, with very different implications for economic development. These trends are summarized in the figure below which shows the individual trend lines for each property as well as the aggregate for the three areas in which the Logan Square community can be divided.

In particular, the southeastern portion of the neighborhood has experienced dramatic appreciation over the time period, as values have increased at a much higher rate than the rest of the community. The northwestern portion of the neighborhood, on the other hand, has had little appreciation, more or less keeping pace with the city as a whole. The central section of this community area has followed yet a different pattern: values have increased significantly, but started rising much later than in the southeastern section.




Having identified these three areas, it is also possible to look at trends across other dimensions, to get a clearer picture of what is actually happening in this neighborhood. For instance, an analysis of building permits data reveals that rehab and new construction activity mirrors closely the trends in prices: it has increased significantly in the southeastern section, shows signs of more recent growth in the central section, and has seen little change in the northwestern portion of the community. Similarly, business data reveals that business presence (particularly bars and restaurants) has doubled in the southeastern part of Logan Square, while it has remained the same everywhere else.




Finally, demographic trends (including change in income and Hispanic population, depicted in the charts above) confirm the significant differences between these three areas – a finding that would be lost in an analysis of the neighborhood as a whole. These trends also help further fill out the picture: the changes in income and ethnicity suggest that the influx of higher income, White households in the Southeastern portion of the neighborhood might be pushing the original Hispanic population northwest, to the portion of the community that has experienced less appreciation and investment. Moreover, the trends in the central portion of the community (which has started experiencing some of the same changes as the Southeast in recent years) suggest that this gentrification pattern might be gradually moving from East to West, and might thus affect the rest of the community area before long. By revealing these more granular and localized dynamics, the kind of analysis enabled by the Neighborscope tool can help inform interventions and development strategies in a way that would not otherwise be possible.

## B. Impact Measurement Tools

Impact analysis is always a difficult exercise, which entails careful consideration of the circumstances and characteristics of the policy or intervention that is being evaluated. For this reason, unlike other aspects of neighborhood analysis, impact measurement does not lend itself to "off the shelf" applications. Nonetheless, the Dynamic Neighborhood Taxonomy project has surfaced some powerful methodologies that could be used for impact measurement purposes and are worth highlighting in this report. As importantly, these methodologies can be applied prospectively to evaluate the potential impact of a given intervention or development project. As such, they can be used to choose where to located interventions going forward, or to evaluate which intervention is more likely to be effective in a particular location.

The first tool is a methodology called geographically weighted regression (GWR), which helps analyze how the impact of an intervention varies across space, and so understand in what kinds of places it might be more or less effective. This method was not developed by the project, but it was used in the Drivers analysis and showed promising results. The second is a method developed by DNT to measure how the impact of an intervention sited in a particular location plays out over space and time.

### *1 Geographically Weighted Regression*

**What it Does:**

This innovative methodology, recently developed by a team of researchers in Ireland and the UK, can estimate how a relationship between two factors (e.g. community policing and crime) varies over space, identifying the places in which it is stronger. While this tool was originally developed in the context of quantitative geography, it can be applied to the field of economic development and **identify the places in which a given intervention is most likely to be effective.**

**Possible Applications:**

Traditional impact analysis typically looks at the effect of an intervention across a set of neighborhoods, implicitly assuming that the impact will be the same everywhere. However, neighborhoods are highly differentiated, and we have seen over the course of the project that what matters varies significantly by place. This tool provides a powerful way to uncover these differences and **estimate the ways in which the drivers of neighborhood change vary across different types of neighborhoods.** This information can be used for a variety of purposes, including to:

