The Case of the Disappearing City:
Redistribution without Growth

Barry Lentnek, Alex Anas,
and Jean-Claude Thill

Lincoln Institute of Land Policy
Working Paper

Lincoln Institute Product Code: WP01BL1

Abstract

Given the durability of real property and the rapidity of structural economic change during the past twenty years, many areas of central cities are bereft of significant economic value and are gradually abandoned as the population filters outward without replacement at the core. Hence, we witness the gradual emergence of a "disappearing" central city. Whether or not, large parts of the central city will actually entirely disappear into vast brownfields remains to be seen.

This project's goals were confined to describing the geography of vacant land in the central city of Buffalo, NY during the 1990's. We conclude this report by describing some of our plans for future research into other aspects of the general problem of the disappearance of population and housing stock. In the future, we hope to propose ways and means by which market forces can be induced to reuse large zones of the central city.

About the Authors

Barry Lentnek is professor and director of graduate studies in the Department of Geography, at the University at Buffalo. He was the project director in this research, and specializes in location theory, urban geography and economic development.

Department of Geography
University at Buffalo
105 Wilkeson Quad
Buffalo, NY 14261
Phone: 716-645-2722 ext. 54
Fax: 716-645-2329
Email: geobl@acsu.buffalo.edu

Alex Anas is the Frank H. and Josephine L. Goodyear Professor of Economics at the University at Buffalo, and was the co-principal investigator in this research project. He has published broadly in urban and regional economics, and has contributed to the theory of urban structure, urban growth and urban spatial self-organization, housing market dynamics, the regulation of housing markets and the structure of housing prices, transportation and its relationship to land use and residential location, environmental economics and private infrastructure investment in developing countries.

Department of Economics
415 Fronczak Hall
SUNY-Buffalo
Amherst, NY 14260
Phone: 716-645-2121 ext. 15
Fax: 716-645-2127
Email: alexanas@anassun1.eco.buffalo.edu
web: http://www.acsu.buffalo.edu/~alexanas/

Jean-Claude Thill is a professor in the Department of Geography, at the University at Buffalo, and was a co-principal investigator in this project. Since 1996, Jean-Claude is the North American Editor of the *Papers in Regional Science*, the Official Journal of the Regional Science Association International. Jean-Claude's research interests include analytical behavioral geography (esp. discrete choice modeling), mathematical modeling, transportation (spatial choice and network analysis, intelligent transportation systems, economic development) and location analysis (esp. retail analysis), geographic information science, and spatial statistics.

Department of Geography
University at Buffalo
105 Wilkeson Quad
Buffalo, NY 14261
Phone: 716-645-2722 Ext. 24
E-mail: jcthill@acsu.buffalo.edu
Web Page: http://www.geog.buffalo.edu/~jcthill

Table of Contents

List of Tables

List of Figures

Forward

This is the final report to the **Lincoln Institute for Land Policy**. We thank the Institute for its generosity, flexibility and patience. No one could have a better research sponsor in terms of the quality of the support.

Despite being the "final" report in a formal sense of concluding the financial relationship with the **Lincoln Institute**, the line of research described in this report is very much a mere beginning of a more extended effort at both research and teaching. We hope to continue the effort to describe, analyze and understand the changing economic geography of metropolises like Buffalo, New York. A substantial numbers of cities share a similar industrial history. Examples are Worcester, Syracuse, Rochester, Cleveland, Detroit and Milwaukee. These cities have a residue of old industrial and residential properties and infrastructure that had been designed for an industrial era passed. In terms of physical structure, inherited skills and perceptual outlook, these cities find the transition to the knowledge-based, service economy both difficult and painful.

Given the durability of real property and the rapidity of structural economic change during the past twenty years, many areas of central cities are bereft of significant economic value and are gradually abandoned as the population filters outward without replacement at the core. Hence, we witness the gradual emergence of a "disappearing" central city. Whether or not, large parts of the central city will actually entirely disappear into vast brownfields remains to be seen.

This project's goals were confined to describing the geography of vacant land in the central city of Buffalo, NY during the 1990's. We conclude this report by describing some of our plans for future research into other aspects of the general problem of the disappearance of population and housing stock. In the future, we hope to propose ways and means by which market forces can be induced to reuse large zones of the central city.

We have made a number of suggestions concerning future research at the end of this report that may provide a basis for a research agenda.

Barry Lentnek
Alex Anas
Jean-Claude Thill

The Case of the Disappearing City: Redistribution without Growth

Summary of Conclusions

The central conclusion of this report is that the housing stock is disappearing at an accelerating rate with inadequate replacement. The stock that is disappearing most rapidly is concentrated in the oldest areas of the city that once housed the poorest working class districts in pre-World War I Buffalo. While the average house is more than 80 years old, the stock that is disappearing probably averages close to 100 years old. In short, the stock that is disappearing first was rather poor housing to begin with (built in an era when Americans were much poorer than they are today) and, after 100 years of use, has worn out.

The area in which this is concentrated represents the poorest, least educated and least employed areas of the African-American community (two-thirds of whom are solidly middle-class and not living in this area). The area contains almost no employment sites including retailing almost all of which is located elsewhere. As the report demonstrates, however, the disappearance of housing occurs in most areas of the city. The area of concentration is expanding in a northeast direction. Secondary areas of abandonment occur near the old factory sites of south Buffalo (near the Buffalo River) and on the west side along the Niagara River north of the downtown (adjacent to what were massive factories alongside the railroads next to the river). These also are expanding.

The analysis presented in this report shows that there is virtually no active market for individual lots now vacated of their housing stock. The few counter examples that we could dredge from the data seem to have been acquired by homeowners whose properties lay next to the lots in question. Virtually all of the purchasers of vacant land in Buffalo live in Buffalo. It is not unusual for people to acquire perfectly sound residential properties for $30,000 to $40,000. For all practical purposes, the value of lots without usable housing is zero. Therefore, it makes private economic sense to abandon housing no longer habitable because demolishing the structures leaves vacant land of no commercial value. Therefore, it is perfectly understandable that the costs of demolition and removal are incurred by local and state governments.

Overall, we are presented in the Twenty-First Century with a city built to densities of the Nineteenth Century and now occupied by half of its original population. In the process of wholesale abandonment of the central city, the current market for individual, formerly residential lots has largely collapsed. The only conceivable way to reverse this process during the next generation is to have the city (supported by the state) collect all of the accumulating publicly-owned land into truly large parcels and either redevelop the land directly or contract with private firms to do the same. The need for really large parcels (measured in square kilometers or even miles) is to permit the recreation of completely new patterns of urban land use. The alternative is to wait for twenty to forty years after which so much open land will have appeared that private developers will find it profitable

to undertake the risky job of building a new city upon the rubble of the old Nineteenth Century city.

The central city had about 580,000 inhabitants in 1950 in a population of about 900,000 (about two-thirds of the metropolitan population). Today, it has about 290,000 inhabitants in a population of 970,000 or less than one-third of the metropolitan population. The borders of the city did not change at all over the past half-century. So, population density decreased by fifty percent. Now, there have been less than five hundred units of housing built in the past fifty years in an original housing stock of more than 75,000. So, more than ninety-nine percent of the housing stock has remained the same as it was right after World War II. Therefore, it is obvious that the amount of living space would have doubled over the same half-century if almost all of the housing stock that existed in 1950 existed today. But, that did not happen. In fact, the housing stock has been decreased by a slow, steady and accelerating process of destruction.

