



**AgEcon** SEARCH  
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

*The World's Largest Open Access Agricultural & Applied Economics Digital Library*

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

[aesearch@umn.edu](mailto:aesearch@umn.edu)

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

*No endorsement of AgEcon Search or its fundraising activities by the author(s) of the following work or their employer(s) is intended or implied.*

# Gentrification and Transit in Northwest Chicago

---

*LeRoy and Sonstelie (1983) propose that the presence of transit, in combination with declining automobile costs, leads to the gentrification of inner-city, transit-served neighborhoods. This paper attempts to empirically demonstrate whether the existence of transit resulted in phenomena consistent with gentrification, utilizing data from northwest Chicago between 1975 and 1991.*

*Using changes in residential property values as an indicator of gentrification, evidence is found that properties closest to transit stations increased in value much more than those farther away, especially in the period 1985-1991. Properties adjacent to transit stations had a 20% higher increase in value compared with those located a half-mile away, supporting the hypothesis that transit access was a spur to gentrification. The data also supports the notion that gentrification has spread like a "wave" over time, moving away from Lake Michigan and downtown Chicago.*

by Jeffrey Lin

The 1980s saw a small but significant trend reversal in American cities. Certain upper- and middle-class persons, instead of choosing to move to the suburbs, resettled near the central business district (CBD) in formerly run-down areas. This middle-class resettlement of the inner city is known as gentrification. In Chicago, gentrification began in earnest in Lincoln Park and has since surfaced around the city, including such diverse neighborhoods as Bucktown, Wicker Park, Ukrainian Village, and Pilsen.

This study examines the role of transit in the gentrification of neighborhoods of the north and northwest sides of Chicago over the period 1975-1991. It was during this period that portions of these areas were particularly sensitive to gentrification pressures. The percentage change in land values is examined as evidence of gentrification. Then, the paper investigates whether the availability of rapid transit service spurred gentrification by testing whether properties close to

mass-transit stations experienced a larger increase in value than those properties located farther away. Finally, the study explores the possibility that gentrification behaved like a "wave," emanating from both the CBD and Lake Michigan.

## Theoretical Considerations

Intellectual support for the hypothesis linking transit to gentrification dates to LeRoy and Sonstelie (1983). A brief summary of their model follows here. They begin with the standard model of urban location (Alonso 1964; Mills 1967; Muth 1969). Residents live around the CBD, where employment is concentrated. Households of different incomes choose to locate at some distance from the central business district, accepting longer commutes for cheaper land, and vice versa. This relationship can be represented by the classic bid-rent curve, plotting land rent  $r$  as a function of distance  $d$  from the CBD (see Figure 1.). In Figure 1, the dotted

lines represent separate bid-rent curves for the affluent (A) and less affluent (L), while the solid line represents the aggregate bid-rent curve. Note that there are two opposing forces here: the affluent have a higher hourly wage and thus place a higher value on commuting time, but they also consume more housing. The former encourages them to live closer to work; the latter has the opposite effect. Also, different socioeconomic groups have different bid-rent curves, leading to separate “rings” of habitation.<sup>1</sup>

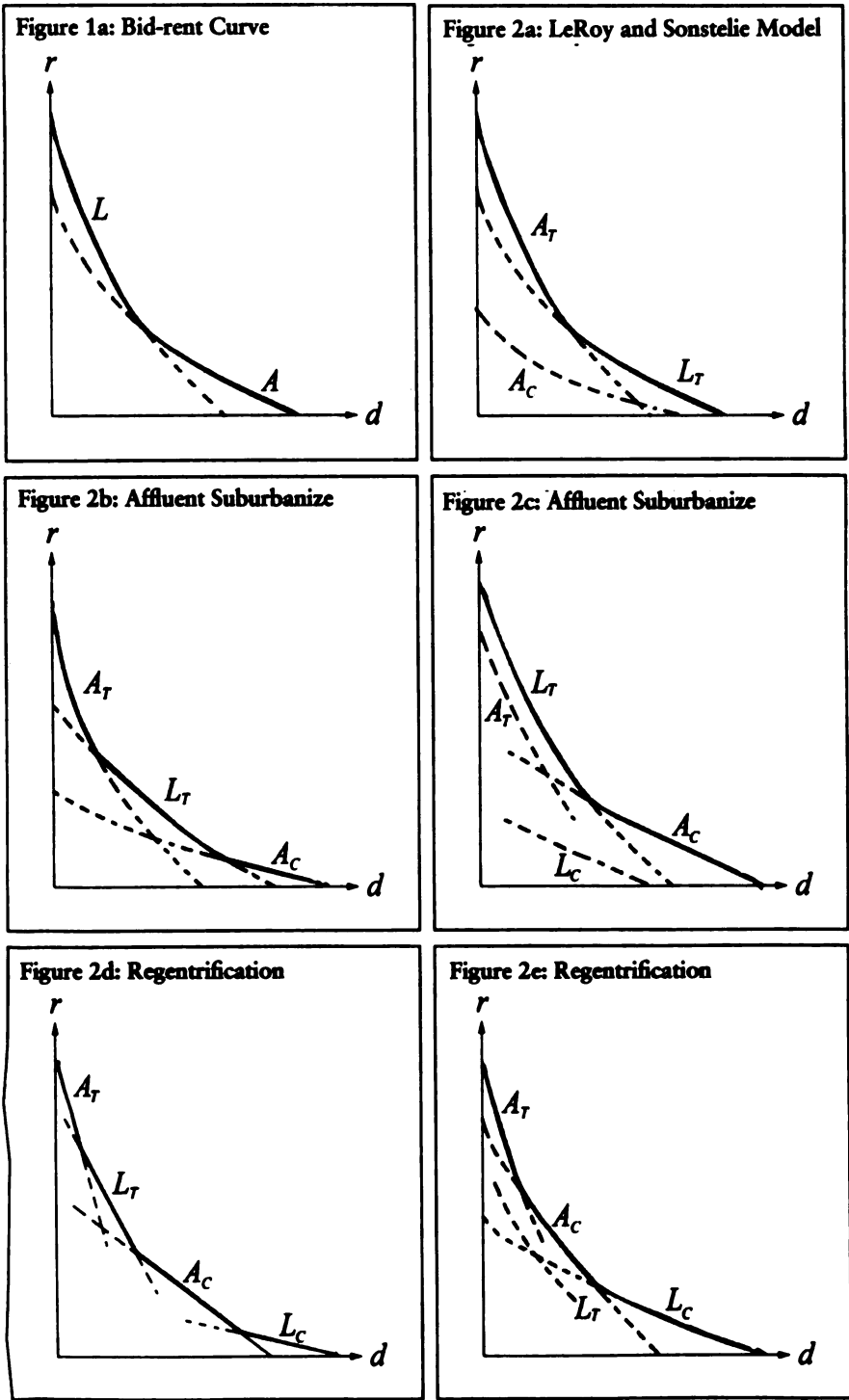
The model implicitly assumes that all households commute by the same mode. In the Alonso-Mills-Muth model, the prediction that the affluent will suburbanize (i.e., their desire for more housing supersedes their desire for shorter commutes) requires a critical assumption. That is, for the affluent, the income elasticity of their demand for housing must exceed the income elasticity of their marginal cost of commuting. Unfortunately for the model, Wheaton (1977) refuted this assumption.<sup>2</sup> LeRoy and Sonstelie’s contribution is a realistic adaptation that introduces changes in transportation technology. It allows modeling of the process of residential location by different income groups within the Alonso-Mills-Muth framework. A choice is introduced between the older, slower transit system and the newer, faster, and more expensive automobile. Given this choice, then the model predicts that the affluent will suburbanize if the auto is affordable to them and not to others. This is because only the affluent will place a high enough value on their time to make adoption of the new transportation technology worthwhile. If the auto is either unaffordable to all or affordable to all, then all individuals will use the same mode, and the affluent (or at least those whose income elasticity of demand for housing is less than their income elasticity of marginal cost of commuting by both modes) will live in the central city.