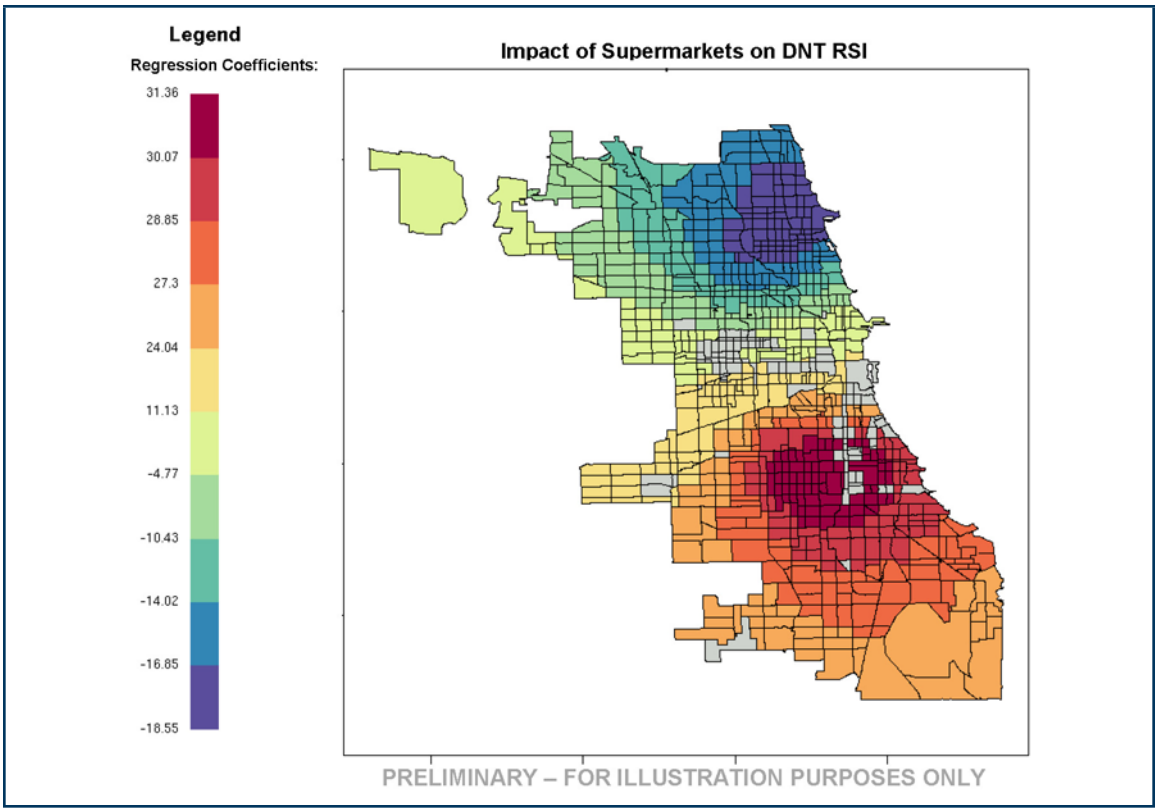
- **Analyze the impact of policies and interventions,** gaining a more nuanced and accurate understanding of their effectiveness.
- **Tailor strategies to specific neighborhood types,** by gauging what is most likely to matter where.
- **Define the geographic scope of development interventions** by estimating the size of the area that is affected by a particular development project.

**How it Works:**

Geographically Weighted Regression (GWR)[2] is a regression technique used to explore relationships that vary across space. Typically, an ordinary regression used to measure the drivers of neighborhood change or the impact of a development intervention does not easily account for possible spatial relationships: it either assumes that the drivers of neighborhood change have a similar effect across all neighborhoods, or it requires a precise specification that must be known beforehand and "built in" to the model prior to estimation. By contrast, GWR does not require the spatial relationship to be known beforehand, and can thus be a powerful tool in exploring how drivers of neighborhood change may vary across space.

**Example:**

The graph below shows a typical GWR output, in this instance based on a simple model of the effect of supermarkets on housing values. While the model did not stipulate any variation across space, the tool revealed a significant difference in the effect between the North side and the South side of the city, revealing a negative effect in the areas that already have a significant retail presence and a strong positive effect in the areas that are generally more underserved.




### *2 The DNT Impact Analyst*

**What it Does:**

This tool **estimates the impact of a particular intervention on surrounding housing values or on other outcomes of interest.** It can be applied to existing interventions in order to evaluate their effectiveness, or to prospective development projects, to estimate the impact they would have on the surrounding community.

**Applications:**

Impact questions arise almost daily in the field of community and economic development: is a particular development policy really working? If a new development comes in, what will be the impact on the neighborhood? What intervention is likely to have the greatest impact on a community?

The DNT Impact Analyst builds upon a sophisticated modeling methodology to answer these questions and more. The tool can be used to:

- **Evaluate the impact of a development project** or localized intervention (such as a new

school, or transit stop, or shopping center) over space and time.