This process has been hastened by the gradual impoverishment of the population in the central city. This is due in part to the movement by (largely white) people into the surrounding suburbs (after all the proportion living in the suburbs has doubled). However, a lot of the impoverishment is due to the collapse of the old, unionized, highly skilled industrial work force that existed in 1950. There are many fewer union jobs in heavy industries today (less than a third as many) and those that do exist are occupied by a much older work force that own their own homes in blue collar suburbs like the Tonawanda, Cheektowaga and West Seneca. One measure of this impoverishment is to note that while two-thirds of all detached, residential property in Buffalo was owner occupied in 1950, only one-third is owner-occupied today. In short, poor renter occupy most of the existing housing stock. The median income per family in Buffalo hovers in the neighborhood of $25,000. This is substantial less than in most other cities of comparable size. A combination of absentee landlords and low income (i.e. low rentals) is really hard on housing. The rate of deterioration probably is increasing.

Last, it is inaccurate to describe the region as the greater metropolitan area of Buffalo. It is, instead, the greater metropolitan area of Amherst (what used to be the largest suburb whose southwestern corner touches the northeastern corner of Buffalo). Amherst currently has far more employment, total assessed property value, urban services and so forth than Buffalo. When one accounts for sheer geographical size, Amherst's population density is approaching that of Buffalo. Buffalo depends much more on Amherst for everything but government services. Indeed, without governments at local, state and federal levels insisting that Buffalo is the central city (and pouring money after the concept), Buffalo would be less than half its current size and a small part of the metropolitan economy. So, in a sense, Buffalo did not disappear. It simply moved twelve miles northeast towards Rochester and changed its name.

The most fundamental policy question is to determine whether we as a society are going to accept what the economy (representing myriads of decisions over generations of time) has wrought. Or, is there a value to retaining an urban use for the land lying under what was the sixth largest American city a century ago?

Section I. Introduction

The economic and demographic decline of old, formerly industrial central cities during the last quarter of the 20th Century is so well recognized that it bears little more than recognition that it is widespread and severe. Much of the fundamental reasons for the decline lie in the vast changes in economic structure that have occurred in the United States during the last quarter of the Twentieth Century. This consisted of a transition from an employment base that rested (at least in the great northern cities of the East Coast and Great Lakes regions) upon manufacturing to one that emphasized producer and consumer services. The newer cities of the Southern and Western States benefited by being more accommodative and by not having to deal as much with the aftermath of employment decline in obsolete industries and obsolete land use patterns. All of this is background to this study because we shall focus here upon one of the consequences of this basic shift in the economic geography of the country.

Our focus is upon a peculiar phenomenon that has appeared in a widespread fashion only during the past twenty years or so in many of these old, central cities of the manufacturing belt. Namely, the wholesale abandonment of residential properties in the 1980's and 1990's following the closing of truly large, heavy industries in the 1970's and early 1980's. The filtering process by which this occurred is fairly straightforward and easily documented. In the 'normal' process of filtering, new homes are created at the edge of the metropolis by wealthy and upper middle class family whose incomes (and accumulated wealth partly derived from the growth in equity represented by previous homes owned) permit the construction costs of new buildings. Homeowners living inwards (that is, towards the old central cities) sell their older homes to purchase the newer (and often larger) homes vacated by those who purchase new homes. This process is replicated ring by ring inwards until one arrives in neighborhoods dominated by rental housing. Some of those renters will be first time homebuyers of the oldest and least expensive owner occupied residential housing. The actual process, of course, was always messier than this simple model. Nevertheless, the filtering model described the actual process of home buying and building with considerable success (and probably still does).

The key issue here is "What happens to the rental housing from which first time home buyers out-migrate?" For most of the Twentieth Century in the United States, the answer was also straightforward. Namely, inner city housing was occupied by new migrants (either African-Americans from the South or international migrants). So, new populations poured into the central city and everyone else migrated by steps out to the periphery. Beginning in the late 1970's, however, the process of migration to the inner cities by people from outside of the region stopped for the set of cities considered in this report. It stopped very simply because new jobs were not available (instead there was job loss at a rate higher than population loss in many of these cities producing growing unemployment rates). Without employment opportunities, the international migrants went to cities in the South and West and, more recently, to smaller cities and towns where living costs are lower and job opportunities occur. African-Americans have stopped migrating (on a net basis) to the old northern cities and, indeed, there is a reverse net migration back to the South that has been growing in volume since the early 1980's. One can consider other

factors (some of which are salient for many individuals) such as crime rates that soared in the 1970's and 1980's and deteriorating school systems but the simple unavailability of jobs probably was decisive. The result is filtering without replacement or redistribution without growth (the report title). Of all of the great northern cities (those whose metropolitan populations exceeded a million in 1970), Buffalo, New York was one of a handful that was hardest hit by this process of emptying out from the center outward.

The Buffalo region was a center of heavy manufacturing. In particular, it was a major producer of basic steel, steel fabrication, engine manufacturing, heat transfer equipment, tool and die making and really massive petrochemical transformation plants. All of these suffered major declines in employment. These varied from a 95% loss in petrochemicals (due largely to automation) to 90% in basic steel to 60% in automotive parts manufacturing. All of these industries were unionized. All paid the highest blue-collar wages in the country twenty-five years ago. Giant manufacturing companies whose headquarters were located in other cities owned all of these plants. Not only were there almost no job opportunities for in-migrants, but there were very few jobs for the children of the industrial workers. While our unemployment rates are in the 5% range, the level of under-employment may account for another 20% of the work force. This is truly a depressed economy that has remained depressed for a full generation of time. The result (recent preliminary results from the 2000 census) is that the Buffalo metropolitan area has a lower percentage of people in the 20 to 34 year bracket than almost anywhere metropolitan area in the country. In short, the region lost an enormous proportion of its young people to the rest of the country (mostly South and West). The predominant color of the central city is neither black nor white. Instead, it is gray.

In this report, we shall answer two questions regarding the outcome of this process in terms of the rapid appearance and spread of vacant land. The first question is: Which parts of the central city 'disappeared' first and how did it spread? The second question is: What is the market value of the vacant land that is created by the disappearance of the houses? By 'disappearance' we mean either the destruction of residential houses by fire or by demolition. What is left (after the basements have been filled) is vacant land that some people called brownfields even though much if not most of this land is not polluted to any significant degree. Please note that we focus upon formerly residential land because we wish to avoid the issues connected to the land formerly occupied by heavy industries—namely, the issues associated with serious pollution. Those issues would need to be the subject for a separate study. It should be understood, however, that more land has been vacated by industry than by residences up until this point in time in the central city of Buffalo.

