The Extent and Nature of Gentrification in U.S. Metropolitan Areas, 1990-2000

Thesis

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Abstract

The goal of this analysis is to establish a national baseline estimate of levels of gentrification within U.S. metropolitan areas. This analysis quantifies gentrification using multiple dimensions of change from 1990 to 2000 to examine exactly how much gentrification occurred during the period. Furthermore, variation between metropolitan areas is examined as a function of disinvestment and subsequent urban reinvestment within central city neighborhoods. To estimate prevalence and variation, data are drawn at the tract level from the Neighborhood Change Database (NCDB) with normalized boundaries so that an unbiased estimate of change may be made. A logistic regression analysis is employed to determine the features of metropolitan areas that are most conducive to gentrification. The findings of national prevalence indicate that sixty percent of metropolitan areas included in the analysis were found to have at least one gentrified neighborhood in their central city area. Cities such as New York, Chicago, Portland, Denver and Cleveland were found to have substantially higher levels of gentrification. Subsequently, the results indicate that cities that have been disinvested vis-a-vis an older housing stock and a large percentage of people in poverty were more likely to experience gentrification. Reinvestment, as measured by the mean central city income increase from 1990 to 2000 also significantly increases the likelihood of gentrification.
Dedication

Dedicated to my parents, my extended family, Maggie, Russert, Gilbert and Chris
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INTRODUCTION

Urban neighborhoods located within metropolitan areas have been the focus of a myriad of sociological studies. Gentrification studies, as a subset of urban analyses represent the intersection of residential segregation and social stratification studies. Areas that experience such a transition present excellent cases for studying the impact of macro social structures on neighborhood level processes, yet research often assumes that gentrified neighborhoods are independent of the context in which they reside. To fully understand the extent and nature of gentrification a truly national representative population of metropolitan areas is needed. Establishing baseline estimates of gentrification is a necessity if further lines of research are to be examined with continued validity and reliability. Studies of gentrification must continue to incorporate the influence of the social, economic and political structures of metropolitan areas into analyses of neighborhood change. While neighborhoods are the fundamental level at which change occurs, the extent of change is modified by extra-neighborhood forces.

For many of these gentrified neighborhoods the transition goes unnoticed over a period of time, whereas more visible gentrification is often documented and studied. For example, we know that gentrification is well documented in cities such as New York (Freeman and Braconi 2004, Wyly and Hammel 1998, Zukin 1982), Chicago (Boyd
Lacking a national estimate of gentrification, research has been limited to treating gentrification as a rare incidence with little generalizability across metropolitan contexts. Furthermore, no research has approximated a level of renovation activity on a truly national scale. Due to this void of knowledge, even the most basic questions about gentrification seem to be unanswerable: What is the extent of gentrification? Where is it more likely to occur? Why does it occur at different rates in one metropolitan area versus another metropolitan area? The main contribution of this paper is to fill that void of knowledge in two manners.

First, this analysis uses a population of metropolitan areas that is truly nationally representative to establish baselines estimates. Using such a large population will also establish the degree of variability in the prevalence of gentrification both within and between metropolitan areas. To establish this national estimate, this analysis improves upon a prior measure of neighborhood change that is similar to the process of gentrification by using stable tract boundaries, multiple comparison groups and a restriction for affluent tracts. Secondly, this study explains the variation observed in levels of gentrification across metropolitan areas by identifying structural features of cities that are conducive to the process of gentrification. By creating and employing a standard measure of change from 1990 to 2000, answering questions about the prevalence and urban form of gentrification should become less abstract.
BACKGROUND: GENTRIFICATION IN U.S. METROPOLITAN AREAS

Gentrification is a process of spatial and social differentiation (Zukin 1987), which involves a different “gentry” of individuals moving into neighborhoods that have undergone a period of disinvestment followed by periods of reinvestment. Gentrification represents a fundamental neighborhood transformation due to a new “gentry” of individuals entering a low-income neighborhood. Because of the variety of definitions available and the lack of theoretical consensus, this analysis defines the process of gentrification in its basic form; urban neighborhoods undergo a process of disinvestment over a lengthy period of time followed by a subsequent period of both private and public driven reinvestment. The process of gentrification is influenced by two levels of analysis: the neighborhood and the metropolitan area. This project separates these two distinct levels for analysis purposes; gentrification, by definition, occurs only in neighborhoods, and thus the measurement must be taken at the tract level. The metropolitan level, treated as the aggregation of the tract level statistics, serves as the main explanatory force of this analysis. To maintain the validity of the metropolitan analysis, a clear and transparent understanding of the definition of gentrification is a necessity.

Gentrification presents a unique aspect of residential segregation because it is a process of spatial inequality that will create a vibrant, up-and-coming neighborhood with
wealthy inhabitants in the midst of concentrated poverty, dilapidated buildings and structural disinvestment. Furthermore, the focus of metropolitan inequality studies tends to be more on the poor than the affluent in studies of metropolitan inequality (Dwyer 2007). This juxtaposition of affluence and poverty in the central city also follows a racialized pattern; one of the primary indicators of gentrification is the displacement/succession of African American households by White in-movers. When dynamics of social class and race are considered, gentrified neighborhoods defy the traditional spatial inequality patterns of central city areas by creating heterogeneous sets of affluent and poor neighborhoods.

Gentrification and the process of urban renewal began to be noticed by scholars during the 1970’s because it was counter-intuitive to the processes of urban exodus. Thus, many studies undertook the task of documenting the extent to which young professionals inhabited refurbished homes in disinvested neighborhoods (Lipton 1977, Black 1975). Many of these analyses found that the extent of revitalization was by no means a large scale phenomenon, and that revitalization was limited to urban areas with strong central cores.

Studies of gentrification began to shift from examining the prevalence of gentrification to the specific localized effects of revitalization, and the majority of new studies on gentrification often operate on the basic assumption that the process and extent to which gentrification is occurring has remained unchanged. The 1990s were heralded as
a period of great central city comeback (Grogan 2000) in which many major urban neighborhoods were fundamentally rebounding due to changes in economic and political structures. Some evidence supports this idea of an urban renaissance during the 1990s; Gould (2007) finds a significant shift in the proportion of central-city neighborhood’s low income tracts experiencing an economic gain. Other statistical analyses indicated that distressed neighborhoods in 1980 were, on average, worse off on many indicators of municipal distress in 2000 than they were in 1980 (Furdell 2005). Given that the 1990s were a period of financial gain for most households in the population, it seems reasonable to claim that the 1990s were a period of economic expansion. This economic expansion seems to favor the idea of urban reinvestment, a necessary component of gentrification. Furthermore, a robust housing market may permit that the preferences of certain individuals dictate where they want to live, whereas a constrained housing market may not let such preferences play out. On the whole, the 1990s indicate a time period ripe for reinvestment, yet levels of gentrification remain wholly unknown.