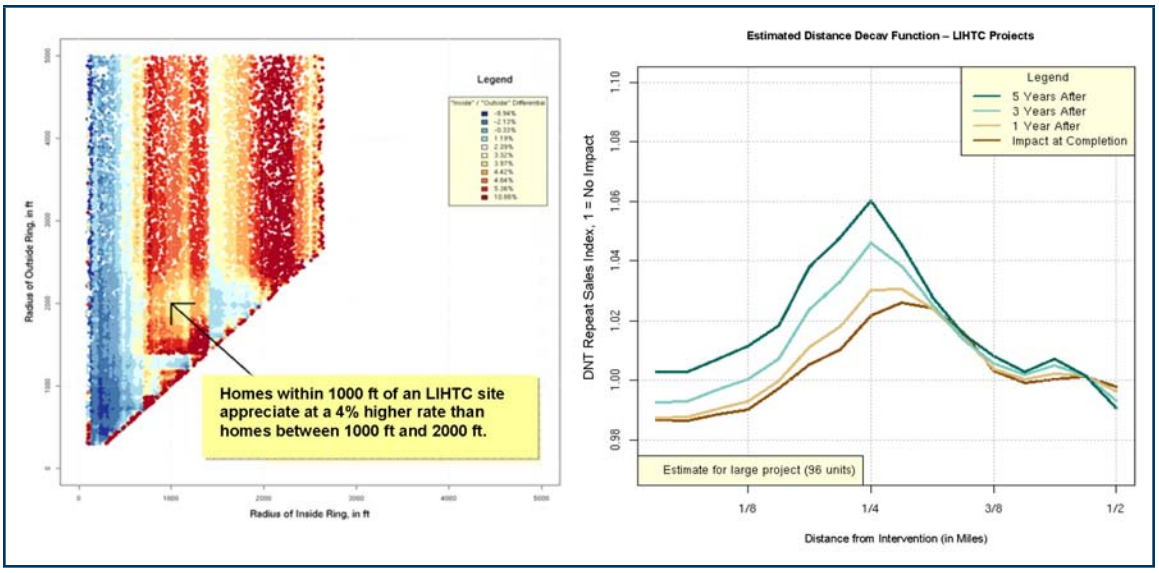
- **Help choose among alternative interventions** based on the estimated benefits to the surrounding community.
- Reveal whether it is worth investing in a development project based on a **comparison of its costs and benefits.**
- **Inform advocacy efforts** in favor of (or against) a particular intervention or development project.

**How it Works:**

The Impact Analyst uses point level data on an outcome of interest (be it crime occurrences or housing values) and a Monte Carlo simulation methodology to determine how the impact of a particular intervention (e.g. a new shopping center, a transit stop, or an affordable housing project) varies over space and time. The estimation is based on a model that compares the difference in the outcome measure across hundreds of thousands of randomly selected concentric rings around the intervention sites, and then translates these differences into a continuous distance decay function.

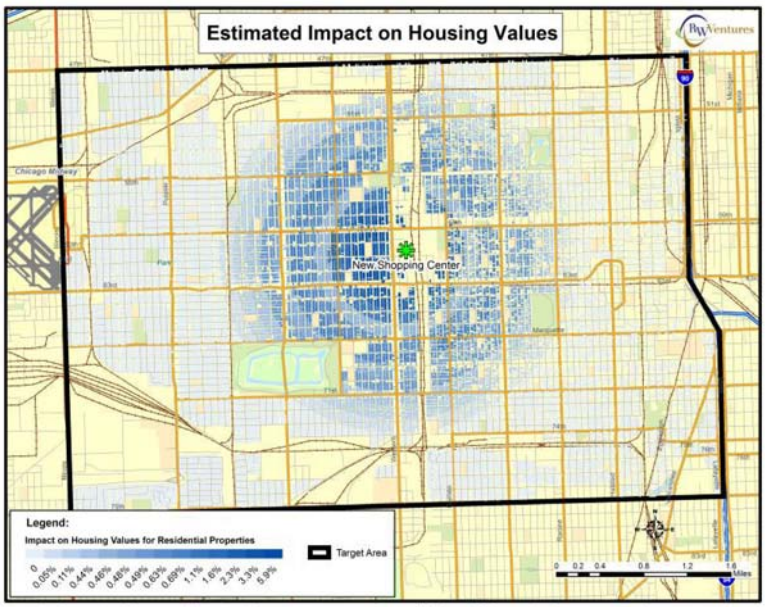
**Examples:**

This tool is already being applied in various settings. The example below shows results from a study completed for LISC on the impact of Low Income Housing Tax Credit (LIHTC) projects on surrounding property values.[3] In this case, the Analyst looked at every LIHTC project constructed over the past 15 years and estimated their impact on change in housing values, using a repeat sales model to control for changes in the quality of the housing stock.



The picture on the left displays the results of the Monte Carlo simulation. Each dot represents a specific combination of rings around the project, while the graph on the right translates this output into a distance decay function which varies over time (from 1 to 5 years after the completion of the project). The results show that, for instance, over 5 years a new LIHTC project results in a 6% increase in value for properties located 2 blocks away, and a 2 percent increase in value for properties located 4 blocks from the site. The impact is negligible for properties located more than 4 blocks away.

The Impact Analyst can also be applied to prospective projects. The picture below displays the expected impact of a new shopping center, based on the impact that similar shopping centers have had on surrounding property values. The shading of the color indicates the magnitude of the impact, which is highest (approximately 6% increase in values) closer to the shopping center and then declines with distance. This application of the tool enables quantifying in a very tangible way the expected benefits that a proposed development (in this case a shopping center) will bring to the community.




**Estimated benefits to the community: $29 million in increased property values, or an average of $1,300 per home owner**

## C. Segmentation Tools

Segmentation tools enable us to identify neighborhoods that are similar to each other along selected characteristics. This capacity is important for a variety of purposes: it facilitates peer analysis and benchmarking of neighborhood performance, helps identify best practices that are relevant to a particular place, and enables impact analysis by identifying comparables.