The remainder of this report is organized as follows. Section II describes the pattern of vacant land in the central city of Buffalo as of the mid-1990's. We shall demonstrate that vacant land is strongly concentrated in specific parts of the central city and that it is clearly associated with various aspects of the population geography of the city. While the 2000 census began to appear during the weeks preceding the writing of this report, we have not had the time to incorporate an analysis of these data into our conclusions. However, preliminary reports (summarized by the local Buffalo News) show that the demographic patterns demonstrated here have deepened during the 1990's. Indeed, our

impression is that the process of abandonment of places like the lower east side (of the CBD) has accelerated.

Section III presents a variety of attempts to estimate the value of vacant land both by direct measure and by an estimate of the role of externalities. The source of data for this part of the study is the assessment roles for 1995 (the last date for which we have a complete assessment). Much of the analysis is based on econometric and GIS techniques.

Section IV summarizes our results briefly (see the summary of conclusions presented at the beginning of this report) but devotes most of its space to an outline of further research and a consideration of the basic issues presented to us by the answers to the research questions asked in this report.

Section II. The Geography of Vacant Land in Buffalo

The Problem of Urban Land Use

Buffalo is disappearing in the physical sense of building destruction, in terms of population numbers, and also as a functional center of its metropolitan area. The city has lost almost half of its 1950 population while the county surrounding and including the city (Erie) has lost a few percent of its 1950 population as of 1990.

The stock of residential housing within the city itself has declined about 10% from its high that occurred around 1960. New urban land is opening up in selected regions of the city as a result of the physical destruction of properties by decay, demolition and/or by fire. One purpose of the analysis presented in this section is to describe and to partially account for the geographical pattern of new urban land that is created in the disappearing city. The analysis presented today is confined to that new open land generated by the disappearance of residential housing rather than commercial or industrial land. The reasons for dealing separately with formerly commercial and industrial land are related to issues concerning ground pollution and they lie outside the scope of this paper.

A Perspective on the Rust Belt of the United States

Buffalo is not singular in its pattern of decline. In fact, we recognize the pattern of decline by calling the set of cities experiencing it, the “rust belt”, and conjuring up the image of abandoned old industrial factories and decaying cities.

Most of the rust belt (but not all) is confined to a roughly rectangular area between Boston and Baltimore on the east and Milwaukee and St. Louis on the west. While most of the large cities in this region were industrially developed during the century between the Civil War and World War II, the actual pattern of development varied considerably within the region**.** The Table 1 describes the population pattern of change of a set of selected cities between 1950 and 1990 for both the metropolitan areas as a whole and for their central cities

Table 1. Changes in Population: 1950-1990

City	% Decline in Urban Population*	Decline of % Urban in Metro
Wheeling	0.67	8
Pittsburgh	0.60	7
Detroit	0.50	60
Cincinnati	0.42	63
Boston	0.40	62
Cleveland (tied)	0.34	61
Baltimore	0.34	55
Chicago	0.28	45
Buffalo	**0.33**	**20**
Syracuse (tied)	0.26	40
Minneapolis	0.26	59
Milwaukee	-0.04	10
Hartford	-0.06	55
New York	-0.10	16
Rochester	-0.19	51
Kansas City	-0.50	12
Indianapolis	-0.71	19

- A negative decline is, of course, an increase. So, the Population of Indianapolis, for example, increased by 71%

As the table demonstrates, Buffalo is about average in terms of the rate of decline in its central city population and is somewhat below the rate of decline in the proportion of the metropolitan population who reside in the central city. In general, the relationship between the rate of decline in the central city is not strongly correlated with its rate of decline in the proportion of the metropolitan population who reside in the central city. In other words, decline does **not necessarily** accompany sprawl. Just one more urban myth of our times.

It should be noted that there are major exceptions to this generalization and one would have to examine this pattern in more detail than we can provide in this paper. For example, Hartford and Rochester's populations both **increased** modestly over the forty-year period but their proportion of their own metropolitan populations declined dramatically due to rapid increases in suburban populations. On the other hand, Boston's population declined rapidly and its suburbs grew rapidly fulfilling standard expectations. There is a lot of complexity here. A full analysis of this pattern is a paper in itself.

Seven out of the nine cities in the rust belt suffering the greatest rate of decline in central city populations were located in the Great Lakes region or the Ohio River Valley. This

fact confirms the general consensus of economic geographers that the places that have been most highly impacted are the former hearths of the old iron and steel and automobile economy. The rank of a city is its position in a list of populations of cities listed from the largest to the smallest. In this case, we chose to display the list of metropolitan populations. The Buffalo metropolitan area declined in population ranking from the fifteenth largest in the United States in 1950 to fiftieth largest in 1990. Current estimates place it at sixtieth in 2000. This indicates that even the suburban populations have expanded more slowly than larger metropolitan areas elsewhere. Early results from the 2000 census indicate that the metropolitan population actually declined during the 1990's.

Geographical Analysis of Residential Vacant Lots in Buffalo, NY

There is no doubt that Buffalo is a city that is shrinking or disappearing in almost every way imaginable: population, industry, commerce, housing, etc. Yet, we understand very little about the process by which a city disappears. At first blush, most peoples' reaction to the proposal that a study be made of the disappearance of a city is: "Why bother? After all, in the end, the city is gone and the route taken to destruction is then irrelevant!"

While seemingly reasonable, that point of view overlooks the possibility that land resources might be made available during the course of disappearance that might prove to be irresistible to developers who would proceed to accomplish the creative part of capitalism's famous 'creative destruction'. Or we might set aside reserves of land for open space thus reconfiguring the use of land in the metropolis. In short, understanding the process of destruction may permit us to discover ways to turn it around and make a virtue out of necessity.

Figures 2 and 3 show the decline in the central city population, the decline in the number of housing units and the decline in the number of persons per housing unit in Buffalo between 1950 and 1990. The population has declined more rapidly than the housing stock. So, the number of people per unit of housing has declined towards two. This implies that there is a substantial number of housing units (mostly single family dwelling units in Buffalo) with only one person inhabiting the place. It is an open question as to whether or not there will be a continuation of the decline in the number of persons per dwelling unit.