For the dynamic implications of this model, consider an example of four periods,

based on the experiences of many US cities. Prior to 1950, autos were not commonly available and both affluent and less-affluent used transit, with the affluent choosing higher-priced properties closer to downtown. After 1950, as the affluent were better able to afford autos, they moved out to the suburbs. In more recent years, auto ownership has become more universal, allowing the less affluent to also migrate outwards. This shift creates competition for land and increased commuting times as the roads become more congested. In the final period, some of the affluent move downtown and commute by transit. Thus, the LeRoy and Sonstelie model predicts gentrification of the central city and the suburbanization of the less affluent as a result of declining automobile costs and increased auto ownership. As a result, this paper deduces that transit serves as a magnet for gentrification, as reduced commute time benefits for the urban professional decline as distance increases from transit access.

Figure 2 displays five bid-rent curves<sup>3</sup> that represent the stages of the theory. In each diagram, the dotted curves represent bid-rent functions for segments of the population, while the upper, solid curve represents the composite bid-rent function. As before,  $r$  is land rent and  $d$  is distance from the CBD.  $A$  and  $L$  are the bid-rent curves for the affluent and less affluent, respectively, with subscripts  $C$  and  $T$  for cars and transit. Figure 2a depicts the initial condition in which the affluent live closest to the city center, and ride transit to work. Figures 2b and 2c show changing conditions in which the affluent begin to drive autos from the suburbs. Figure 2d is the regentrification of the city, in which the affluent and less affluent reside in alternate rings of habitation. Finally, the last panel, Figure 2e, illustrates a return of the affluent to the city center.

The LeRoy and Sonstelie model is attractive because it accounts for changes in urban location without resorting to explanations relying on changes in preferences over time



Figures 1 and 2: Aggregate bid-rent curves denoted by solid lines.

Generated at University of Minnesota on 2021-11-16 16:23 GMT / https://hdl.handle.net/2027/mdp.39615047929339  
Creative Commons Attribution-NonCommercial-ShareAlike / http://www.hathitrust.org/access\_use#cc-by-nc-sa-4.0

or across income levels. Mieszkowski and Mills (1993) note that “[o]bserved changes over time and differences in choice for different households at a point in time are simply the result of differences in budget opportunity sets and changes in these sets over time.” Others who used this model include Gin and Sonstelie (1992), who examined the suburbanization hypothesis using data from Philadelphia, and DeSalvo and Huq (1995), who extended the model.

### Previous Literature: Definition and Other Causes of Gentrification

Gentrification, generally, is the “resettlement in older run-down areas by middle-class persons already renting in other city neighborhoods” (Schwirian 1983). There are other, slightly different definitions, but all involve the movement of middle-class persons into a neighborhood near the central business district and the displacement of the previous, lower-income group (Schwirian 1983; Zukin 1987).

Outside of the LeRoy and Sonstelie model, gentrification has largely been viewed as a sociological or demographic phenomenon. The number of causation theories is too great to list here. Since this paper tests the LeRoy and Sonstelie model, only a meager summary follows. Sociologists have two dominant theories of neighborhood change: Invasion-Succession and the Life Cycle model (Schwirian 1983). Chicago sociologists perceived that an invasion by socially or racially different individuals (in this case, the “gentry”) would meet resistance. Competition ensues, and either a stable equilibrium will be reached, or one group will withdraw. If the original population leaves, then succession has taken place. The second model is Hoover and Vernon’s Life Cycle model (Schwirian 1983). They argued that neighborhoods undergo life-cycle changes that involve five stages: development, transition, downgrading, thinning out, and renewal.

Demographic trends are also claimed as causes of gentrification. A growing demand surge generated by the baby boom generation, smaller household sizes, and changing household structures are commonly cited factors (Ley 1986). An economic twist to these arguments explores the value of urban amenity (Ley 1986; Brueckner 1999); that is, when the central city has a strong amenity advantage over the suburbs, the affluent are more likely to live near the central business district. These amenities may attract niche groups such as artists, often signaling the early stages of gentrification. While Brueckner’s amenity-based theory is not the main focus of this study, the effect of downtown Chicago’s rich cultural assets cannot be discounted.

### Measurement of Gentrification

Gentrification is generally associated with a variety of things, including conversions from renter-occupied to owner-occupied housing, multi-family units to single-family units, changes in race and demography, and increased property values. The large number of associated, disparate phenomena make a simple quantification of “gentrification” difficult. Generally measurement is divided into two categories, as in Ley (1986). One is the measurement of changes in housing market activity, such as price changes, renovations, permits, or sales. The other is the measurement of changes in household status, such as household size, structure, income, and education. Ideally, one would examine both, but household status variables, as drawn from the census, are clumsy because of their lack of sufficient geographic detail and their decennial frequency. (This study requires greater geographic disaggregation than census tracts allow.) Ley (1986) takes this approach, but his aims are different, and the household status approach would not work well for the “transit-centered” approach taken here.

Thus measuring gentrification by using housing market activity remains the only feasible method. This study opts for property values, and more specifically, *changes* in property values, as the most succinct and sufficient measure of residential change. O'Loughlin and Munski (1979) utilized a similar technique in part of their analysis of New Orleans neighborhoods. They found that a higher rate of change in average property values was consistent with gentrification. Additionally, Wilson (1987) notes that property-value growth was an indicator of gentrification on the Upper West Side of Manhattan in New York City, although it lagged behind the neighborhood change.

Finally, it is well established that the existence of transit service creates a premium on property value (Forrest, Glen, and Ward 1996; McDonald and Osuji 1995). However, the author of this study is not aware of any literature that supports the idea that transit service leads to a higher *rate of growth* in property values relative to other areas. This paper examines differences in property value growth rates rather than differences in property values. Thus, this author feels reasonably confident in utilizing percent changes in property values as a rough proxy for the phenomenon in question.