In this section, we introduce three segmentation tools that have been either applied or developed by the DNT project and would be particularly useful to the field of economic development. The first is the Neighborhood Typology presented in Section VI. The second is a different application of a similar methodology, which would enable the end user to generate "customized typologies" based on the characteristics they are most interested in and identify neighborhoods that are most similar along those characteristics. The third tool is a well established statistical technique called regression tree (or Classification and Regression Tree) that could be productively applied to this set of issues. Each of these tools and their applications are briefly illustrated below.

### *1 DNT Neighborhood Typology*

The neighborhood typology developed by the DNT project is a particularly powerful tool because of the amount of information embedded in it and the multiple ways in which it can be used. A detailed presentation of the structure, content and applications of the typology can be found in Section VII, and the key highlights are reported below.

**What it Is:**

The DNT Neighborhood Typology uses hybrid hierarchical clustering to group all neighborhoods into nine broad types and 33 detailed sub-types based on the key factors that have emerged from the analysis of patterns and drivers of neighborhood change. **The information contained in the typology can be used to prioritize and target interventions to each neighborhood type**.

**Key Features:**

This typology was designed to help inform economic development interventions. As such, it has several distinctive features:

- **It is dynamic:** it incorporates the project's findings on patterns and drivers of change, and it shows how neighborhood types can transition to other types over time, revealing what can be expected in different neighborhoods.
- **It is multi-dimensional:** it incorporates many of the factors that proved to make the most difference to the economic performance of neighborhoods. As such, it helps identify the challenges and opportunities in each place.
- **It is layered:** its hierarchical structure goes from the broadest possible class to the narrowest grouping of neighborhoods that are most similar to each other. This means that it can be used to classify neighborhoods in terms of broad types or more detailed subtypes – but it can also be used to identify, for any given neighborhood, its closest peers.

**Applications:**

The typology has numerous applications for the purposes of economic development, including:

- Tailoring interventions to the needs and opportunities of specific neighborhood types
- Anticipating and managing neighborhood change
- Benchmarking neighborhood performance
- Enabling peer analysis and identification of meaningful best practices
- Facilitating impact analysis by identifying comparable neighborhoods

### *2 Custom Typologies*

As noted above, the typology developed by DNT is only one of many different possible typologies, since the classification of neighborhoods is contingent upon the specific factors that are selected. A different set of variables would group neighborhoods with respect to different characteristics, and produce a different set of neighborhood segments. Indeed, each specific typology helps identify how each neighborhood compares to its peers with respect to the selected characteristics. As a result, the potential of neighborhood typologies as a tool for the analysis of local economies goes beyond the example presented here.

In fact, an additional, powerful use is to customize the typology itself: any given neighborhood-based organization or investor could ask that a typology be created more specifically focused around the characteristics it is most interested in. Thus, **practitioners could identify peer neighborhoods** (and examine differences that might account for varying success), **with respect to any qualities they want to better understand or develop:** the typology could focus, for instance, on identifying neighborhoods with similar combinations of employment mix and educational levels, patterns of mobility and aging, or many other factors.

This tool could be implemented using the same methodology adopted for the DNT neighborhood typology, which would enable the user to immediately find the neighborhoods that are most similar, as well as identify broader segments based on the factors of interest. This tool is ideally suited to being embedded into an interactive web-base platform. A simple interface could allow users to easily construct multiple typologies based on the factors that they are most interested in, and see how their neighborhood compares to its peers.

### *3 Classification and Regression Trees*

**What it Does:**

Regression trees are a well established statistical methodology[4] that can productively be ap-

plied to the field of economic development. They are a particularly powerful tool because they **enable us to classify a neighborhood based on an outcome of interest, and at the same time to see what factors determine that outcome.** We can then go back and look at what factors need intervention to change the outcome, deriving important implications for development practice.

**Applications:**

By grouping neighborhoods based on a particular outcome, regression trees enable us to **compare trends and best practices across neighborhoods that are similar** with respect of the dimension of interest. More importantly, by identifying the factors that cause that outcome, they **help surface leverage points that can be used to effect change**.