Figure 1

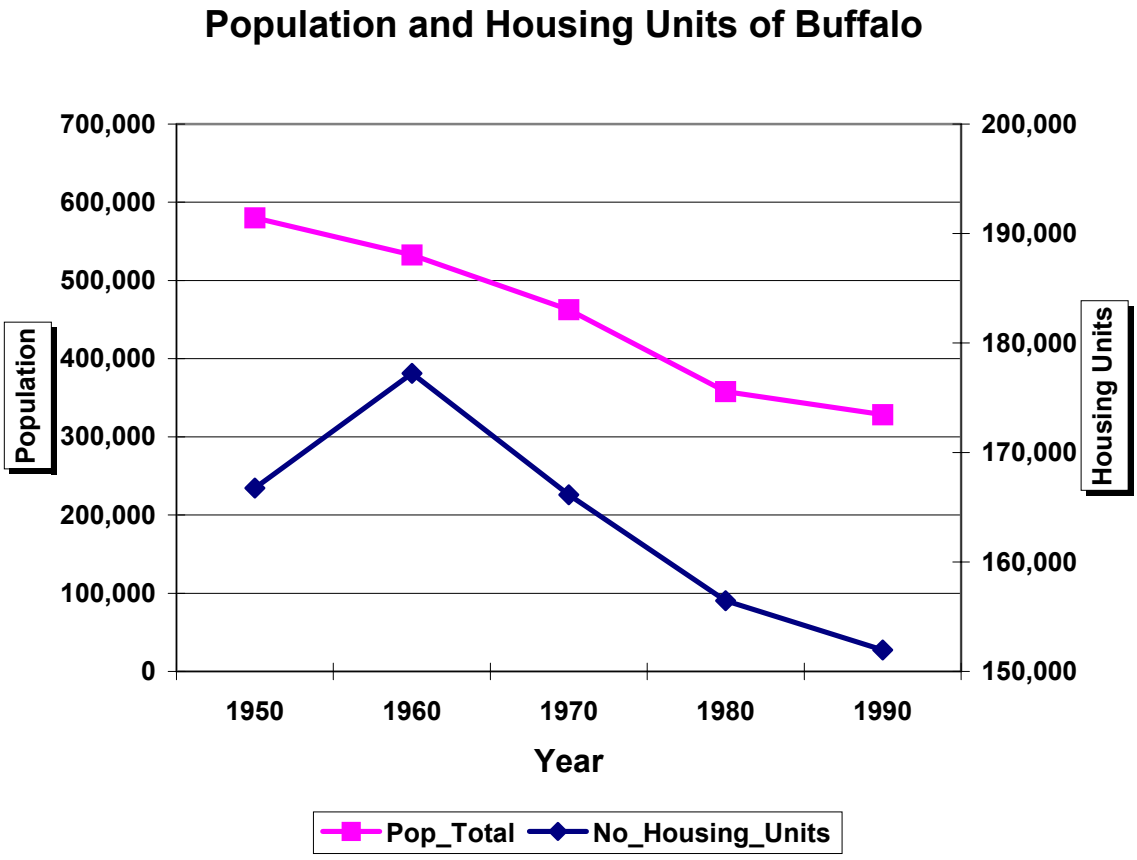
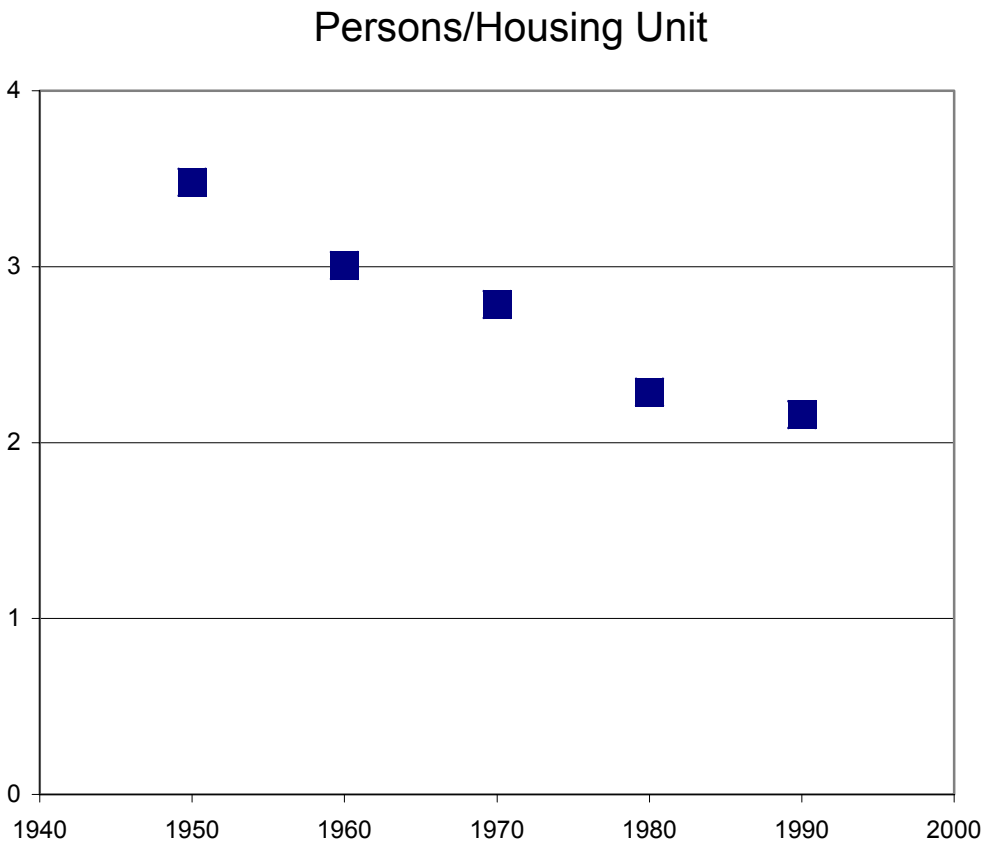

Population and Housing Units of Buffalo
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
Population
200,000
190,000
180,000
170,000
160,000
150,000
Housing Units
1950
1960
1970
1980
1990
Year
Pop_Total
No_Housing_Units

Figure 2



A Geographical View of Vacant Land and Its Population Correlates

There is a value in examining the distribution of vacant residential land from a cartographic point of view. The value can be demonstrated by comparing the geographical distributions of vacant residential lots with certain key variables. We begin by displaying a map of the distribution of vacant land computed by census tracts as defined in the 1990 Census of Population (Figure 3 below).