Localized studies of the effects of gentrification involve first identifying a gentrified area and then documenting the changes that occur within that neighborhood over time. These contemporary research areas indicate the direction of more current gentrification literature. Such contemporary research is focused upon answering questions about neighborhood level processes. Contemporary quantitative gentrification
research of neighborhood change is clustered within three specific areas; displacement studies, racial studies and studies of neighborhood collective efficacy.

Displacement studies of gentrification examine the extent to which established residents are forced from their homes and neighborhoods by the rising cost of housing due to an increase in neighborhood reinvestment by in-movers. The extent to which displacement is occurring is still debatable in the literature at this time, and large numbers of good studies indicate mixed results\(^1\). Regardless, these in-movers are differentiated from the established residents in the three key areas of education, income and race. What is not known is the extent to which urban neighborhoods are at risk of displacement due to a lack of knowledge about the extent of gentrification; most studies assume that gentrification is not a large scale phenomenon, yet frequencies within metropolitan areas are largely unknown. Establishing a baseline estimate of gentrification is an important necessity. By establishing such baseline estimates, pressing issues such as displacement may be examined with much more reliability and validity. Displacement may also

\(^1\) Research by Vigdor (2002) placed the focus upon displacement of lower income households, limited to Boston between 1970 and 1990. Vigdor concludes that less educated householders are significantly more likely to remain in their housing unit than they are elsewhere in the metropolitan area, while White (2007) finds a similar disproportionate retention of black householders with a high school degree in gentrified neighborhoods. Similar to displacement studies, Freeman (2005) differentiates those in gentrified neighborhoods who have moved from those who are displaced using panel survey data. Freeman’s measure of gentrification is by far the most complex and generalizable across metropolitan areas; his relative definition of gentrification was used as the foundation for this article. Freeman’s conclusion is that similar to the study of Freeman and Braconi (2004) in that the results are inconsistent with the notion that high rates of displacement always accompany neighborhood gentrification. Wyly and Newman (2006) argue that if residents are not being displaced by gentrification, they are equally liable to be harmed by the increasing cost of rent and neighborhood amenities.
provide serious residential mobility issues for those established residents whose neighborhood preferences may be superseded by economic concerns. If gentrification does cause displacement, then metropolitan areas that have the highest numbers of gentrified areas are more likely to feel such effects, and patterns of residential mobility will be significantly altered by neighborhoods that are changing from poor to non-poor.

Gentrification studies also encompass many analyses of racial dynamics because gentrification often involves white in-movers and established minority residents. Research that has investigated the role of race in gentrification tends to understand minorities to be the victims of white gentrifiers (Muniz 1998). Other researchers have began to document a phenomenon known as “Defensive Development” (Boyd 2008); such a strategy aims to protect black neighborhoods from control by white elites, leading to what has been called “Black Gentrification” or the return of the Black middle class to poor neighborhoods (Owens 1997). Neighborhood changes affect the way in which a neighborhood is conceptualized by its residents, often producing a struggle between two racial groups competing to define a particular social space (i.e. a neighborhood) as they see fit. In metropolitan areas with large percentages of non-white populations in central city areas, gentrification will significantly change the racialized geography. If gentrification is more likely to occur in metropolitan areas that are historically black, then the process becomes a fundamental question of residential mobility, segregation and household wealth accumulation. If white individuals are moving to central city areas to
upgrade the housing stock at the expense of minorities, serious stratification may emerge. In light of the potential effects of gentrification, understanding the extent to which it is occurring is an important goal for researchers.

Collective efficacy, defined as social cohesion between neighbors, is embedded in the structural context of a neighborhood and is thought to become less stable in areas experiencing rapid population change (Sampson & Raudebush 1997). Furthermore, a high rate of residential mobility fosters disruption and weakened social controls over collective life. Thus, gentrification tends to decrease voting among established residents and has a destabilizing effect on the communities of the previously established residents, and thus leads to decreased political participation (Knotts 2006). Crime studies indicate that gentrification leads to some eventual reduction in personal crime rates but that it has no significant effect on property crime (Mcdonald 1986). Newer studies of crime in gentrified neighborhoods indicate that when impoverished blacks experience greater levels of spatial integration with non-blacks who are in a better socioeconomic position, rates of lethal violence in the black community will be lower (Lee 2007). Both crime studies indicate that gentrification may have a dampening effect on crime in central city neighborhoods, but at the same time be a destabilizing force for some members of the established community because of the weakening of neighborhood collective efficacy.

Again, understanding the prevalence and determinants of gentrification is a necessity to understanding dynamics of collective efficacy. Cities that have experienced gentrification
may conceptualize their communities in much different manners than cities that have fairly homogenous populations. Before any claims of causality are to be established linking crime, voting or collective efficacy to gentrification, it must be examined across multiple metropolitan contexts. Given the aforementioned studies, it seems that linking gentrification to such outcomes requires a macro level analysis to remove any spuriousness between individual neighborhoods and collective efficacy outcomes.

**PREVALENCE AND PROCESS OF GENTRIFICATION**

Previous studies have struggled with a basic operationalization of the process of gentrification due to the availability of multiple definitions. Some studies simply operationalize gentrification as an increase in median income in those neighborhoods that were considered low income prior to gentrification (White 2007). Other studies use more complicated, mixed measures that include some dimensions of central city location, a period of disinvestment, an influx of a new population and a subsequent increase in neighborhood investment (Freeman 2005, Vigdor 2002, Kolko 2007). Based upon the variety of definitions available, multiple definitions of gentrification are a necessity for a comparison of alternative definitions. This analysis uses a variety of definitions that examine both relative and absolute changes in both the housing stock and demographic characteristics of a given neighborhood to maintain a high level of validity. Furthermore,
using multiple dimensions also will correctly discard neighborhoods that simply became
less poor or more affluent during the decade. Gentrification is fundamentally a change
that occurs in poor neighborhoods that make the transition from divested to reinvested:
using multiple dimensions will help to parse out such change from other types of
neighborhood change.