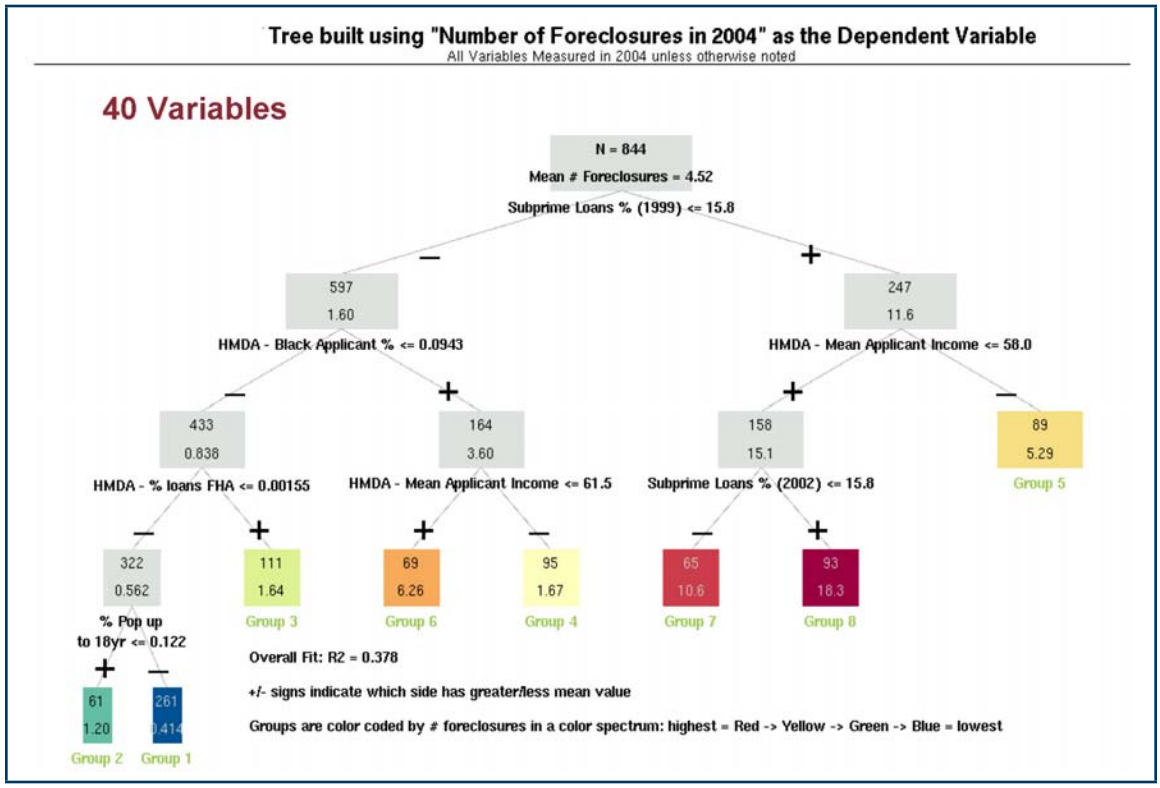
**How it Works:**

Classification and regression trees are a statistical methodology that combines both regression and segmentation features. This tool produces a segmentation that groups together neighborhoods that are most similar with respect to a particular outcome of interest (e.g. foreclosure rates, as in the example below), as well as a highly interpretable model that can help identify the drivers of that outcome (e.g. sub-prime lending, credit scores, income, etc.). Starting with a dependent variable of interest, the method builds a "tree" model by first searching for the explanatory variable that can create the greatest amount of separation among neighborhoods with respect to the dependent variable. For instance, neighborhoods that have a percentage of sub-prime loans over a certain threshold tend to have much higher foreclosure rates than neighborhoods that have a percentage of subprime loans below that threshold. This process is then repeated within each of the resulting groups of neighborhoods until an optimal amount of separation is reached. The result is a hierarchy of factors that best explain the outcomes on the dependent variable, and a set of neighborhood segments that have similar values with respect to that dependent variable.