A fulfillment of the LeRoy and Sonstelie prediction leads to gentrification, as measured by change in property values, being most evident near transit access points.<sup>4</sup> In addition, two geographic features are considered that are likely to wield a strong influence on gentrification patterns: the CBD and Lake Michigan. Specifically, it is expected that gentrification would act like a "wave," originating from both sources and spreading outwards as time progressed. Urban professionals would seek to be as near as possible to the CBD to shorten their commute times. As inner neighborhoods fill up with previous gentrifiers, development occurs in areas farther from downtown. Similarly, the north side lakeshore has traditionally served as a

magnet for the affluent. As lakefront properties reach capacity, development is expected to move westward from Lake Shore Drive over time.<sup>5</sup>

This study conducts a test for transit-induced changes in Chicago property value growth rates. The study region is the area bounded by North Avenue, Elston Avenue, Foster Avenue, and Lake Shore Drive during the period 1975-1991. Increases in property values by block are regressed on the type of property, distances from the CBD and Lake Michigan, and proximity to Chicago Transit Authority (CTA) elevated stations that lie along rail transit lines. If upper- and middle-class professionals are gentrifying as predicted by the above theory, then a premium should be placed on mass transit access. Thus, property value growth rates closer to transit stations should exceed growth rates farther from transit stations.

## Methodology

As mentioned above, this study utilized residential land values as an indicator of gentrification. The data was obtained from *Olcott's Land Values Blue Book of Chicago and Suburbs* (1975, 1980, 1985, 1991), a unique resource that provides estimates of land values on a block-by-block basis in the city of Chicago and its nearby suburbs.<sup>6</sup> The estimates are based on local realtor data, actual sales data, appraisals, and asking prices. *Olcott's* has been utilized in many past studies of Chicago and was recently used by McDonald and Osuji (1995) to estimate the effect of anticipated transportation improvement on Chicago's southwest side. The advantages of using *Olcott's* are obvious: it is an annual data source, meaning that neighborhood changes are more likely to be detected, and data is available at a disaggregate level within neighborhoods.

The model takes changes in property values as the dependent variable. A fulfillment of the LeRoy and Sonstelie model prediction

should result in significantly greater growth rates in property values near transit stations. Properties farther away from transit access, on the other hand, would not experience benefits from decreased commuting time, and would undergo slower property value growth. The percent change in value is also used to test for a wave-like pattern of gentrification. As discussed earlier, property value growth should behave as a wave, spreading westward from the lakefront and northward from downtown over time.

The analysis involved three time periods (1975-1980; 1980-1985; and 1985-1991) and residential properties in the trapezoidal area roughly bounded by Foster Avenue on the north, North Avenue on the south, Elston Avenue on the west, and Lake Michigan on the east (see Figure 3a). This geographic area allowed the inclusion of properties both near and far from transit (see Table 2). The data was parsed into cases each consisting of a 100 by 100 address block (a square with sides of 1/8th of a mile). Using the Chicago grid system, each address block was assumed to have an expected location at the center of that block (e.g., an address of 4850N/2450W corresponds to the block directly northwest of the intersection of Lawrence and Western). There were approximately 1,000 address blocks; of these, 700 were zoned for residential use. Some descriptive statistics are summarized in Table 1.

For each address block, the percent change in estimated land value was computed based on figures quoted by *Olcott's*. These prices were adjusted for inflation (to 1980 dollars) using the Consumer Price Index. The percentage change in land value is the dependent variable in the model specification. *Olcott's* also provides information on zoning, which was used to identify high-density and low-density areas. Two dummy variables were constructed; medium density zoning (R-4) was the control group.<sup>7</sup> Approximately 15% of the properties were considered high density; most of these prop-

erties were farther south and east. Thirty-five percent of properties were in low-density zones.

Straight-line distances (expressed in miles) were calculated from each address block to the nearest transit station, the central business district, and Lake Michigan. Transit station addresses were obtained from the Chicago Transit Authority and Metra (commuter rail). In all, 35 CTA stations and five Metra stations were used in the study as transit access points. Some of these stations lay outside of the study's boundaries, but were included as the closest transit stops for certain properties in the sample. Distance to Lake Michigan was calculated (more specifically) as distance to Marine Drive, which is the western edge of Lincoln Park. Finally, the central business district was defined as the corner of State and Madison Streets, or, in Chicago grid terms 0,0. The termination of the study area is at North Avenue (1600 N), north of any standard definition of the central business district.

It should be noted here that distances to bus stops have been excluded in this analysis. The reason for this is twofold. Including bus lines would mean that operationally, all of the study region properties would lie within 3/16th of a mile from a bus line. Second, the LeRoy and Sonstlie model takes transit to be oriented towards the central business district. Outside the lakefront market, the Chicago bus system is not oriented towards the CBD; instead, it operates along major north-south and east-west thoroughfares. Additionally, the average bus journey length in Chicago is about 2 miles, versus six miles on the "L."

In the data sample, distances to the CBD range from 2 to 8.59 miles, with a mean of 5.6 miles; distances from Lake Michigan range from zero to five miles, averaging 1.85; distances to transit range from zero to 1.06 miles with an average distance of 0.402 miles. The distribution of distances to transit is in Table 2.

Figure 3a: Study Area

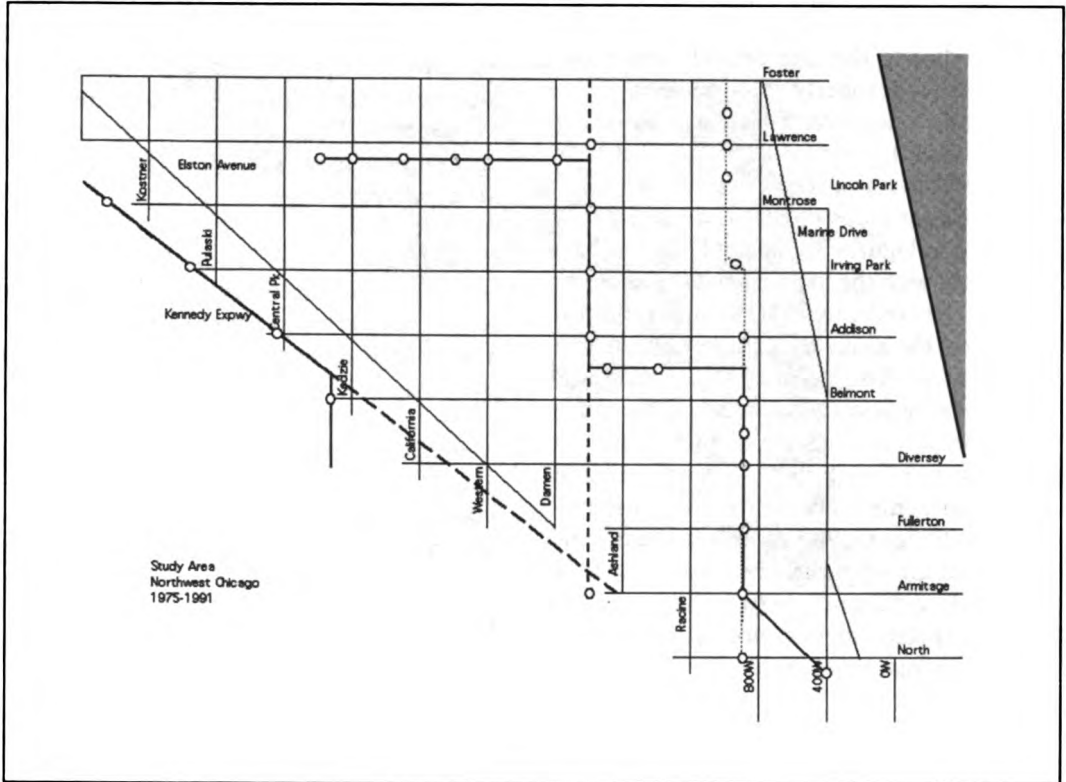


Table 1: Descriptive Statistics

n	700
mean $d_{CTA}$	0.402 miles
mean $d_{CBD}$	5.612 miles
mean $d_{LAKE}$	1.849 miles
High density	15%
Medium density	50%
Low density	35%