Not all urban neighborhoods are at risk of becoming gentrified, and thus any
useful definition must delineate between real neighborhood renovation and statistical
measurement error. Affluent neighborhoods that merely gain income over the time period
should by definition not be considered gentrified because structural disinvestment has not
occurred. Gentrification should thus be limited to areas that were considered to be in the
lower end of the median household income distribution of the given metropolitan area
and have improved significantly relative to other neighborhoods. Alternatively, a semi-
poor tract may have a housing project demolished between the measurement time
periods, artificially inflating the median household value of the given neighborhood.
Ex​aming the neighborhood conditions in gentrified areas in comparison with other poor
central city neighborhoods is crucial; many of the aforementioned studies offer no
alternative measures of gentrification. This means that they may have confounded
gentrification with a mere decline in poverty (Jargowsky 1996). As previously
mentioned, based upon the variety of definitions available and the high sensitivity of the
number of tracts designated gentrified to the way in which one defines gentrification,
multiple definitions of gentrification are a necessity for comparison (Galster 1985). Given that many neighborhoods experienced a decline in poverty during the 1990s, the decline must be separated from gentrification because a mere decline in concentrated poverty is not the same as broad renovation activity (Jargowsky 2003).

The key characteristics of gentrification represent a general “upgrading” process at the neighborhood level. Evidence of gentrification varies greatly among studies, yet a good deal of literature considers neighborhood change to be the primary indicator of revitalization. Change is usually measured as the neighborhood level characteristics relative to the same neighborhood at a prior period of time. A certain threshold is thus determined, and any neighborhood falling above a certain “quality” threshold is considered to be gentrified. The process of gentrification is essentially a class based process which produces changes in both the demographics and the housing stock of a given area. Established residents are more likely to have consumption patterns of a lower socioeconomic class, be of a different ethnic and racial community, and generally be of older age group (Zukin 1987). Furthermore, the recent in-movers are overwhelmingly white college graduates (White 2007), particularly those employed as professionals, administrators or executives. Therefore, primary indicators of gentrification are often a change in the class structure of a neighborhood and a subsequent change in the housing stock due to reinvestment in the neighborhood.
Due to the lack of theoretical consensus on what gentrification actually is, many different measures of neighborhood change exist. To summarize the measures used in previous studies, Table 1 includes the Author, Year, Measures and Data sources of contemporary research that has operationalized gentrification. It should be noted that many of these studies use a measure of gentrification as a means to an end; that is to say that they do very little work to examine the validity and reliability of their measures, with great exception to Lance Freeman who includes a lengthy discussion of his measure of gentrification in his work “Displacement or Succession”. The selected works included in the table represent the majority of the relevant literature that has attempted to operationalize gentrification within the last decade. A full list of relevant studies can be obtained at the author’s request. All authors listed are included with the title of their respective studies in the reference page.

As evidenced by Table 1, there is little consensus on how gentrification should be measured, much less an agreed upon source for measuring such change. Many sources of data are available for estimation of class change, but most suffer from severe limitations that produce either biased estimates of change or estimates that do not encompass all metropolitan areas. Using neighborhood satisfaction surveys may also introduce a degree of bias; estimates of “renovation activity” may merely reflect the training and social position of the researcher collecting such data and the intercoder reliability of such satisfaction survey may be very low, severely limiting the degree to which studies are
replicable (London and Palen 1984). Furthermore, neighborhood satisfaction surveys are cross-sectional, and cannot capture the longitudinal change that gentrification produces within neighborhoods effectively. To estimate the prevalence and extent of gentrification effectively, the usage of macro-data sources is a necessity. While critiques have been made against the usage of tract level census data as a proxy for a specific “neighborhood” tract data are the best available measures available to researchers at this time (Cohen and Dawson 1993).

As previously stated, there is little understanding of the prevalence and variation between metropolitan areas during the 1990s, however moderate estimates based upon a limited sample size have been estimated. More specifically, Wyly and Hammel (1999) indicate that during the 1990s the percentage of inner city populations living in gentrified areas may be high as 22%, yet their study is severely limited by scope and only includes 8 metropolitan areas. Similarly, Glick (2008) estimates that anywhere from 6% to 35% of homeowners in metropolitan areas reside in an area undergoing gentrification, based on limited analysis of seven metropolitan areas from 1994-2004. In both cases, the small sample size makes examining prevalence and variation a challenge; alternatively, since gentrification is such a small phenomenon, the small sample size reduces the likelihood of obtaining a good metropolitan analysis. Using un-normalized boundaries and an alternative definition of “central city”, Lance Freeman (2005) found that a total of around 7% of all urban census tracts gentrified during the 1990s. Other studies indicate a more
modest number of gentrified areas; during the 1960s gentrification only affected 5% of the entire housing stock (Clay 1979). Based upon these estimates and the theoretical limitations of revitalization, gentrification is by no means a large scale phenomenon in some cities but remains a very large issue in others. Establishing cities that have exceptionally high levels of gentrification will also help research become more targeted. Given the time restrictions of this analysis (1990-2000) the neighborhoods identified here are in the process of gentrification, and neighborhoods that have already transitioned will not be captured. Thus, this project represents gentrification that only occurred during the 1990s and will reflect the contemporaneous changes that were also occurring in the social, political and economic profiles during the same period. The gentrification that occurred during the 1970s may be similar but by no means identical to the gentrification that occurred during the 1990s.

This project will establish a better baseline estimate of the extent and variability that exists within and between metropolitan areas that has been largely ignored in favor of neighborhood level analyses. A composite measure of neighborhood change is thus constructed that is sensitive to the renovation of high-income central city neighborhoods. Education was used as a standard measure of demographic change because it varies less than income over a period of time; while an individual may acquire a job that pays a higher sum of money over a short period of time, attaining a higher level of education takes a lengthy period of time. The addition of the housing stock variable was also
included in the measure because gentrification is driven by a preference for older homes located in central city neighborhoods, and census tracts with a high number of new homes may indicate an area that has not been developed at all prior to gentrification occurring and not including such a measure would erroneously capture census tracts that are merely experiencing new growth. Finally, a real increase in housing prices measure was included to capture the effects of the reinvestment processes that coincide with gentrification.

**METROPOLITAN DETERMINANTS**

A neighborhood is directly interrelated with the transitions of growth and expansion of the metropolitan area in which it resides. Specifically, a central city area that has been disinvested over a period of time that has a large number of older homes is the basis for understanding gentrification at the neighborhood level. At the metropolitan level, contextual effects should influence the prevalence of gentrification beyond the sum of their individual parts; for example, the role of suburban housing developments and local labor markets has been largely ignored in many gentrification analyses. A period of disinvestment followed by a period of sustained reinvestment in an older metropolitan area should produce a large number of tracts that are at risk for becoming gentrified.
Thus, this project makes the argument that the prevalence of gentrification is not only linked to neighborhood specific features but specific structural features of the metropolitan level in which it resides.