Figure 3

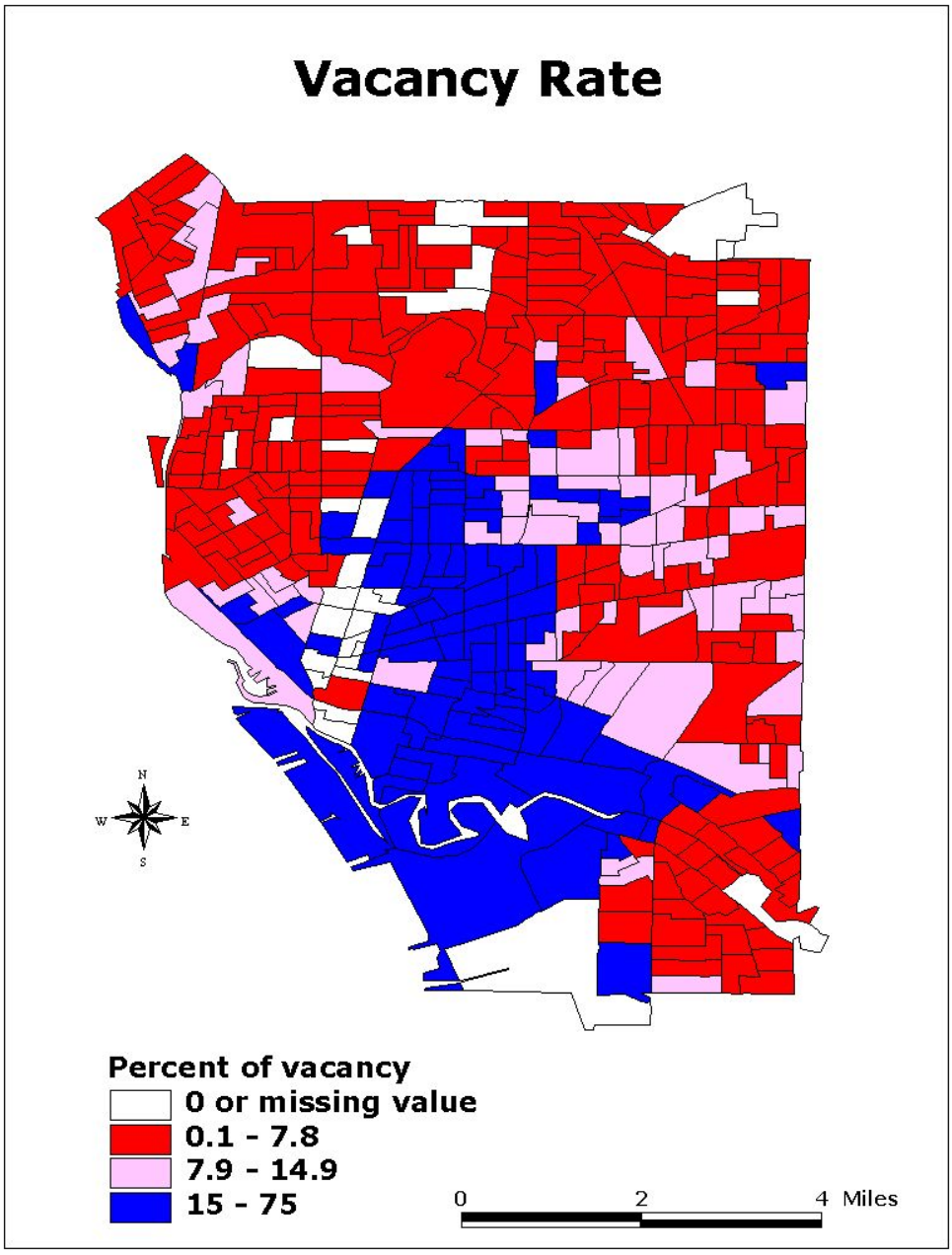
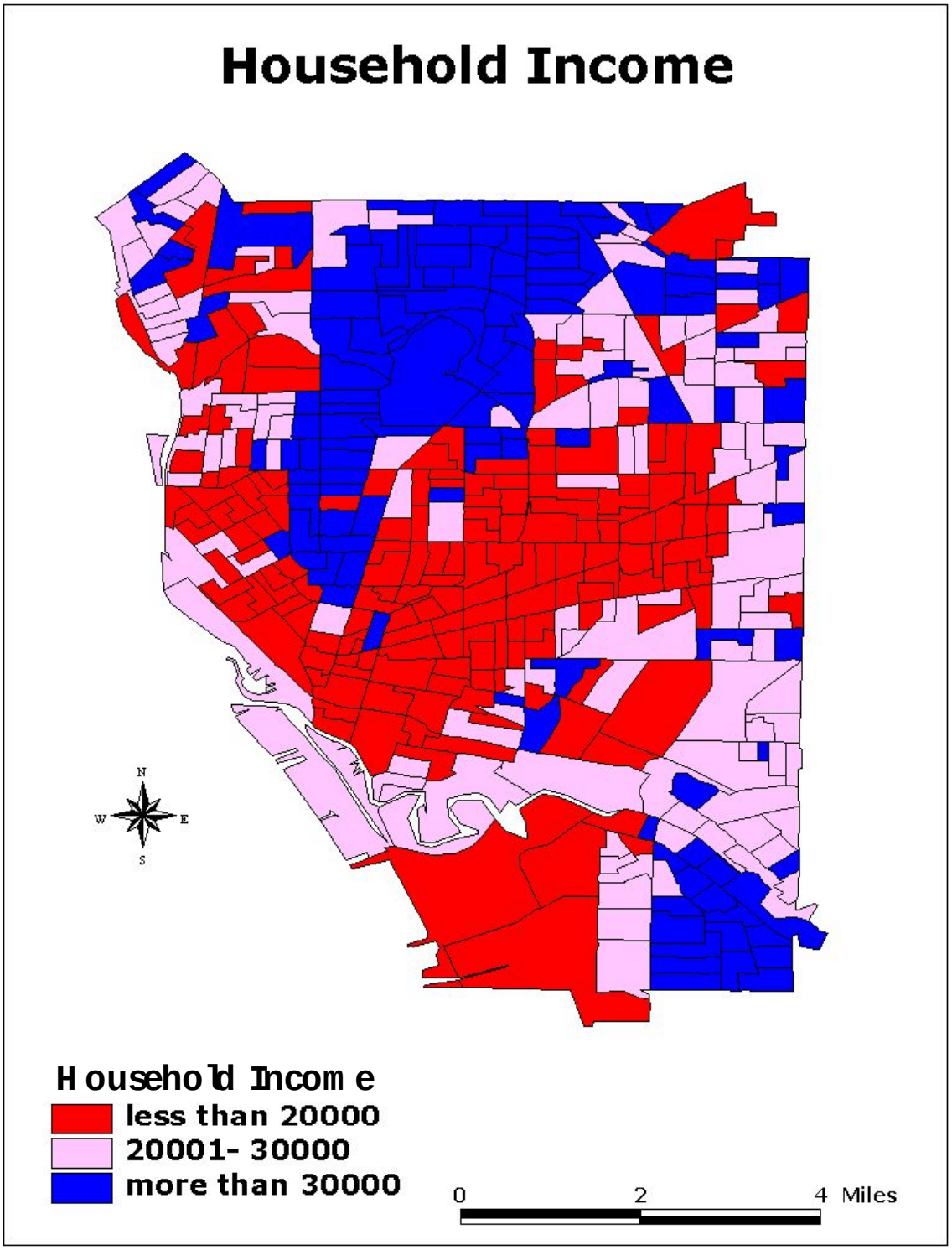

Vacancy Rate
N
W
E
S
Percent of vacancy
0 or missing value
0.1 - 7.8
7.9 - 14.9
15 - 75
0
2
4 Miles

Figure 3 shows that vacant properties are concentrated strongly in the southern portion of the City of Buffalo in the area surrounding the Buffalo River and then extends northeasterly through area locally known as the 'fruit belt' (so-called because the streets are named after fruit trees). It is also the area in which the poorest segment of the African-American community lives. The area of expansion (see in pink on the map) lies predominantly to the east and northeast of the area of concentrated abandonment. The only other area containing a high proportion of vacant lots is the one adjacent to the shoreline of the Niagara River (upper left side of the city) where there are a string of abandoned heavy industrial plants. The residential areas lie parallel and just to the east of those former concentrations of industrial employment. We now turn our attention to some characteristics of the population that are geographically associated with this very clearly defined area of abandonment. Figure 4 shows the distribution of household income in the city in 1990 (also in 1990 dollars).