$d_{CTA}$  = distance to transit  
 $d_{CBD}$  = distance to CBD  
 $d_{LAKE}$  = distance to Lake Shore Drive

Table 2: Distribution of Distance to Transit

Miles from CTA	Number of blocks
0.10	42
0.18	64
0.25	105
0.33	91
0.41	77
0.48	71
0.56	78
0.64	66
0.71	48
0.79	25
0.87	17
0.94	12
1.02	7
More	2

Data Analysis

An immediate result is the sharp increase in growth during the last period. The mean change in real property value between 1975-1980 was a negative 7%; between 1980-1985 it was a positive 16%, and between 1985-1991 it was a staggering 98%!<sup>8</sup>

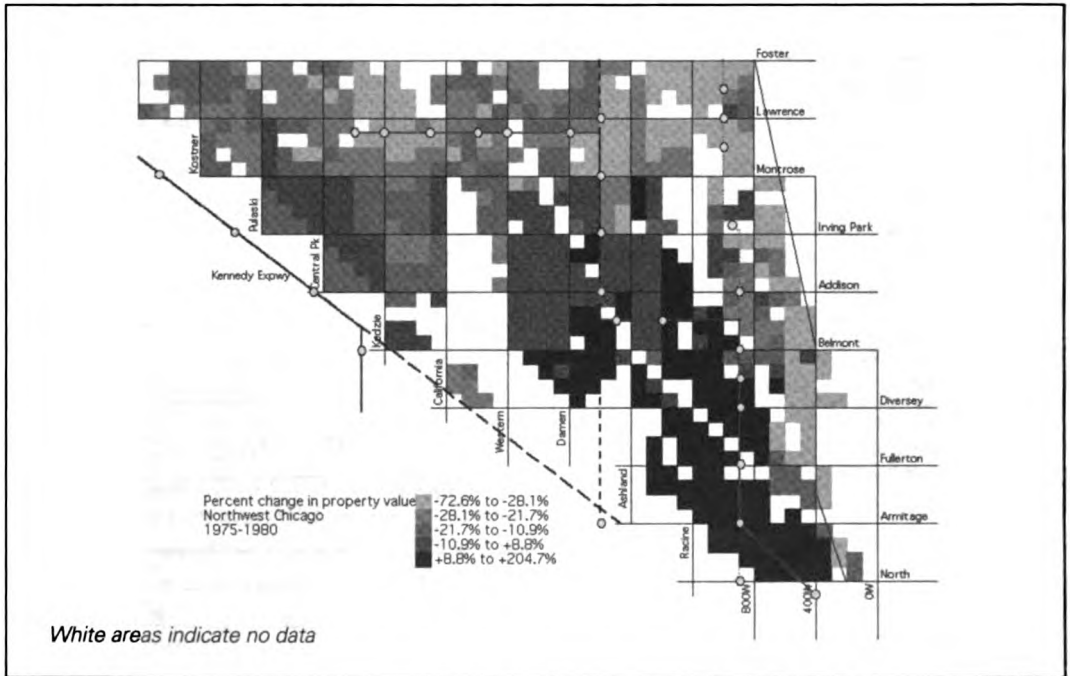
A series of maps of the study region can be found in Figures 3b, 3c, and 3d. The data is overlaid with the main transit routes in the region: the Red Line, the Brown Line, the Blue Line, the Kennedy Expressway, and the Metra tracks. The Kennedy Expressway and Blue Line lie just to the west of the study area's boundary; because of this, Blue Line stations were included as transit access points for completeness. The maps use percentage change in land value as a theme, and are sorted into quintiles. In accordance with the vastly different rates of change across periods, specific shades encompass different rates of change on each map.

Clearly identifiable on the maps is a core region along Lincoln Avenue where property value growth has been consistently and exceptionally strong. (A commercial area along Clark and an industrial corridor along the Chicago River can also be seen as white space on the maps.) In 1975-1980, this core area was principally south of Belmont Avenue. Between 1980-1985, its extent expands north to Addison; in 1985-1991, the northern extent reaches Irving Park Road. Here is rough, visual confirmation of a wave moving northward from downtown over time.

The maps of the dependent variable, percent change in land value, closely mirror anecdotal evidence of gentrifying neighborhoods during these time periods. From this, it seems that any findings of increased rates of property value growth are evidence of probable gentrification.

The evidence of a wave from Lake Michigan is less visually convincing, but still plau-

Figure 3b: Percent Change in Property Value, 1975-1980



Generated at University of Minnesota on 2021-11-16 16:23 GMT / https://hdl.handle.net/2027/mdp.39015047929339 Creative Commons Attribution-NonCommercial-ShareAlike / http://www.hathitrust.org/access\_use#cc-by-nc-sa-4.0