The initial stage of gentrification, disinvestment, is a necessary condition for gentrification to occur; revitalization by definition can only occur in areas that have been undervalued for a significant period of time. Central city areas had already begun to feel the economic effects of widespread suburbanization prior to the 1990s, yet this disinvestment was not equally distributed across metropolitan areas. Many central cities lost vibrant neighborhoods because of the change in neighborhood selectivity and the economic restructuring of jobs to suburban areas; individuals traded older homes in the high density undesirable urban centers for newer homes in low density suburban areas. By the year 1980, decades of suburban industrialization resulted in suburb-to-suburb commutes becoming the primary pattern for travel to work, and by 1990 48% of Americans lived in suburban places (Baldassare 1992). Furthermore, major metropolitan areas had been subject to the spatial redistributions of jobs from the central city to suburban areas prior to the 1990s (Kasarda 1995) that led to the exodus of the middle class from once prosperous central cities. Such an exodus to suburban areas essentially eroded the tax base of many urban neighborhoods leaving them undesirable due to the lack of amenities (i.e. schools, hospitals) as well as subsequent increases in crime. The lack of an economic base to support many middle class individuals, coupled with the
increased desirability of low-density suburban housing developments left many urban neighborhoods in sharp decline well before 1990. Smaller towns and non-metropolitan areas expanded at the expense of metropolitan areas, resulting in the well documented relocations that have emptied older neighborhoods (Kasarda 1985). This process occurs over a period of structural disinvestment and subsequent reinvestment in urban areas, where a desirable older home may once again become attractive to potential buyers due to a large amount of residential filtering to suburban areas (Meligrana and Skaburskis 2005).

Gentrification is subject to the forces of supply and demand, corporate centralization in a select number of central cities, as well as the increase in concentration of high-order producer services, producing the economic conditions necessary for gentrification to occur (Cohen 1981). Furthermore, the results of many of the first studies of gentrification indicated that cites undergoing reinvestment were of local or national historical importance with a housing stock that was built primarily before 1939. Brian Berry (1985) and his ecological study of gentrification indicated three central factors that show how characteristics of the ecologies of cities produced such neighborhoods in transition. His three factors are (1) economic, (2) demographic and (3) supply-side effects. Economic factors are such things as the local economy, proximity to the central business district, and the effect of switching from a heavy manufacturing industry to a service sector industry. Other studies indicate that economic factors may
provide a key piece of the puzzle when it comes to understanding the motives behind gentrification. Clearly the devaluation of decaying cities, coupled with the rising cost of suburban housing may have a significant effect on gentrification processes (Smith 1987). Berry also indicates that “nodal” cities or those of economic international importance are more likely to experience revitalization. Demographic factors include the relative decline in fertility rates and numbers of babies being born; young professionals with no children may not consider the quality of schools or safety of the neighborhoods as would a couple with children. Supply-side effects, in Berry’s estimation, are rates of suburban development that has increased the number of vacancies in older, more impoverished neighborhoods within the inner city. Further research on the structural factors of gentrification has called the process a back to the city movement by capital, not people (Smith, 1979). While many hypotheses were offered as to why revitalization had occurred, the primary forces behind urban revitalization were to be found at the metropolitan level.

Sharon Zukin’s (1987) work on economic restructuring indicated that gentrification was more likely to occur in cities whose manufacturing base had been displaced from the central city and that had subsequently been replaced by professional occupations related to business services. Likewise, older metropolitan areas that once had large manufacturing centers that lost large amounts of industry should be primed for revitalization. Once business and other professional services located in the central city are
introduced into such an environment of disinvestment, money may once again be reinvested in dilapidated areas. After a lengthy period of suburbanization and disinvestment in urban neighborhoods, a “rent gap” often appears. The "rent gap," is the disparity between the potential ground rent (with re-development) and the actual present ground rent (Smith 1979). For example, a large home may sit vacant in an undesirable neighborhood and have a very large rent gap because with a small amount of reinvestment, its maximum potential may be reached. Thus, gentrified neighborhoods often have a housing stock that has been undervalued for a lengthy period of time, only requiring reinvestment to close the “rent gap” between their maximum value and their depressed current values.

An increase in the concentration of professional jobs in selected urban centers, as well as the subsequent increase in travel time to work created by suburban sprawl has been offered as an alternative explanation of gentrification. Clearly the devaluation of decaying cities, coupled with the rising cost of suburban housing may have a significant effect on gentrification processes (Smith 1987). Thus, individuals are thought to wish to gentrify if the metropolitan area has experienced a rapid amount of suburban growth and the suburban lifestyle may not become as attractive in cities in which the cost of living in such a neighborhood (housing, increased travel time) outweighs the perceived benefits. This is the initial process of disinvestment that a neighborhood may experience prior to revitalization and is a necessary condition for gentrification to occur; the process must be
rooted in demand-side shifts of professional job growth anchored in the central business
district of cities (Berry 1985).

Urban racial segregation, and the amount of poverty in a metropolitan area,
should also play into levels of gentrification and also represents a severely neglected area
of analysis. Wacquant (2008) makes the claim for a much more focused critical analysis
of gentrification. Research should not ignore structures of power in gentrification analysis
and a critical perspective is often discarded because of the perceived positive change in
poor neighborhoods. As Wacquant states, many analysis of gentrification ignore the class
dynamics of neighborhood change. Furthermore, gentrification can be viewed as a
manifestation of the power of a given social class to define and change a neighborhood.
Given that many gentrification studies have evicted critical perspectives and negated the
role of stratification, it seems necessary to include a measure of metropolitan segregation
and percent poor. Furthermore, examining gentrification as a form of spatial inequality
allows for much more theoretical cohesion between ideas of neighborhood change, race
relations, class analysis and stratification.

There is great variability in the extent to which urban revitalization occurred
between metropolitan areas. Gentrification, as a subcategory of revitalization, should
reflect the changes in the social and economic profiles of metropolitan areas. Central
cities that have experienced a prolonged period of disinvestment followed by a sustained
period of reinvestment should have the largest number of neighborhoods gentrified.
Furthermore, the strength of the central city should mediate this relationship; disinvested areas may not experience reinvestment if the local business climate does not attract young professional individuals. The aim of this analysis is to confirm these hypotheses by employing a valid and reliable measure of gentrification, examining the levels of gentrification that occur with a metropolitan area and then using these features, with significant controls, to explain the variation between metropolitan areas.
DATA AND METHODS

Data

Data from this project are taken from the Neighborhood Change Database (NCDB) using stable tract boundaries from years 1990-2000, allowing the researcher to approximate change without having to manually re-estimate data for census tracts that have changed during this time period. This broader measure of gentrification introduces the possibility of all metropolitan area census tracts to become “gentrified” during the period 1990-2000, thus giving an overall sense of the prevalence of gentrification across metropolitan areas. Data are taken at the census tract level and the metropolitan level, including 51,467 census tracts distributed within 331 metropolitan areas. The structure of the data allows the researcher to examine data at different levels simultaneously; that is to say that every tract is nested within a specific metropolitan area, nested within a specific region. Data estimates are taken from mean census tract estimates and to compute the metropolitan level values, both central city census tract level as well as suburban tract level data is aggregated. Disinvestment and subsequent reinvestment are measured
relative to the entire metropolitan area\(^2\) rather than using absolute change. The following six metropolitan areas included in the analysis had no clearly defined central city:

- Anchorage, AK MSA
- Bergen-Passaic, NJ PMSA
- Brazoria, TX PMSA
- Middlesex-Somerset-Hunterdon, NJ PMSA
- Nassau-Suffolk, NY PMSA
- Punta Gorda, FL MSA

As a result the logistic regression analysis was conducted with the remaining 325 MSAs.