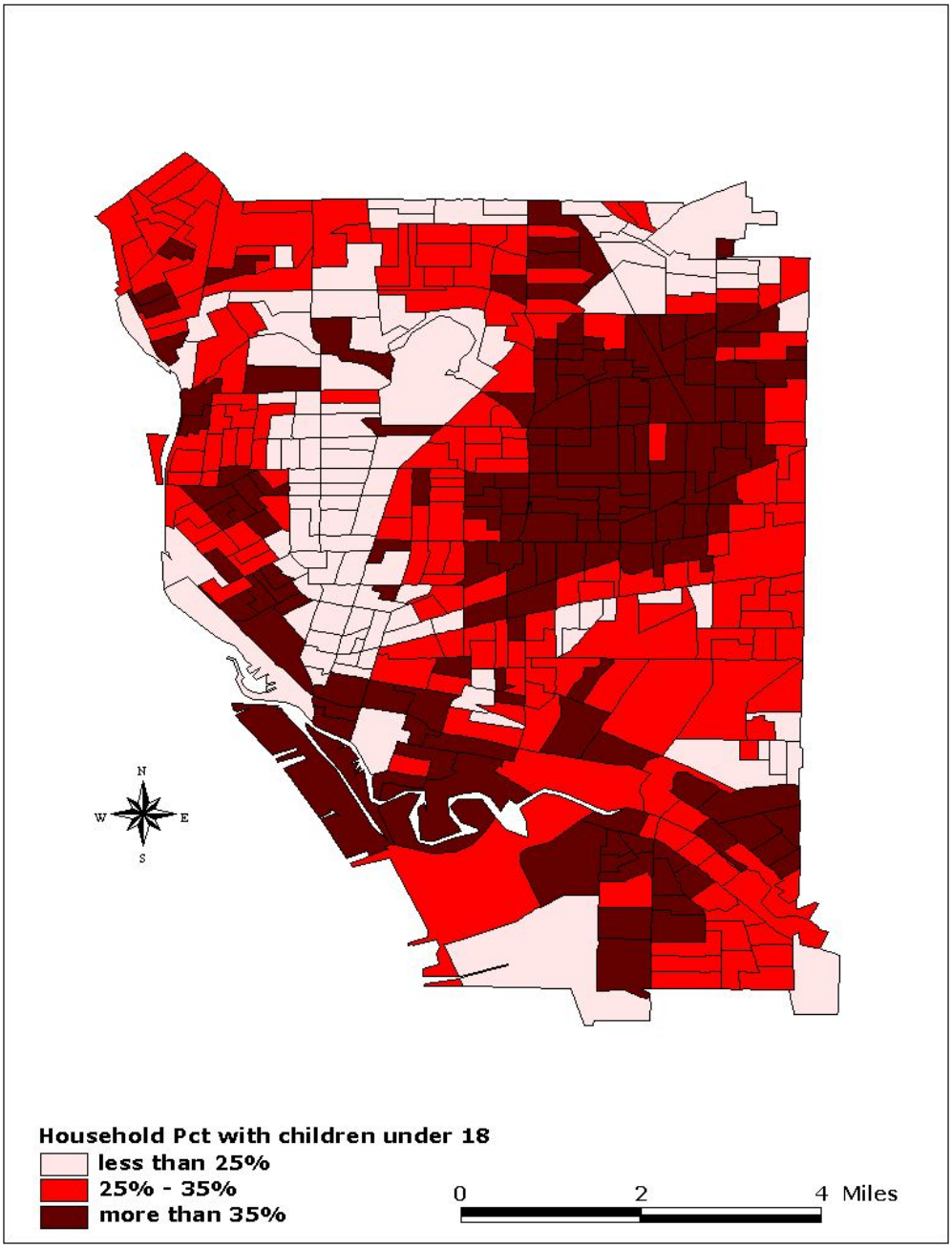
Figure 4



It is clear that, in general, the areas of the highest rates of abandonment coincide with the poorest regions of a basically poor city. Furthermore, the areas that show moderate rates of vacancies (adjacent to the core region) also have high rates of poverty. So, it is clear

that housing abandonment coincides with poverty and results in vacant urban land. Our next step is to examine the geographical correlation between the region of housing abandonment and the presence of school age children. The distribution of children under eighteen years of age is displayed in Figure 5.

Figure 5. Households Percent with Children under 18



It is very clear from Figure 5 that the region of abandonment coincides with the principal region of concentration of school age children. The major exceptions are the west side of the city (the southern portion of highest concentration is a Latino community—principally Puerto Rican in Buffalo—whereas the northern portion of the west side is working class Italian-American) and a much smaller neighborhood on the southeastern corner. Once again the southwestern to northeastern orientation is clear if not striking. Note that the highest income area in Figure 4 was a wedge of territory starting near the downtown and expanding northward to surround an old Olmstead Park ('Delaware Park') that includes almost all of the cultural facilities of the city. That area is not only relatively wealthy but it is also white and contains very, very few children.

We examined quite a number of other demographic variables including the age of the housing stock, the distribution of older people (over 65), the proportion of the population that were represented by single heads of households (mostly female) and so forth. Either the results coincided closely with the three maps already shown or they were random. The one exception is age of housing stock. As could be expected from such a traditional city (built largely before World War I), most of the oldest housing lay around the old CBD and newer construction radiated out from there. Given the very strong wedge of vacancy that begins on the shores of the Buffalo River and extends definitively northeast from there, it is clear that the geographic association of age of housing stock with property abandonment and destruction is not very strong. Clearly older housing that is well maintained tends to last much longer than somewhat younger housing that is poorly maintained. Thus, income is the determining factor, unsurprisingly. Therefore, given the focus on vacant land, we eschew an interesting but not terribly germane excursion into more detailed population geography.

We next summarize these cartographic results by doing a bit of multivariate analysis of the relationships between the rate of vacancy (see below for definition) and various demographic measures all of which are computed at the resolution of census block groups.

A Multivariate Analysis of the Vacant Lot—Population Relationship

Cartographic presentations help one to see spatial relationships in a clear and sometimes convincing manner. However, maps are exploratory devices and often are very deceptive because they are the product of the mapmaker's art. Choices are always made about intervals of data to map (the classification scheme), scales at which to aggregate data (e.g. census tracts or block groups or zip codes or traffic analysis zones, etc.) and the details of the actual graphic portrayal. All of this leads to perceptions that may or may not be accurate. In this part of our analysis, we shall present some simple semi-logarithmic, multivariate regressions and correlations with more variables than are presented cartographically.

The variable that we wish to explain is a transformed version of the percentage of all current and former **residential** lots in a block group that were vacant in 1995. The raw variable is labeled PV for percent vacant and the actual expression used is:

Ln [PV/(1-PV)]

The principle reason for this representation is that we wish to avoid having arithmetic interdependence among the values of the variable that is, after all, expressed in terms of a percentage. As with many similar exercises using census data, we chose a set of seven variables that seem to us to have a decent chance of co-varying in a significant way with the dependent variable and, hence, 'explaining' it. Regressions using these variables are presented in Tables Two and Three.