Figure 3c: Percent Change in Property Value, 1980-1985

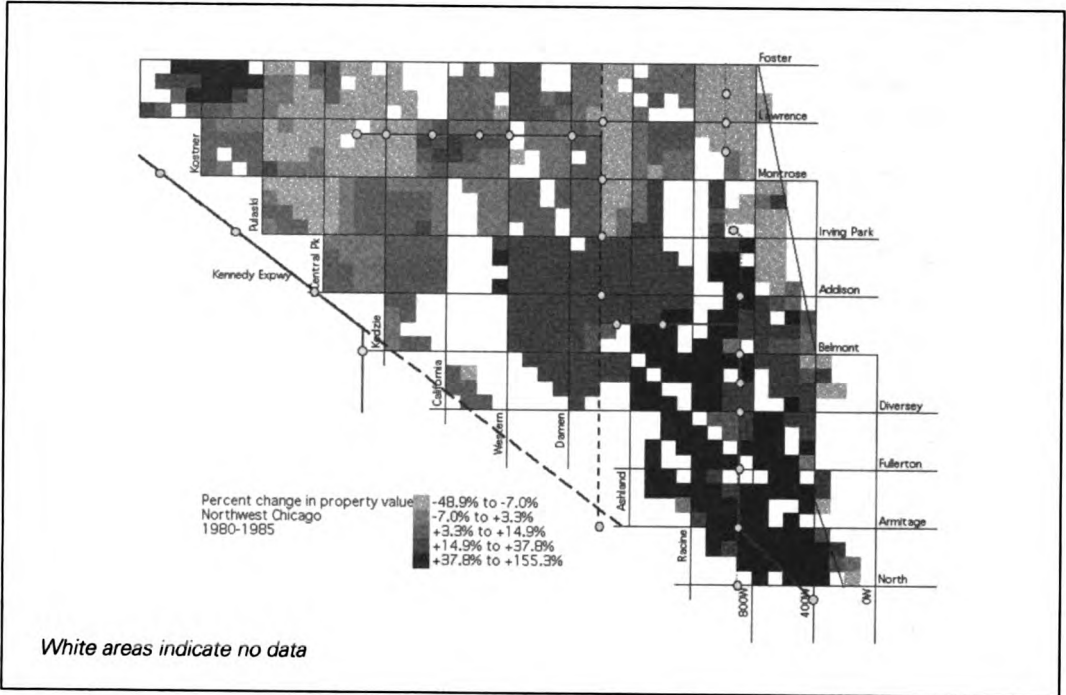
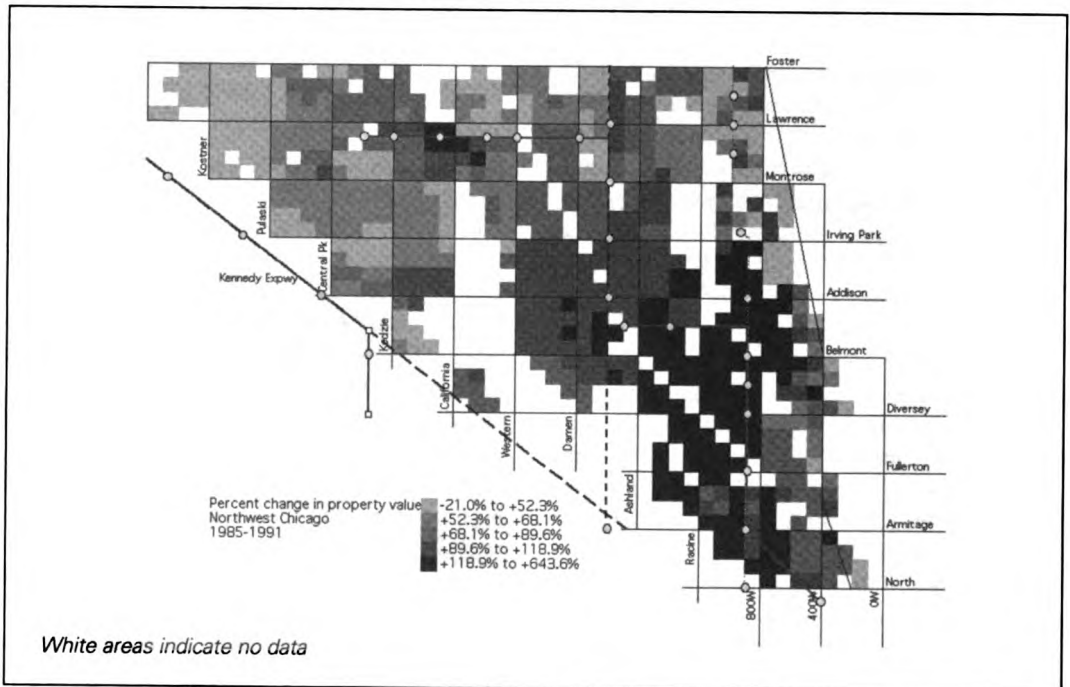


Figure 3d: Percent Change in Property Value, 1985-1991



Generated at University of Minnesota on 2021-11-16 16:23 GMT / https://hdl.handle.net/2027/mdp.39015047929339  
Creative Commons Attribution-NonCommercial-ShareAlike / http://www.hathitrust.org/access\_use#cc-by-nc-sa-4.0

sible. Surprisingly, proximity to Lake Michigan seems to have had a large negative effect on land values in 1975-1980. A possible explanation could be an increase in housing prices along Lake Shore Drive in the period immediately prior to 1975-1980. Further analysis is required for a conclusive explanation. What can be seen from the maps is that the two highest quintiles of growth rates creep north along Lincoln Park to Addison in the period 1980-1985, eventually reaching past Addison in 1985-1991. In the last period there is some evidence of gentrification in long-lethargic Uptown, by Lake Michigan, between Montrose and Foster.

During the second period there is particularly intense property value activity in the northwest corner of the study region, near the intersection of Foster and Kostner Avenues. There may be several explanations for this occurrence. The most apparent explanation is the opening of the River Road (1983) and O'Hare (1984) extensions to the Blue Line, which runs just west of this intersection. The expansion to O'Hare International Airport would have particularly benefited areas along the Blue Line. A comparable example is the 1993 opening of the CTA Orange Line to Chicago's Midway Airport on the southwest side. McDonald and Osuji (1995) analyze property value growth in the face of anticipated transit improvements to Chicago's southwest side and find significant evidence of growth three years before the Orange Line to Midway Airport opened. It seems similar effects were at work along the Blue Line on the northwest side. In fact, there is relatively stronger growth along the Blue Line in both the first two periods. There also seems to be a positive externality generated by the Kennedy Expressway and the Blue Line, although the peak change is at a small distance from the right-of-way.

Another possible explanation for intense outlying activity in property value change during 1980-85 is a special case of demand for housing in neighborhoods on the fringe of

Chicago. Anecdotally, many city employees, required to live within the city proper, have made homes in southwest side neighborhoods such as Beverly and near Midway Airport. The same phenomenon may be occurring here, near the Kennedy Expressway.

Percent change in property value is regressed on residential density, and distance to the CBD, Lake Michigan, and transit. Nonlinearity in the model specification was expected; in order to account for the possibility of peak development behaving as a wave emanating from both Lake Michigan and the CBD, the model includes squared terms for these distance variables. A cubic term for distance from Lake Michigan was included to account for two powerful corridors: Lincoln Avenue and the Blue Line/Kennedy Expressway. Thus, the model was expected to indicate two separate "peaks" when percent change in property value was plotted against distance from Lake Michigan (in addition to already-accounted-for transit effects).<sup>9</sup> The estimated equation is

$$(1) \quad C_i = \beta_0 + \beta_1 \cdot L + \beta_2 \cdot H + \beta_3 \cdot D_{\text{CBD}} + \beta_4 \cdot D_{\text{CBD}}^2 + \beta_5 \cdot D_{\text{LAKE}} + \beta_6 \cdot D_{\text{LAKE}}^2 + \beta_7 \cdot D_{\text{LAKE}}^3 + \beta_8 \cdot D_{\text{TRANSIT}}$$

where  $C_i$  is the property value percentage change in period  $i$ ,  $L$  and  $H$  are dummy variables for residential density (equal to 1 for low or high density, zero otherwise), and  $D_{\text{CBD}}$ ,  $D_{\text{LAKE}}$ ,  $D_{\text{TRANSIT}}$  are distances to the CBD, Lake Michigan, and transit, respectively. This specification was estimated for each of the periods 1975-1980, 1980-1985, and 1985-1991. The results are summarized in Tables 3, 4, and 5.