As population changes occur over time, tracts get redefined so that a reasonably uniform distribution of people in tracts can be maintained. If a tract grows in population between censuses, it may be split into two or more separate tracts in later years. Alternatively, several existing tracts may be reconfigured into new tracts for subsequent censuses. This problem is more likely to affect areas undergoing strong population growth or loss, but is not insignificant; an analysis of 1990 and 2000 census tract boundaries showed that about 46 percent of all tracts were redefined between these two census years.\(^3\) The Neighborhood Change Database is very well suited to measure gentrification given that it pays greater attention to maintaining stable geographical tract

\(^2\) Change relative the central city was also used as an alternative measure but did not produce significantly different results; the alternative measures were highly correlated (.96).

\(^3\) The NCDB is a database distributed by geolytics inc.(www.geolytics.com). This information was obtained from the data codebook, appendix E.
boundaries than almost all other sources of data. See appendix A for an example of how tracts changed between 1990 and 2000.

Measuring Gentrification

As previously mentioned estimates of gentrification at the census tract level are measured by four dimensions of demographic and housing stock change-- two that measure disinvestment and two that measure reinvestment. These measures are similar to those used by Lance Freeman (2005) with two significant improvements. The use of a relative definition only extends so far as a census tract that had a median household income of less than 60,000 in 1990 was included, so as to exclude areas that simply experienced a large amount of growth during the 1990s. Given the attention to the shifting tract boundaries, The Neighborhood Change Database (NCDB) is the best possible source of data to estimate the type of change caused by gentrification at the metropolitan level. Alternative data sources were considered for this project, yet were seriously hindered by the lack of national representativeness.4

4 The usage of the AHS, or American Housing Survey, to identify gentrifying areas of a city do not identify specific neighborhoods but rather “zones” that often encompass a large number of neighborhoods and an average of 100,000 individuals, whereas a census tract only encompasses an average of 4,000 individuals and a significantly smaller geographical area. This study treats gentrification as primarily a neighborhood level process, and the usage of a metropolitan sub area or zone to determine levels of gentrification is too theoretically broad to examine class change. For example, one quarter of a zone may become gentrified, but due the large amount of non-gentrified households in a zone that may downwardly bias the estimates of change, it may be erroneously discarded as non-gentrified (Glick 2008). PSID geo-coded data is an improvement upon the AHS data, however it is taken from census tract level data without normalized boundaries, so estimates of change are biased by the redistricting of certain census tracts. Furthermore, the
Four dimensions of change are used in this analysis, representing the best possible theoretical construction of disinvestment and subsequent reinvestment, two demographic and two housing. By definition, gentrification can only occur in central city areas; no known gentrification studies to date have ever established suburban gentrification. To capture disinvestment, the mean income of the tract in 1990 was used. If the mean income was less than the median of the given metropolitan area then the tract was considered disinvested. To restrict against affluent tracts that become wealthier, the mean income of the tract was not to exceed $60,000. The second measure of disinvestment was the proportion of the housing stock that was built within the last 20 years; to be considered disinvested, the tract must also have lower than the median number of newer homes than the entire metropolitan area. Thus we are left with (relatively) poor tracts that have not experienced much economic gain prior to gentrification. To establish reinvestment, educational attainment was used because of the relatively small rate of aggregate change over time, whereas income reinvestment may be much more sensitive to other factors. The last dimension of reinvestment was an increase in housing prices greater than the median of the metropolitan area and was

usage of smaller samples of neighborhoods and metropolitan areas severely limits the ability to estimate national prevalence

5 Changes in Occupational Prestige and Race were also tested. Income and Educational change were found to be very closely related, whereas racial and occupational change produced a divergent set of estimates. Ultimately, given that income and education are often considered to be the best primary indicators they were chosen in favor of the alternative measures.
chosen because of the general upgrading process that occurs in the housing stock. Thus any of the 51,467 tracts that are considered to be gentrified must meet all four criteria. See table 2 for the construction of the key measures.

Analytic Strategy

To establish prevalence of gentrification, the aforementioned predictors are measured at the tract level and then aggregated to the central city level to measure metropolitan level disinvestment, reinvestment, segregation and relative central city strength. The central city status was determined by the usage of a variable that determines the percent of population in the central city where a value of 100% indicates that the entire tract is within the central city; 19,247 neighborhoods in the database are considered to be entirely in the central city. Anything less than 100% was considered to be a suburban area.

The dependent variable in the analysis is a dichotomous variable that indicates the presence of gentrification in any neighborhood within the metropolitan area; if any of the neighborhoods successfully meet the five criteria then they are assigned a value of “1”,

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6 Business Reinvestment may also be a critical component of gentrification, yet the focus of this project is to focus solely on reinvestment as measured by changes in household indicators, which theoretically should be correlated. Similarly, the role of finance and banking institutions in reinvestment should manifest itself in the rates of household change. See Wyly (2002) for a good discussion of housing policy, lending and gentrification.
whereas the neighborhoods that were considered not to be gentrified were assigned a value of “0”. After collapsing the neighborhoods and summing the total of the dichotomous gentrification statistic, any metropolitan area with a gentrification value of greater than “1” was considered to have gentrification, or at least one gentrified neighborhood. Thus, the logistic regression was used to estimate the probability of a metropolitan area having any gentrified neighborhoods. Because the units of analyses are metropolitan areas, it should be noted that these effects differ from a tract level analysis; while the measure of gentrification is conceptualized at the neighborhood (tract) level, the significant predictors used in the logistic regression analysis are measured at both the central city and entire metropolitan area. An alternative dependent variable that treated gentrification as a continuous percent of gentrified neighborhoods in metropolitan areas was also estimated. This secondary analysis did not produce any significant difference other than the interpretation of the coefficients. The logistic regression was chosen in favor of the traditional regression due to the difficulty in interpretation of the continuous measure.