Table 2: Logistic Regression of the Ratio of the Number of Vacant Lots to Residential Lots in Block Groups in Buffalo, NY in 1995

	# Lots		Area	
Ind. Variable	Reg. Coef.	"t"	Reg. Coef.	"t"
Intercept	7.00	1.17	9.38	1.54
% 65 & Older	**1.00**	**3.40**	**1.10**	**3.64**
% 18 & Younger	0.49	1.60	0.54	1.66
% Single, F. HH	0.84	0.18	0.79	2.10
Median Income	0.11	0.39	0.14	0.46
Pop Density	-0.23	-1.73	-0.20	-1.36
Ave. Age Prop.	-0.71	-1.55	-0.83	-1.75
Ave. Val. Prop.	**-1.41**	**-.4.46**	**-1.67**	**-5.09**
R^2 for Number of Lots is 0.25 and for Area of Lots is 0.29				

Table 3: Regressions with 'Significant Variables' Only # Lots Area

Ind.Var.	**Reg. Coef.**	**"t"**	**Reg. Coef.**	**"t"**
Intercepts	16.30	8.45	17.90	9.15
HH's >65	1.00	3.40	0.69	2.70
AVP	-1.82	-10.30	-2.15	-11.64
The coefficients of determination are 0.21 and 0.26 respectively. HH>65 = Households Over 65. AVP = Avg. Val. of Property				

Note that we have achieved only a modest degree of statistical success in that only about 25 % of the variance in the odds of lot vacancy has been 'explained'. The only variable that appears to dominate the relationship is the average value of surrounding property. The negative regression coefficient requires a little explanation. Since we are measuring a negative phenomenon ('empty' lots), the equation states that, as the average value of surrounding property decreases, the proportion of all property that is vacant increases. This is common sense since poor neighborhoods are more likely to have deteriorated structures that are more likely to be destroyed and produce vacant lots.

There is a difference between statistical relationships in which the address of the data is not specified and spatial relationships in which address play a prominent role. For example, the presence of young children is strikingly coincidental with high rates of vacancy but only for a portion of the population. There are other areas (as discussed above) on the west side of the city which do have high numbers of children but low rates of vacancy. So, the over all correlation is low even though there clearly is a strong local effect. In short, factors may inter-relate in some areas but not others (sometimes viewed as a contextual effect).

Section III. Econometric Analysis

We focus in this section upon answering just one question. Namely: "What explains variation in the market value of vacant land in Buffalo in 1995?" Our principal motivation in asking the question is to look forward to the possible reconstruction of the city. One of the key elements in that reconstruction surely will be the cost of acquiring open land for new development. Now, by definition, vacant land contains no structures having significant market value. On the other hand, urban land in Buffalo **is** developed land in the sense that it is fully serviced by utilities and other city services. So, it is not raw land such as exists on the urban fringe. Because of the lack of structures, the value of this developed land depends upon only two things. The first is the size and shape of the property. The second is the location of the property vis-à-vis other properties. We deal with the issue of size by computing market values per square foot (ignoring the fact that large properties may be worth more per square foot. Because we have no data on shape, we simply ignore the problem. Size can be re-introduced into the analysis later as an independent variable. Shape files do exist but were created only in the last year or so and present serious problem due to their enormous size (beyond the abilities of most PC's to manage). So, the problem of estimation reduces to a question of location.

In order to estimate market value, we needed to observe actual market transactions. Finding sales data proved to be challenging because the market for open land in Buffalo is very thin. Table Four presents an inventory of all vacant lots in the city for selected years. Note that the inventory of formerly residential vacant lots for 1995 was approximately 10,000 or about 10% of all lots. Preliminary analysis indicates that that proportion has been roughly constant over the past 50 years.

Table 4: All Vacant Lots in Buffalo for Selected Years*

Dates	Total Lots	Vacant Lots	Percent of Total
1950	Unknown	11,827	?
1960	99,405	09,886	09.94
1970	99,189	10,737	10.82
1980	99,351	11,137	11.32
1990	98,182	11,261	11.47
1995	97,611	10,658	10.92

***** All in this case refers to origins of vacant, i.e. residential, commercial and industrial. Residential lots tend to be a fairly consistent 80% of all lots.

Of course, the only way to explain the value of vacant land in Buffalo is to base the explanation upon actual market transactions (a possible exception to this rule would be the ask prices for vacant land listed with realtors—whether a sufficient quantity of vacant lot listing can be found in the Multiple Listing Service records is not presently known). Basing an analysis upon actual sales proved to be very difficult because there were very few transactions. Table Five describes all of the sales of formerly residential vacant land in Buffalo between 1993 and 1997

Table 5: Sale of Vacant Lots between 1993 and 1997

	Valid Sales	Non-valid Sales	Total Sales
By Government	105	27	132
By Private Owners	146	131	277
All	251	158	409

Sales are considered to be non-valid if title is transferred for a nominal sum such as one or two dollars. These are often between relatives in the close knit ethnic communities of the Buffalo region and the effect upon market values is problematic. As the table demonstrates, there were only about 250 valid sales of property in the city over a five-year period. About forty percent of these were by local government (mainly the city).

Valid sales were only about three percent of all formerly residential, vacant lots in the city over a five-year period. That is a market clearing rate per year of 0.6%.

We sought to explain the variation in the prices at which these 251 properties sold during the mid-1990's. As discussed before, the only source of explanation for variation in the price of empty lots is location. The way in which we measured location is to ask the question: How do the characteristics of surrounding property affect the variation in the price for empty lots?"

The characteristics of the surrounding property that we used in an attempt to explain variation in the price of land are:

The number of vacant lots
The total area of vacant lots
The average area of vacant lots
The average value of residential property
The average value of residential property per square foot

We defined the term 'surrounding' by constructing a set of ten concentric 250 foot rings around each of the 251 vacant lots that were sold for a valid market price. Then, we computed a value for each of the above five variables using GIS technology and high-speed computers. Please note that we are able to locate every property by co-ordinates that came from prior database research.

After all of that work, the results are rather stark. First, almost none of the coefficients on values of variables in rings further than the very first were significantly different than zero. Second, only the average value of residential property for the first ring had a coefficient significantly different than zero. It should be mentioned that we tried many different transformations of the data without good result.

The resulting equation is:

The price per sq foot of vacant land	=	0.66 Average Value of Residential Property

This relationship is a valid one. The regression coefficient has a t value of 8.2, the F value for the regression is 65 and the variance is heteroscedastic. But, the coefficient of determination is only 0.20. In short, we have accounted only for 20% of the variance in prices of vacant land in Buffalo. While this equation (low coefficient of determination or not) indicates a positive price for vacant land, it should be noted that there are very few parcels of vacant land in wealthier neighborhoods. The value of existing homes in the poorer neighborhoods is very low and the rate of sale of vacant land in those neighborhoods is very small.

Clearly, something else is involved in determining the price of the tiny proportion of all property that was sold during those years. Table Six also involved rather extensive database searches. However, it turned out to be more revealing than the traditional econometric estimate of externalities.

Table 6: Vacant Lot Sales by Buyers' Locations (Valid Sales Only)

Sales by Government = 105	
To buyers who are adjacent to lots purchased	32
To buyers who are NOT adjacent to lots purchased	73
Living in Buffalo 62	
Not living in Buffalo 11	
Sales by Private Owners = 146	
To buyers who are adjacent to lots purchased	67
To buyers who are NOT adjacent to lots purchased	65
Living in Buffalo 55	
Not living in Buffalo 10	
Incomplete information about address of buyer	14
Total Valid Sales = 251	
Total sales to adjacent owners	99
Total sales to buyers within the city that were not adjacent	117
Total sales to buyers outside the area	21

Sales by government and private owners to the owners of adjacent properties constituted 99 out of the 251 or a bit less than 40% of all vacant properties sold. Another 117 buyers (in addition to the 99 who bought the property next door) were residents of the city. Only 21 buyers out of 251 lived outside of the borders of the city. That amounts to four buyers **per year** on the average over the five years of record.