All model specifications exhibited strong significance. The key variable, distance to transit, had a significant and strongly negative effect on property value change in the first and third periods. This finding is consistent with the hypothesis that transit was a spur to gentrification.

**Table 3: Percent Change in Property Value for the Period 1975-1980**

Variables	Coefficients	Standard Error	t-statistic	Significance
(Constant)	164.511	11.562	14.229	**0.000
Low density	-3.654	2.467	-1.481	0.139
High density	-35.861	4.006	-8.953	**0.000
Distance to CBD	-45.327	4.517	-10.034	**0.000
Distance to CBD <sup>2</sup>	2.482	0.451	5.508	**0.000
Distance to lake	30.728	8.069	3.808	**0.000
Distance to lake <sup>2</sup>	-15.436	3.603	-4.284	**0.000
Distance to lake <sup>3</sup>	2.414	0.500	4.828	**0.000
Distance to transit	-24.203	4.596	-5.266	**0.000

*Distances in miles; dependent variable expressed as follows: 50% = 50*

*\* Significant at the 10% level \*\* Significant at the 5% level*

*n=697 R<sup>2</sup> = 0.620 Adjusted R<sup>2</sup> = 0.616 F-statistic = 140.678*

**Table 4: Percent Change in Property Value for the Period 1980-1985**

Variables	Coefficients	Standard Error	t-statistic	Significance
(Constant)	125.360	9.994	12.544	**0.000
Low density	5.125	2.115	2.424	**0.016
High density	-3.716	3.314	-1.121	0.263
Distance to CBD	-35.567	3.914	-9.086	**0.000
Distance to CBD <sup>2</sup>	1.796	0.391	4.595	**0.000
Distance to lake	57.375	6.636	8.646	**0.000
Distance to lake <sup>2</sup>	-30.800	3.033	-10.156	**0.000
Distance to lake <sup>3</sup>	4.647	0.426	10.901	**0.000
Distance to transit	6.042	3.990	1.515	0.130

*\*Distance in miles: Dependent variable expressed as follows: 50% equals 50*

*\* Significant at the 10% level \*\* Significant at the 5% level*

*n=699 R<sup>2</sup> = 0.606 Adjusted R<sup>2</sup> = 0.601 F-statistic = 132.828*

In the period 1980-85, the coefficient on distance to transit was found to be insignificant (at the 10% level), and even slightly positive. For some reason, transit's affect on development paused during this period. Some strong possibilities exist to explain the discrepancy in the findings. Two have already been suggested earlier in this paper; they are the anecdotal evidence about city

employees living just within the city boundaries, and the uncertainty that the Brown Line faced in the early 1980s. In addition, the oil price shock of 1979-1980 and the early 1980s economic recessions played an important role in this result. It seems likely that the recession limited investment in rehabbed and new housing, reduced numbers of jobs, and otherwise limited moves to

Table 5: Percent Change in Property Value for the Period 1985-1991

Variables	Coefficients	Standard Error	t-statistic	Significance
(Constant)	184.682	31.339	5.893	**0.000
Low density	11.107	6.631	1.675	*0.094
High density	-6.608	10.392	-0.636	0.525
Distance to CBD	-13.186	12.275	-1.074	0.283
Distance to CBD <sup>2</sup>	-1.853	1.226	-1.512	0.131
Distance to lake	123.530	20.809	5.936	**0.000
Distance to lake <sup>2</sup>	-58.706	9.510	-6.173	**0.000
Distance to lake <sup>3</sup>	8.071	1.337	6.037	**0.000
Distance to transit	-41.361	12.510	-3.306	**0.001

\*Distance in miles: Dependent variable expressed as follows: 50% equals 50

\* Significant at the 10% level \*\* Significant at the 5% level

n=699 R<sup>2</sup> = 0.403 Adjusted R<sup>2</sup> = 0.396 F-statistic = 58.394

the city. Additionally, the LeRoy and Sonsteli model predicts that a rise in the cost of commuting by automobile should lead to the suburbanization of the affluent. This line of thought merits further analysis; extending the model to periods thought to lack intense gentrification may provide some answers. Still, the empirical strength of the findings in the first and third periods provide support for the hypothesis that access to transit fostered gentrification.

The coefficients on distance to the CBD, another predicted cause of gentrification, were found to be significant and strongly negative in the first and second periods. This result was expected and within the framework of the theory. Coefficients on the Lake Michigan variables were, likewise, significant and strong. Discussion of these results follows in the next section.

The coefficients on the dummy variables for high-density properties were not consistently significant. However, in the periods 1980-85 and 1985-91, low-density properties experienced a significant gain in property value change versus the control group of medium-density properties. This result seems

likely to have occurred as development moved away from denser areas near downtown and along the lakefront.

### Further Analysis

To interpret the results further, the regression results were utilized to chart percentage change of property values as a function of each distance variable independently. This was done to look for evidence that the wave of gentrification rolled outwards from both the central business district and Lake Michigan. To do this, each distance variable was examined holding the other distance variables at their mean value. The results are charted in Figures 4a, 4b, and 4c.

The obvious first impression upon examination of these graphs is the great acceleration in property value growth in the period 1985-1991. In contrast, changes in value during the previous two periods seem miniscule. As previously noted, the mean percentage change in the period 1985-1991 was +97.5%, versus -7.3% and +16.3% for the first and second periods, respectively. (Note that prices were adjusted for inflation.) This