Measurements of disinvestment are captured at the year 1990, prior to the process of subsequent reinvestment and gentrification. Poverty was measured by the percent of the central city in poverty. Racial impact, as measured by the percent of central city black was also included to examine the interaction between gentrification, disinvestment and race. The measure of the metropolitan older housing stock is a dichotomous variable that
assigns a value of “1” to metropolitan areas that had greater than the median percentage (5.68%) of homes built before 1939 of the entire population. This measure was alternatively tried as a continuous measure and produced no significant differences in results, ultimately the dichotomous variable was chosen for ease of interpretation. The dissimilarity index was calculated for each metropolitan area as the dissimilarity between white and black populations between neighborhoods. The dissimilarity ranges from 0 to 1 where a score of 1 indicates complete dissimilarity. The index of dissimilarity was included at the metropolitan level rather than just the central city; a highly segregated metropolitan area is much more likely to influence gentrification than simply a downtown area that is highly dissimilar.

Measures of reinvestment are measured as the change from 1990 to 2000 contemporaneous to gentrification. Reinvestment is conceptualized as the change within a central city neighborhoods class structure, and thus measures of income, housing and population are included for only central city areas. The coefficients represent a one unit change in the rate of change from 1990 to 2000; thus if income were to be significant, it would indicate that a net gain in mean tract income during the period is associated with the presence of gentrification. This is simply the central city value for 2000 subtracted from the value in 1990 to obtain the rate of change\(^7\). An index of change that measured

\(^7\) An index of change was alternatively estimated by using the central city value of the MSA divided by the suburban value. The results of this alternative analysis produced the same significance in both the partial and full model. Ultimately the raw change was chosen in favor of the index for ease of interpretation.
the central city value in relation to the respective suburban value was also estimated; the results of this secondary analysis were strikingly similar to the first, and for the sake of parsimony and ease of interpretation, the absolute change (i.e. a tract relative to itself 10 years earlier) was considered to be the best measure of reinvestment.

Geographical region and central city population (1990) were used as controls in the logistic regression; given that previous research and the basic descriptive statistics of the first part of this analysis indicate that gentrification is more likely to occur in larger metropolitan areas in the Midwest, controlling for these was necessary to establish a relationship between disinvestment and reinvestment. Obtaining significance net of these controls may indicate a stronger relationship between the predictors and the outcome. Likewise, goodness of fit measures were employed to examine how well the independent variables were able to predict the presence of gentrification. For a list of the metropolitan areas included in the analysis, as well as the descriptive statistics see appendix see appendices C and D.
RESULTS

Prevalence of Gentrification: National Estimates and Metropolitan Variation

Nationally speaking, the results indicate that an average of 2-3% of all neighborhoods located within a central city were gentrified during the 1990s. This analysis has produced by far the smallest estimate of renovation activity of all the previously mentioned studies, perhaps due to the sheer scope of the analysis and the total number of tracts that could possibly be considered gentrified. This national estimate is the most unbiased estimator utilized because it provides for the possibility that any neighborhood within any city may become gentrified, and is thus not limited to including cities in the analysis that merely have had renovation activity reported.

National prevalence and metropolitan variation were determined by aggregating the tracts on to their respective metropolitan areas; the number of gentrified tracts was divided by the total number of tracts within the MSA to obtain a frequency distribution of the percentage of tracts. Graph 1 indicates the prevalence. A substantial proportion of metropolitan areas (37%) had no gentrification during the 1990s. This measure established that the prevalence gentrification is concentrated in a select few metropolitan
areas and was found to be relatively insensitive to discrepancies between alternative central city definitions between metropolitan areas. When broken down by region and by share of total gentrification, it appears that gentrification is more likely to occur in the Midwest (36.81%), followed by the West (25.92%), the South (25.09%), and the Northeast (12.16%). These results do indicate that there is variability between metropolitan areas that has yet to be explained and examined. Furthermore, the discrepancies between the two models are displayed in graph 1 (See Appendix); while the alternative methods of identifying gentrified areas were by no means exactly the same, much of the rank ordering of the metropolitan areas in terms of the percentage gentrified between the two alternative measures did not change.

Geographic regions do seem to produce differing levels of gentrification, and the Midwest is clearly one of the outliers in this analysis. Midwestern rustbelt cities had experienced disinvestment prior to the 1990s, yet it appears that reinvestment was also favorable in this region due to the depressed values. Alternatively, the South and

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8 Alternative measures of gentrification were highly correlated (0.96), yet varied in their estimates of prevalence at higher levels of gentrification. The results reported use the definition relative to all tracts within the metropolitan area because of the relative agreement. Examining change relative to the entire metropolitan area was considered to be a more valid measure of change because of the sensitivity to changes in the entire metropolitan area. Examining change in a broader context also increases the validity by downwardly biasing any estimates of change. Table 3 indicates the level of agreement between the two alternative measures. A large number of tracts (721) were deemed as gentrified by both measures and the measure relative to all tracts identified nearly 150 more tracts than the measure relative to the central city. The biggest discrepancies between the two models come at higher levels of gentrification, and interestingly there is not a clear relationship across regions in both measures. In the Midwest and South, the alternative measure increased the number of gentrified areas whereas in the Northeast and West the alternative measure decreased the number of tracts. This could be due to the large variability in what is defined as the central city for any given metropolitan area, or alternatively it could also be due to large degree of variability in income and education between the central city and the suburban area of any given MSA.
Northeast present two cases in which (1) widespread disinvestment has not yet occurred, such as in the majority of southern cities, (2) significant urban reinvestment has not yet taken place or (3) in the case of the Northeast, gentrification had already occurred prior to the 1990s and was thus not identified by the measure presented here.

Specific levels of gentrification within cities do seem to indicate that metropolitan area, not geographical region is the appropriate level of analysis. In terms of raw number of neighborhoods gentrified, Chicago and New York clearly are the two outliers consistently producing two to three times the amount of gentrification found in other cities. Furthermore, the size of the metropolitan area seems to be playing a role in the differential levels of gentrification. The 129 metropolitan areas that had no gentrification had a median population value of 2.1 million whereas the mean for the 202 metropolitan areas that did experience some gentrification was closer to 4.5 million inhabitants. Other metropolitan areas that were in the top ten such as Portland, Seattle and San Francisco represent the classical gentrification model; amenities attract young professionals to urban centers with what Richard Florida calls the “talent, technology and tolerance” (2002). It should also be noted that a good deal of gentrification studies have been done in these metropolitan areas, bolstering the claim that gentrification is occurring within these areas at a rate not found anywhere else in the United States.