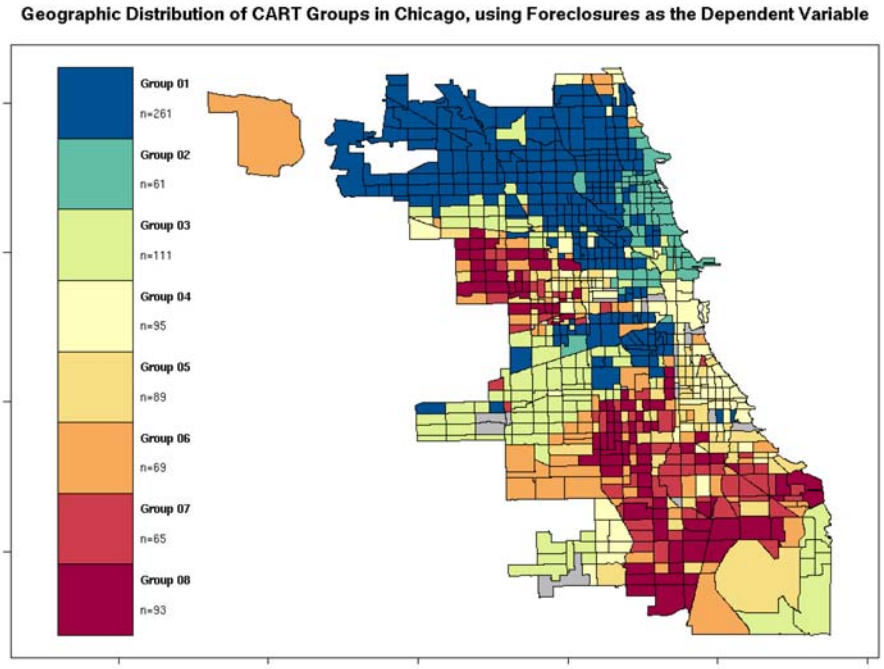
**Example**

As an illustration of this tool, the project ran a regression tree model on census tract level foreclosure rates in the city of Chicago in the year 2004, testing over forty variables as possible explanatory factors. The tool identified 8 neighborhood segments characterized by similar foreclosure rates, and a set of factors that determined the attribution of each neighborhood to its segments. Not surprisingly, the main determinant of foreclosure rates was the percentage of sub-prime loans in previous years. Race and income were also powerful predictors. The figure below presents the model results: each split in the tree is caused by a particular factor, starting with the percentage of sub-prime loans in 1999. Neighborhoods

that had a percentage of sub-prime loans higher than 15.8% in 1999 tended to have higher foreclosure rates five years later. The resulting two groups are then split by the model based on race, income, and so forth. At the bottom of the tree we have the 8 segments, which we numbered from 1 to 8 based on their foreclosure rates (1 being the lowest and 8 being the highest).



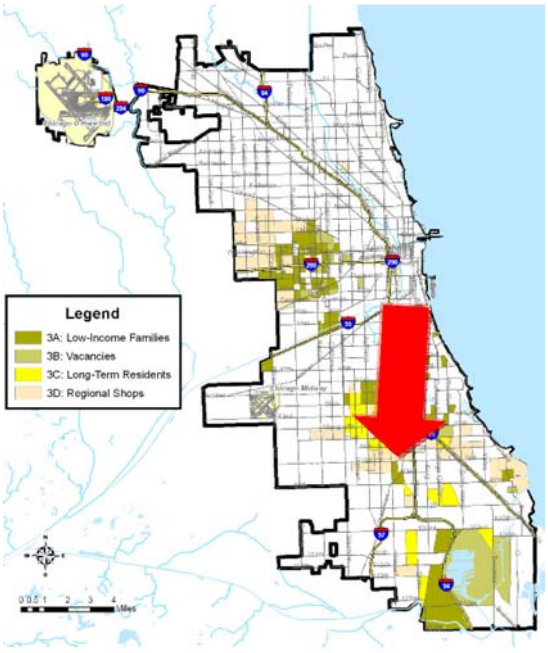

Each segment can then be mapped and profiled to identify its key characteristics and risk factors. Segment 8, for instance is the one that has the highest foreclosure rates. It is composed primarily of more isolated and underserved communities, predominantly African American. These neighborhoods are also characterized by high rates of unemployment and sub-prime loans. The primary risk factor with respect to this segment is the level of sub-prime lending activity, which was at its highest (and still rising) as of 2005.




## D. Applying the Tools

These tools would be particularly powerful when used in combination with each other and with the other models and findings developed by the project. While they have more applications than can be demonstrated here, it might be helpful to provide an example of how these tools might inform development practice in a particular place. It should be noted, however, that this example is necessarily different from a "real world" application, since the findings from the tools would normally be grounded and interpreted in the context of the local knowledge of the community.[5]

By way of illustration, let us take a census tract in the community of Auburn Gresham, on the South Side of Chicago. Someone in the community who was interested in applying the DNT tools to better understand the neighborhood's dynamics and inform development interventions could go through a process articulated in three steps: (1) understanding how the neighborhood is doing today compared to its peers, and what its specific challenges and opportunities might be; (2) understand what changes might lie ahead and what could be the most appropriate development goals for the community given where it is today; and (3) identify the priority areas of focus and development interventions that would enable the neighborhood to achieve those goals.




With respect to the first step, the DNT neighborhood typology provides a good starting point. This community is a type 3-A ("Low Income Families"), characterized by single family homes and a stable resident base. Based on the DNT RSI, this neighborhood is not doing as well as its peers, as it registered a growth rate of 61% compared to 129% for its type. An analysis of other data points for the neighborhood also surfaces potential "red flags," including population loss (a 6% decline between 1990 and 2000), a loss of business establishments (a decline of over 50% of its retail and service establishments between 1990 and 2006) and signs of financial distress (high foreclosure rates and a high percentage of credit lines past due). At the same time, the data collected by the DNT project also reveals some positive signs, including a decline in unemployment (from 20% in 1990 to 14% in 2000) and low crime rates.