Figure 4a: Percent Change in Property Value vs. Distance to Lake Michigan

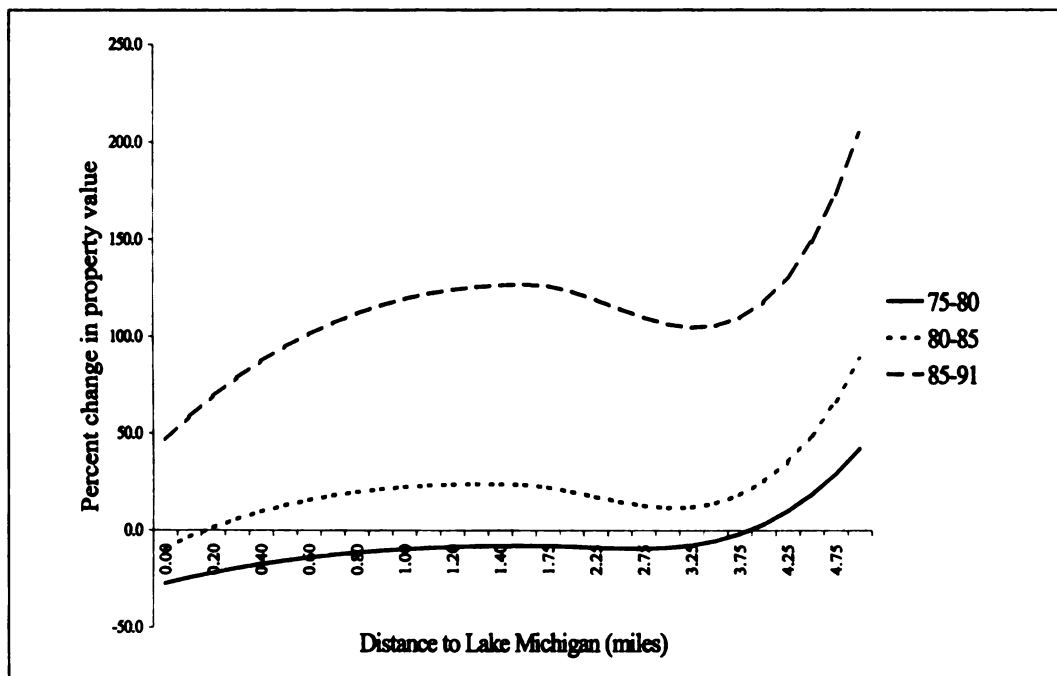


Figure 4b: Percent Change in Property Value vs. Distance to Transit

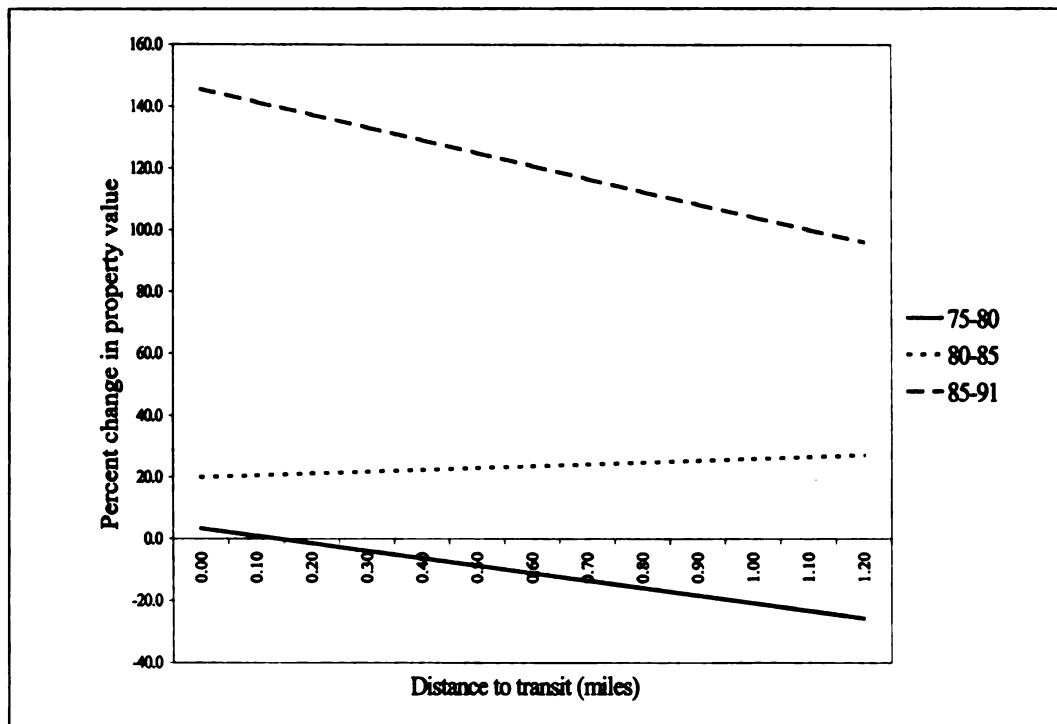
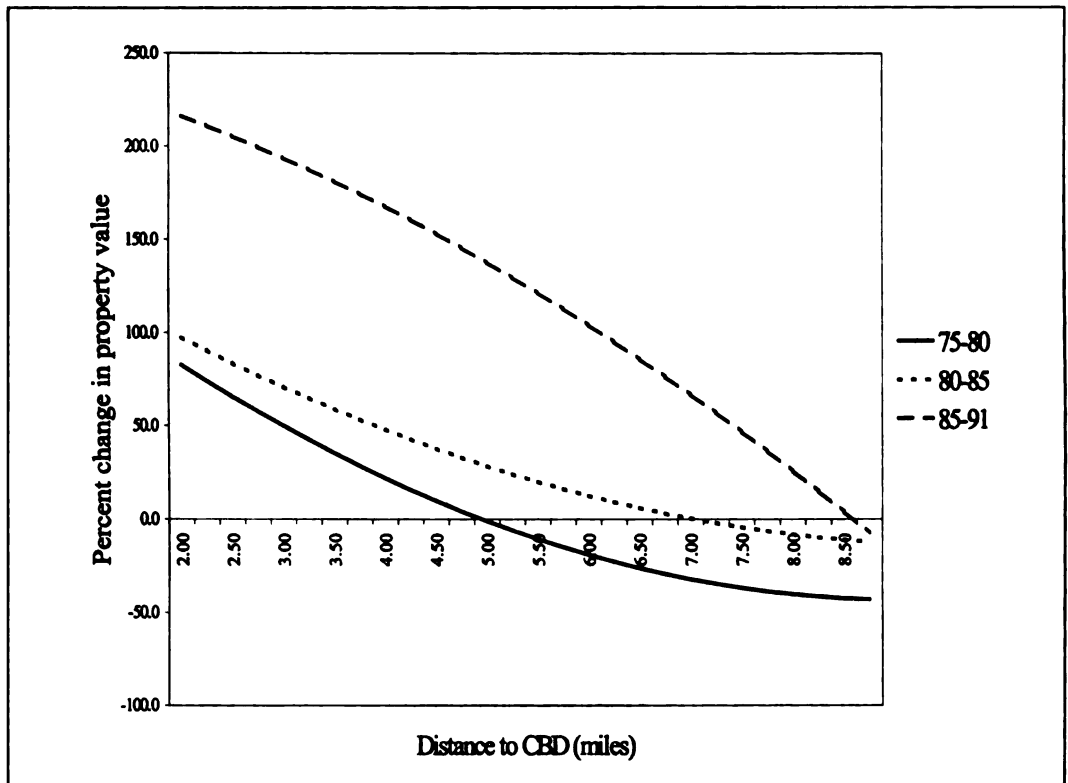


Figure 4c: Percent Change in Property Value vs. Distance to CBD



difference is starkly reflected in Figures 4a, 4b, and 4c.

Figure 4a charts percentage change in property value as a function of distance to Lake Michigan. The data exhibits a cubic shape, with two distinct peaks, as expected. The movement of the first peak reveals a slight wave-like behavior, with development emanating from Lake Michigan and moving westward. Between 1975 and 1980 the largest increases in property values occurred about 1.4 miles west of Lake Shore Drive; between 1980 and 1985 that distance was 1.3 miles; and between 1985 and 1991 it was 1.5 miles. The movement of the “trough” that follows the peak is more consistent: between 1975-80 the trough was at 2.75 miles; between 1980-85 the trough was at 3.0 miles; and between 1985-1991 the trough was at 3.25 miles.