Given the previous estimates of gentrification, the results presented here highlight the relative selectivity of gentrification processes. In comparison to prior research that
estimates prevalence using a limited sample of metropolitan areas, the extent of gentrification found during the 1990s was considerably less than all prior estimates, perhaps due to the scope of the analysis. The range of gentrification presented here does seem to be close to what Glick (2008) estimated the variation to be, albeit Chicago and New York are clearly the cities that experienced the most. Given the prior estimates and the results found here, gentrification does seem to be a phenomenon that reproduces itself across a variety of similar metropolitan contexts.

**Process of Gentrification: Changing Neighborhoods**

The results indicate that there is variability in the percentage of gentrified neighborhoods within metropolitan areas. Table 4 indicates the specific changes that took place within neighborhoods from 1990-2000 with suitable comparison categories (Gentrified Central City, Non-Gentrified Central City and Suburban). The changes that took place in the neighborhoods identified by the model indicate that a significant shift in the class composition of such neighborhoods is occurring. At the neighborhood level, the changes that indicate the presence of significant urban revitalization and a drastic changes in many of the aforementioned markers of gentrification that were not used as indicators. Examining change at the neighborhood level was also used as a test of the validity of the measure; previous research has well established the types of neighborhood change
associated with gentrification and we should expect to see similar changes in the neighborhoods identified as gentrified by this method of identification. As an alternative validity check a map of the tracts identified as gentrified in Columbus, Ohio was examined (see appendix), and these tracts did indeed correspond to place locals recognize as gentrifying neighborhoods.

In gentrified areas the Percent Black Population declines at a higher rate (-3.99%) when compared to other central city areas (3.90%), and the Hispanic population followed a similar trend of generally decreasing in gentrified areas and increasing in other sub-areas, indicating that gentrified areas discourage minority population growth. Whites had the highest rate of population growth in gentrified areas (4.96%), and this growth was almost double the rate of grown in the non-gentrified central city White population growth (2.25%). This may indicate that gentrification is not a process by which large numbers of individuals move at one specific point in time, but rather in a more gradual stage process similar to that proposed by David Ley (1996). This measure may be only capturing the initial stage of gentrification, and thus may not reflect the widespread changes that one would expect in a traditionally gentrified area. The results indicate that gentrification is causing higher numbers of whites to move into renovated areas and thus decreased the number of available units for minority individuals, yet the link is not as straightforward as simple displacement or succession. This analysis does not follow individual householders from 1990 to 2000 but rather the same geographical area
(neighborhood) and the question of displacement or succession is better left to research such as that by Vigdor (2001) that uses panel survey data such as the PSID.

Other changes are more noticeable at the neighborhood level; the percentage of people employed as professionals, managers and administrators grew faster in gentrified areas (2.39%) than in other central city areas (.22%), and even outpaced the suburbs which, on average, lost professionals during the 1990s (-.59%). This finding is consistent with the majority of the literature on gentrification, and seems to be one of the most visible within neighborhood changes. Since the number is relative to the value in 1990, perhaps there was not a gain in absolute number of professionals in gentrified areas but rather a loss of non-professionals, inflating the percentages. In either manner, professionals seemed to be living in gentrified areas at close to nine times the rate of comparable central city areas and the surrounding suburban areas. This result is also theoretically consistent with what Berry (1985) expected to find; the more professionals found in the area, the greater the likelihood of gentrification.

Perhaps the most significant characteristic shared by gentrified areas is the overall age of the metropolitan area and the respective housing stock. Gentrified areas have a large average number of houses built before 1939 (665.78) whereas other central city areas had a smaller number (384.12). This finding is also consistent with the theoretical understandings of why an older home may become financially attractive to investors; after a lengthy period of suburbanization and disinvestment in urban neighborhoods, a
“rent gap” often appears. Such a scenario seems to be playing out in this analysis; the median home value in the gentrified neighborhood appreciated an astounding $64,788 whereas other comparable central city locations had nearly half the appreciation ($33,750). It should also be noted that gentrified areas had a median home value significantly less than non-gentrified areas during the period and displayed more than the median value for non-gentrified areas, yet this was part of the initial definition of gentrification. The areas that are experiencing such a change were actually appreciating above and beyond their urban counterparts to a level that puts them on par with the suburban areas. Gentrified neighborhoods often have a housing stock that has been undervalued for a lengthy period of time, only requiring reinvestment to close the “rent gap” between their maximum value and their depressed current values, and thus this analysis seems to confirm that older homes that experience renovation do have a large gap present.

The changes produced within these neighborhoods represent areas that had been poor in 1990 and had experienced significant demographic shifts during the decade; what is not known is at what stage these neighborhoods are currently experiencing such a change. It is possible that a local college opened near such a neighborhood and a significant portion of the inhabitants obtained some kind of post secondary degree; yet such a scenario cannot account for the larger population growth, decline in the number of vacant housing units and the influx of new home buyers. On the whole, gentrification
processes seem to represent a significant change in a neighborhood in a very short period of time. The process also represents an opportunity for individuals to purchase a home for renovation in such neighborhoods as an investment, given that the median value of the housing units in gentrified areas nearly doubled during the period. Given the changes produced within these neighborhoods, the results presented here seem to be theoretically consistent with previous studies conceptualization of gentrification.

Metropolitan Determinants: Disinvestment, Reinvestment, and Central Cities

Given the validity of the measure, establishing metropolitan (as opposed to neighborhood) determinants was the secondary goal of this analysis. Cities such as Chicago and New York are clearly very large cities of international importance, but what about cities such as Portland, Cleveland and Denver? Establishing metropolitan profiles that are conducive to gentrification was the next logical step after determining prevalence. To determine the extent to which gentrification levels are a function of the disinvestment/reinvestment paradigm, a logistic regression analysis was used. Three models were used to estimate the effects independently and then subsequently estimated simultaneously; first only the disinvestment variables were used as predictors, subsequently the reinvestment variables were introduced and finally both were combined.
This method was used to estimate the relative impacts of disinvestment and reinvestment separately to examine the strength of the predictors. The likelihood ratio index (LRI) measures the proportionate increase in the log-likelihood relative to a baseline, or null model. Similarly, the Fleiss, William and Dubro (FWD) R-squared statistic also indicates an increase in explanatory power as independent variables are added to the analysis. Taken as a whole, the series of models seems to indicate that the full model is a stronger predictor of gentrification than the partial models. The results are presented here in table 5, and descriptive statistics are included in the appendix.