By applying the specialized drivers models we can then shed some light on what can be expected in this neighborhood over the next few years. For instance, the convergence models show that this neighborhood is very unlikely to experience significant market reinvestment, suggesting a need for targeted economic development interventions to spearhead change. High levels of foreclosure rates and an increase in subprime lending activity through 2005 are likely to be a major issue in this community at least through the year 2010, and deserve particular attention. The Pattern Search tool could also be applied to this neighborhood to see how other neighborhoods with similar patterns of change evolved over time.

The Typology can then tell us something about the kinds of changes that tend to occur in this type of neighborhood. Type 3-A in particular tends to remain the same type, but can transition to Type 7 ("No Place like Home"), a neighborhood segment characterized by a similar housing stock and resi-

dential stability but slightly better socioeconomic indicators. This kind of transition could be something to strive for in the neighborhood, as it would translate to higher quality of life for its residents.

Based on these results, and what we know about the drivers of change for this type of community, we can then identify a few key focus areas for this neighborhood. These include increasing homeownership rates for local residents, continuing to build on the positive employment trends (particularly by improving connection to jobs), and addressing vacancy rates and population loss. A development intervention that might be useful for these purposes could be something along the lines of a Center for Working Families, which combines financial and homeowner counseling with employment services. The next round of interventions could then focus on bringing some retail amenities back to the neighborhood.

Additional tools that could be brought to bear in this case could then include the Impact Analyst, used to evaluate the likely impact of potential programs at specific sites in the community, or the NeighborScope tool, used to see which parts of the neighborhood are in most need of interventions (as well as the extent to which neighboring communities are affected by the same issues and could be part of the solution).

The tools can also be applied in instances in which an organization is working on a particular intervention, rather than in a particular neighborhood. For instance, Regression Trees can be used to profile neighborhoods based on their need for child care centers, and see what factors should be influenced to bring more facilities to the neighborhoods that need them the most. Similarly, the Affordability Reports can be used to target affordable housing policy, identifying areas that are in most need of affordability preservation efforts as well as places where it is too late for preservation efforts and new affordable units need to be created. This list could go on, but the key point is that there is tremendous potential for the application of more powerful analytics to the design and planning of community and economic development interventions, and the initial tools developed by the DNT project provide a useful basis to move in this direction.

*Endnotes for Chapter IX*

1 Cleveland, William S., Susan J. Devlin. 1988. "Locally Weighted Regression: An Approach to Regression Analysis by Local Fitting." Journal of the Americal Statistical Association. Vol. 83, pp.596-610.

2 See Fotheringham, A.S., Charlton Martin, and Chris Brunsdon. Geographically Weighted Regression. (Chichester: John Wiley & Sons, 2002).

3 The full report is available on the RW Ventures web site, at www.rw-ventures.com/publications.

4 Breiman, L., Jerome Friedman, Charles J. Stone, and R.A. Olshen, Classification and Regression Trees. (Belmont: Wadsworth Publishing Company, 1984).

5 In general, all the tools developed by DNT are designed to complement, build upon and make transparent, not replace, the local knowledge of the community, which will always be deeper than what any external data source or methodology can achieve.

## X. Building on the DNT Foundations

From its onset, the DNT project was conceived as a first step towards the development of a more complete understanding of urban neighborhoods and a new set of tools for community and economic development. This first step builds upon an enormous amount of prior work, and the hope of the project team is that other people and organizations will want to continue building from this foundation. We particularly see opportunities in two general directions: by applying the tools developed by the project and using them to inform work in urban areas across the country; and by continuing the product development work started by DNT – by digging deeper into particular subject areas, including new places, investigating additional dimensions of neighborhood change, and developing additional new tools for the field.

As this report is being finalized, work is already underway in both directions: the tools developed by the DNT project are being applied to guide a variety of community and economic development activities, from helping with Tax Increment Financing applications on the Southwest Side of Chicago to informing the siting of workforce housing, to changing the property assessment process to better reflect the impact of foreclosures. The data and models assembled by DNT are also being used to investigate additional questions, including an analysis of the impact of Low Income Housing Tax Credit projects on property values and crime and a set of summary reports on changes related to the Chicago Housing Authority's Plan for Transformation.

Additional ideas for further research have been suggested throughout the report, but it is useful to highlight them here, as they would naturally build on the work conducted thus far and be particularly helpful to guide interventions.

One particularly useful next step would be to complete the analysis of the drivers of neighborhood change for each of the neighborhood types identified by the DNT Typology. This could be done by implementing the same approach used for the analysis of immigrant communities presented in Section VI.C. It would also be possible to build entirely new models that would start with a specific hypothesis on what factors are likely to matter most to a particular type of neighborhood.[1] This type of analysis would complete the picture of how neighborhoods are differentiated in terms of their drivers of change and so enable a better understanding of what type of interventions are most likely to be effective in particular places.