This is overwhelming evidence of a collapsed market. With a rate of sale of 50 properties per year (on a base of more than 8,000), the market is about as thin as could be identified. About 98% of the buyers in that market lived in the city, which indicates that it is fair to say that there is no non-local interest in city property. With nearly half of the few properties sold acquired by neighbors, even the city market is extremely narrow.

In general, it is fair to say that the current market value of vacant land in the City of Buffalo either is effectively zero or can not be estimated because of extremely low transaction volume. **Either** way, the situation would need to be substantially altered before the private market will evidence any interest in the development of residential land in most of the city. While we have not produced a systematic survey of the data, our impression is that the few residential properties that have been constructed are heavily subsidized by the government and/or churches and/or or not-for-profit organizations.

This collapse of the market for urban land leads inevitably to the continued destruction of the remaining private residential property given enough time and the persistence of urban poverty. The process will deepen in its current heartland of south and south-central Buffalo (see red areas on the map). Our impression from looking preliminary population

data from those districts for the 2000 Census indicates that the rate of deepening accelerated during the 1990's. It also will spread both on the west side along the Niagara River as a secondary cluster of destruction and eastwards towards the city border with the working class suburb of Cheektowaga. Thus, it is **not hyperbole** to cite this place as a case of a disappearing city.

Section IV. Results and Conclusions

Results

We may have two processes of property destruction at work in Buffalo during the 1990's. The first is a regional concentration of property destruction among the poor with the most advanced stage of destruction occurring in black neighborhoods. The second is a process by which, once a vacant lot appears on a block filled with residential housing, housing disappears in expanding clusters up and down city streets. The two scales appear to be linked by a gradual increase in the probability that housing will disappear as the housing stock ages and deteriorates in neighborhoods whose populations filter down from the middle class to the urban poor.

Let us re-examine the filtering model in the case of a disappearing city. As the reader of this report well knows, the filtering model is predicated on the observation that wealthy people show a high marginal propensity to spend discretionary income on new, large and technologically contemporaneous homes. When they exercise this preference in a metropolitan area that is not growing, the resulting series of upwardly mobile moves outward leaves an area in the center without effective demand. Absentee landlords find that marginal costs consistently exceed marginal revenues and they abandon the properties whose market value in any case has become insignificant.

The process by which real property is abandoned itself takes time. First, maintenance investment is reduced well below the rate of physical deterioration (which, in the case of modest dwellings now more than a century old, is high). As a result of that process added to the presence of clients whose motivation towards property maintenance is minimal, the properties rapidly deteriorate. Eventually, they become uninhabitable and the landlords are hauled into housing court. They make the minimum necessary repairs to stave off court action and try to unload the property if possible on the true bottom feeders of the real estate market. At some point, often measured in months, the owners cease paying property taxes. Virtually all of the properties are held by companies whose only asset is the property itself (i.e., the companies have nearly zero net worth). After a few years of non-payment of taxes, the city forecloses (reluctantly) on the property, the health department declares the structure uninhabitable, the current tenants are moved to 'emergency' shelters and the house is abandoned. Alternatively, the same process occurs while the property is still in private hands. It is regularly reported that the city often cannot even locate the property owners.

The end result is the same. The abandoned property becomes re-inhabited by drug dealers, addicts and prostitutes. Eventually, some one drops a lighted cigarette or joint or

match and the tinder dry, century old wood disappears in a few hours. The city then has to refill the basement because it is a hazard to the community. Another path to disappearance is demolition. The city does the vast majority of demolitions and regularly schedules millions of dollars for that purpose. Sometimes, the city can force private owners to pay for the demolition (costing upwards of $5,000 to $10,000 and resulting in a vacant lot worth nothing at all).

There is some evidence that the process is contagious in the sense that the presence of other vacant lots increases the probability that more vacant lots will appear. The ring count data regressions were an attempt to get at that contagion but without much success. As noted later, we shall attempt a more dynamic approach to the estimation of this neighborhood effect when a complete twenty-year record is compiled. For now, we can say that the dominant causes of this process are the concentration of old homes, poor people with all of the social ills of poverty and a population that finds greater opportunities elsewhere. Since these factors are themselves concentrated in areas of the city where vacancy rates are high, it may not be necessary to gild the lily.

Conclusions

Well, we believe that we have met the objectives of the study. The first objective of this study was to determine where open land appeared in the city and to explain that geography. The second was to estimate the market value for the vacant land that did appear. Our responses are that the city is emptying out from the south to the north and from the middle outwards both west and east. The value of individual lots is hard to estimate because very, very few are ever sold. In general, the value of the lots that are sold is two-thirds of the average value of surrounding property. However, this statistical conclusion is very dubious both on statistical grounds (less than a fifth of the variance is explained after a massive attempt to provide an adequate explanation) and because the market that does exist is thin, local and depends upon individual circumstances to an unusually high degree. The market is about as far from perfect as one can imagine. The vast majority of vacant properties remain off of the market (only about 3.0% of vacant lots are sold in any one year). This is true evidence of a market collapse of the sort seen only around Three Mile Island nuclear plant in the six months following that industrial accident. So, the general answer to the question is: The value of formerly residential vacant land is zero in most cases.

So, from where do we go now? The first point to make is that these conclusions are about the past under circumstances that prevailed then (and probably still). It is possible to project the process for, say, another ten to twenty years by obtaining a sufficient density of data over a sufficient length of time and create a truly dynamic model of the process in which all variable are time denoted and the resultant vacancy can be accurately projected (**not predicted**). We have little doubt that if such a model were created, in general it would show a city in which fully one-third or more of its land surface is devoid of habitation. The area of complete destruction could begin to approximate Dresden or Tokyo in the months following World War II.

Next, it is clear that there are large portions of the city that are not headed for complete destruction. For example, the wedge shaped region beginning at City Hall and extended due north incorporating the major cultural legacies of the city and an Olmstead Park. There are several other regions of the city that remain reasonably healthy. Furthermore, there has been a sharp downturn in crime, vandalism and arson. The adjustment of the city to the era of a service-based economy, while terribly slow, is happening now (Thank God!). There is a trickle of new centers of employment appearing and constructive reuse is being made of old but serviceable major buildings. Most of the middle classes of the city are fully aware of the danger and there is a renewed determination to survive as best they can.

Finally, a virtue can be made of necessity. Large tracks of open land already owned by the city provide a tempting target for the kind of truly large scale redevelopment possible only on completely open farmland (which land would need substantial investment in infrastructure). One possibility is to preserve the most polluted land as designated wilderness areas surrounding by a buffer of parkland. The edges and vicinity of the parkland would be attractive to private development interests. The issue is one of scale. Once vacant land begins to be measured in square kilometers (and that is already possible in south Buffalo along the river), a coalition of the Urban Development Corporation with its rights of eminent domain and bonding authority and major local land developers could write a new chapter of urban history in the Twenty-First Century built on the rubble of a now disappeared Nineteenth-Century City.