Distance from transit, Figure 4b, depicts roughly the same story. In the period 1985-1991, property value growth adjacent to transit held a 20-percentage-point advantage over property value growth a half-mile away. From the graphs, property values increased the most at the closest points from transit during the first and third periods, whereas that phenomenon paused during the 1980-1985 period. As suggested by the regression results, this seems to indicate that transit was an important spur to gentrification during the first and third periods. The second period seems to be the anomaly in that relationship. Note the flatness of the curve relative to the other two periods. In this period, property value growth does not seem dependent on distance to transit. Why an interruption of a clear trend in surrounding periods might have occurred is not clear, and merits further study.

Figure 4c charts percentage change in property value against distance to the central business district. Again, change in the last period easily outpaces change in the first two periods. Properties nearest the CBD experienced the highest growth rates in all periods. However, it seems that property value growth from the first period to the second period accelerated farther from the CBD (at a maximum difference at 8 miles, roughly near Lawrence and Pulaski in Albany Park). The ring around the central business district at 8 miles only intersects the study area in the far northwest corner. In contrast, between the second and third periods growth accelerated much closer to the CBD, at a maximum at 2.75 miles (with a difference of 118%). This circle intersected the study area at its southwest tip, along Armitage Avenue (2000N). What is clear is that those properties closest to the central business district have always experienced the highest growth rates. However, it seems that properties farther away have, fairly consistently, improved their position relative to the best-improving properties, as evidenced by the flattening curves.

## Conclusions

This study hypothesized that transit access was a spur to gentrification in northwest Chicago between 1975-1991. In conclusion, the data seem to support this hypothesis. It

seems clear that in the periods 1975-1980 and especially 1985-1991, properties closest to transit experienced significant gains in property value change versus properties located farther from transit. In 1980-1985, the trend seems to have been interrupted. However, the coefficient on transit access during this period was not statistically significant. Certainly, this result warrants further analysis of this period.

The data also present strong evidence of a wave theory, i.e., that gentrification spread like a wave emanating from Lake Michigan and downtown. The peak changes in property values moved roughly westward from Lake Michigan in the periods of analysis. In addition, a flattening property value curve suggests that properties farther from the central business district were catching up with the growth rates in value experienced by properties near the central business district. The extent of both this phenomenon and the relationship between gentrification and transit should be explored further by extending the analysis into the 1990s, when further growth took place (especially in areas such as Wicker Park and Uptown). However, the uncertain future of *Olcott's Land Values Blue Book*, the unique data source that made this study possible, makes further exploration difficult. The explosive growth experienced by northwest Chicago in the period 1985-1991 seems likely to have been continued—if not continually observed.

## Endnotes

1. Note that Figure 1 is drawn such that the desire of the affluent to consume more housing outweighs their desire for shorter commutes.
2. Wheaton (1977) uses empirical evidence to show these elasticities to be comparable and thus calls into question the model's usefulness in explaining residential location.
3. These are based on LeRoy and Sonstelie (1983). See their article for a complete description.
4. Conversely, periods without this sort of gentrification should not exhibit these differences in property value growth rates.
5. See O'Loughlin and Munski (1979) for discussion of the "wave" theory.
6. Since 1991, only one edition (in 1994) of this once-annual data source has been publicly released. Additionally, the 1994 edition seems to suffer from a decline in quality relative to previous years. Attempts to secure a similar data source for more recent years were unsuccessful, limiting this paper's ability to expand the period of study.
7. The Chicago Zoning Ordinance primarily uses floor-to-area ratios to control density, but the main distinction here is between single-family and multi-family residences.
8. It has been suggested that the Brown Line's tenuous position in the early 1980s, facing possible CTA budget cuts, was responsible for depressing property values during that period, and hence making property value growth even more dramatic in the period that followed. This is probably true, but this analysis also includes other transit lines.
9. It should be noted that the addition of the cubic distance-to-lake term might add a proxy for distance to transit. In essence, the model predicts peaks in the rate of property value change along transportation corridors (Lincoln Avenue and the Kennedy Expressway). Despite this redundancy, there may be a transit effect on rates of change in addition to another effect that peaks multiple times as distance increases from Lake Michigan.

## References

- Alonso, W. *Location and Land Use*. Harvard University Press, Cambridge, MA, 1964.
- Brueckner, J.K., J.F. Thisse, and Y. Zenou. "Why Is Central Paris Rich and Downtown Detroit Poor? An Amenity-based Theory." *European Economic Review* 43(1), (1999): 91-107.
- DeSalvo, J.S. and M. Huq. "Income, Residential Location, and Mode Choice." *Journal of Urban Economics* 40(1), (1996): 84-99.
- Forrest, D., J. Glen, and R. Ward. "The Impact of a Light Rail System on the Structure of House Prices: a Hedonic Longitudinal Study." *Journal of Transport Economics and Policy* 30(1), (1996): 15-29.
- Gin, A. and J. Sonstelie. "The Streetcar and Residential Location in Nineteenth Century Philadelphia." *Journal of Urban Economics* 32 (1992): 92-107.
- LeRoy, S.F. and J. Sonstelie. "Paradise Lost and Regained: Transportation Innovation, Income, and Residential Location." *Journal of Urban Economics* 13 (1983): 67-89.
- Ley, D. "Alternative Explanations for Inner-City Gentrification: a Canadian Assessment." *Annals of the Association of American Geographers* 76(4), (1986): 521-535.
- McDonald, J.F. and C.I. Osuji. "The Effect of Anticipated Transportation Improvement on Residential Land Values." *Regional Science and Urban Economics* 25(3), (1995): 261-278.

- Mieszkowski, P. and E.S. Mills. "The Causes of Metropolitan Suburbanization." *The Journal of Economic Perspectives* 7(3), (1993): 135-147.
- Mills, E.S. "An Aggregative Model of Resource Allocation in a Metropolitan Area." *American Economic Review* 57 (1967): 197-210.
- Muth, R.F. *Cities and Housing*. University of Chicago Press, Chicago, 1969.
- O'Loughlin, J and D.C. Munski. "Housing Rehabilitation in the Inner City: A Comparison of Two Neighborhoods in New Orleans." *Economic Geography* 55(1), (1979): 52-70.
- Olcott, G. *Olcott's Land Values Blue Book of Chicago and Suburbs*. G. Olcott and Company, Chicago, 1975, 1980, 1985, 1991.
- Schwirian, K.P. "Models of Neighborhood Change." *Annual Review of Sociology* 9 (1983): 83-102.
- Wheaton, W.C. "Income and Urban Residence: An Analysis of Consumer Demand for Location." *American Economic Review* 67 (1977): 620-631.
- Wilson, D. "Urban Revitalization on the Upper West Side of Manhattan: an Urban Managerialist Assessment." *Economic Geography* 63(1), (1987): 35-47.
- Zukin, S. "Gentrification: Culture and Capital in the Urban Core." *American Review of Sociology* 13 (1987): 129-47.

### Acknowledgement

I would like to thank Ian Savage, for his invaluable guidance.

*Jeffrey Lin is a graduate student in economics at the University of California, San Diego. Both the Transportation Research Forum and the Metropolitan (Chicago) Conference on Public Transportation Research have honored his work. Lin holds a B.A. in Economics and Mathematical Methods in the Social Sciences from Northwestern University.*