Another next step that would make use of the current data and models would be to "dig deeper" into the effects of specific factors. Given the scope of the work, the project analyzed the effects of possible drivers of change at a very high level, but it is possible to conduct a

much more nuanced analysis of particular factors, in three respects: first, the analysis could be conducted at a more granular level of geography, which would reveal the extent to which particular factors have a significant effect, but only affect areas that are smaller than census tracts. Second, as mentioned above, it is possible to more systematically investigate the extent to which the same driver has different effects across different types of neighborhood. Finally, each factor could be examined in more detail to better understand potential policy implications. For instance, rather than looking at the effect of public housing as a whole, it would be possible to look at the differential effects of different types of public housing development (e.g. highrises vs. scattered site), or distinguishing between different types of crime, or different types of business establishments, and so forth.

The framework, data, models and tools developed by the project also make it much easier to investigate entirely new questions. These questions could relate, for example, to the effect of particular development interventions, which could range from public health improvements to foreclosure remediation. They could also seek to investigate additional dimensions of neighborhood change, such as, for example the relationship between neighborhood change and individual life outcomes of neighborhood residents. Finally, additional analysis could look at particular neighborhood segments that are not necessarily the ones identified by the typology: for example, what are the factors that determine the success of stable, mixed-income communities?

The work of the DNT project could also be expanded in two additional directions: expanding the data and models to other cities, and continuing the "product development" aspects of the work highlighted in the Tools Portfolio chapter of this report. The first line of work would have tremendous benefits: first, it would ensure that the results are applicable and useful beyond the four sample cities selected by the project. Second, it would enable testing and refining both the model results and the typology, and possibly surface new neighborhood types and dynamics that might not be present in Chicago, Cleveland, Dallas or Seattle. Finally, it would provide a much larger sample of neighborhoods, which would allow for more in depth and reliable analyses.

The second line of work would also be valuable, as it would ensure that the tools developed so far by the project (as well as any additional tools that could be devised) would actually be deployed and used in the field. This work would entail testing and refining existing tools, as well as developing new tools. More important, it would focus on making them widely accessible and useful to the field either by embedding them in existing web-based platforms or by developing easy to use software tied to and embedded in routine decision-making processes.

**Fundamentally, the community economic development field has matured to the point**

**where it can offer more nuanced and sophisticated understandings of the dynamics of neighborhood change, and develop and apply more advanced, business-like, tools to drive neighborhood investment and development. This project took a first step towards this next generation of economic development capacity, with the hope that, as these initial results and prototype tools are disseminated more widely, many more individuals and institutions will apply them to their work, undertake further tool development and refinement, and continue carrying this work forward.**

*Endnote for Chapter X*

1 A limiting factor in this respect is likely to be sample size, as some neighborhood types do not comprise enough census tracts to enable this type of analysis. This limitation could be addressed if, as suggested below, the DNT data and metrics are developed for other cities.

## XI. Conclusion

The project, with the support of numerous partners and advisors throughout the country, has generated three kinds of outputs that can help lead to a next generation of community and economic development capacity:

- **New Findings:** The analysis of hundreds of indicators over a twenty year period across four cities generated new insights on the patterns and nature of neighborhood change; on the factors that cause change across all neighborhoods as well as in particular neighborhood types; and on the defining characteristics and dynamics of distinct neighborhood types.
- **New Tools:** Based on the observation that neighborhoods are highly dynamic and specialized, the project began developing new tools for the analysis of development opportunities in particular places. These tools, including an innovative repeat sales index that can be used as a powerful indicator of neighborhood performance, bring a new level of analytic and planning capacity to the development field, enabling a much more granular and routine analysis of development issues and neighborhood dynamics, including particularly evaluation of what interventions will make the most difference in what places.
- **New Capacity:** The data, models and tools assembled and developed by the project are available to other individuals and organizations who are interested in using them, and make it much easier to continue this kind of work, take it further and apply it to other places and subject areas

As importantly, in the aggregate these outputs suggest a new understanding of how neighborhoods arise and function in the context of larger systems, and new approaches to enhancing both neighborhood and regional performance. Neighborhoods as complex, dynamic entities that arise from the interaction of social, political and economic systems with a particular place, and that function to increase the capacity and opportunity of their residents (and the overall performance of the systems) through enabling connections and transactions. This notion is at the core of a new framework for understanding, analyzing and intervening in neighborhoods, focusing on the particular opportunities that each community presents and on the dynamics of the systems that affect the desired development outcome.

This way of approaching community and economic development is the natural extension of changes already underway in the field, including the shift towards market-based approaches to development and the increased sophistication in the tools and practices that are brought to bear by economic development organizations. The DNT project represents another significant step in this direction: expanding the knowledge base of the field, and equipping these organizations (including community development corporations, local governments,

businesses, foundations and others investing in neighborhoods) with a new capacity to take a more granular look at their neighborhoods, intervene in more specialized ways, analyze the impact of interventions, and generally become more strategic and effective in improving urban neighborhoods and the quality of life of their residents.