**Disinvestment**

Metropolitan age, as measured by the presence of an older housing stock, was significant in both models indicating that older metropolitan areas are much more likely to become disinvested and are thus targeted for reinvestment. Older metropolitan areas may also have homes that have certain architectural features (i.e. Victorian) that newer metropolitan areas do not. Cities that had an older housing stock were 24% (as indicated by the odds ratio) more likely to experience gentrification than those that did not. An older housing stock may also be indicative of an area that has a large number of abandoned factories and warehouses that may have been converted to lofts (i.e. “Loft Living”). It may not exactly be the older housing stock per se that is producing such a
change, but other features associated with metropolitan age. Regardless, significance of metropolitan age maintained in both the partial models and the full gentrification model.

The percent of the central city in poverty was also significant in both the partial and the full model. For every one percentage increase in the poverty rate, the odds of gentrification increase by a factor of 5, a very large ratio. This finding is interesting and perhaps may give credibility to the displacement argument; as poor householders lack the social and economic capital to retain possession of a disinvested home, individuals outside of the community may view the property as a good investment opportunity to obtain remittances by closing the “rent gap” and thus may buy out established residents. Furthermore, this may be a decision by the in-movers not as motivated by racialized tendencies but rather by economic position; a net gain of $64,668 is not likely to go unnoticed and those individuals who have the financial capital to invest in such areas will often do so at the expense of others who cannot afford to stay put and thus experience what Glick (2008) calls “The Racialized geography of Home Equity”. Such geography is likely to perpetuate metropolitan level inequality as recent in-movers are likely to receive the aforementioned appreciation of housing value at the expense of the poor minority householder, to say nothing of the renters in the area that experience no appreciation in housing value and subsequent household wealth. Large numbers of individuals in poverty in a central city area does not only denote disinvestment but also may indicate an area that had been developed as a public housing project that had subsequently been
demolished or removed from the neighborhood. For example, in Chicago many high-rise projects were demolished in the downtown areas, relocating the residents and replacing them with mixed-income housing (Briggs 2005). Impoverished central city areas in 1990 were thus much more likely to experience higher levels of gentrification due to housing authority programs designed to eliminate large concentrations of poverty.

The number of vacant central city housing units was insignificant in both the partial and full models. This may indicate that the type of gentrification presented here is more likely to occur by succession of the poor rather than a brownfield development manner; vacant homes may also indicate an area that has become too disinvested for potential reinvestment. Gentrification is thus more likely to occur in areas that are poor, demographically speaking, but that have a relatively desirable housing stock. Given the rent-gap idea, it seems that when poor individuals reside in a neighborhood that was at one time affluent the neighborhood will once again transition back given a particular set of circumstances.

The percent of central city black was also insignificant in both the partial and the full models, contrary to expectations. Given that the poverty rate was a significant predictor, it appears that gentrification is not merely motivated by racial tendencies of in-movers. Given that, many neighborhoods that experience gentrification are located in central city areas that are overwhelmingly associated with racial and ethnic minorities. Perhaps an interaction between poverty and race exists, and such a connection should be
explored in further gentrification research. Similarly, the metropolitan index of
dissimilarity was also insignificant in the partial and full model. Gentrification, in its
initial stage, is a process of economic and racial integration in which affluent whites live
in close proximity with poorer racial and ethnic minorities. In metropolitan areas that are
highly segregated, perhaps the in-movers are much more cautious that a neighborhoods
housing stock will not appreciate at a desirable rate; a gentrified neighborhood requires
what are commonly referred to as “pioneers”, or individuals who are willing to purchase
dilapidated homes in questionable neighborhoods (Zukin 1987). In highly segregated
metropolitan areas, perhaps such pioneers are willing to tolerate less of a risk on their
initial investment due to the nature of the local housing market.

The effects of the independent variables that represent disinvestment mesh with
many past studies; older, poorer metropolitan areas are much more likely to experience
gentrification. This finding also seems to indicate a more class based approach to
understanding the process of gentrification; wealthy individuals may seek out areas of a
central city whose residents are inhabiting a desirable older home in hopes of purchasing
the house at a discounted rate in the hopes that the renovation will produce a net gain on
their investment in a robust housing market. Given that the racial variables were
insignificant, it seems that economic considerations should be given more weight in
future gentrification analyses or interactions between race and poverty should be
explored. On the whole, gentrification is more likely to occur in cities with large numbers of poor individuals living in older, more desirable homes.

**Reinvestment**

The change in the mean central city income from 1990 to 2000 was significant in both the partial and the full model. Theoretically speaking, this indicates that gentrification is more likely to occur in more downtown areas that added a net gain in income, be it from jobs in the downtown areas that were generally growing or from increases in human capital, such as education. Since this variable was standardized, a one unit increase corresponds to a standard deviation ($4,088) from the mean ($1,204) income change from 1990 to 2000; thus for every four thousand dollars above the mean income gain, the log odds of gentrification increased by .50. This finding is similar to what Brian Berry hypothesized; downtown areas that generally have more corporate centralization and business growth are much more likely to become gentrified. The link between the central business district and housing markets is very important given the findings here; in central cities that are generally better off than they were ten years ago, gentrification is more likely to occur. Alternatively, poverty may become displaced from the central city areas to suburban areas when gentrification occurs; a recent analysis
found that 9% of metropolitan suburban neighborhoods are high-poverty, compared to 44% of central city neighborhoods (Holliday & Dwyer 2009).

Surprisingly the appreciation in the median housing value was not significantly associated with gentrification. This may be indicating that homes that appreciate in gentrified neighborhoods are the exception to a pattern of central city home appreciation. Given the descriptive of neighborhood change associated with gentrification, it does seem as if these neighborhoods are “Islands of Renewal in Seas of Decay”, or perhaps islands of housing appreciation in central city areas that experienced little to no gain over the decade. This also indicates that gentrification does not occur in downtown areas that are generally upgrading, but rather in downtown areas that continue to become disinvested. Perhaps this may explain the relative importance of gentrification to understanding the linkages between household wealth accumulation and social class; individuals who have the financial capability to invest in up and coming areas in a relatively bad housing market are still able to obtain appreciation.

The change in the number of professionals was also insignificant in both the partial and the full models as well, perhaps due to the addition of the income variable. While professionals are often touted as being the majority of in-movers, this analysis indicates that adding professionals to the downtown areas does not impact gentrification, but adding household income does. Perhaps the addition of managers, executives and administrators is merely not enough to spur gentrification, or perhaps the right
occupational category was not chosen to represent the labor status of the in-movers. Alternative occupational prestige variables that denote a professional class should be further examined to determine what types of industries and occupations the typical in-movers represent. Regardless, employment and occupation should theoretically be linked to the process of gentrification, yet more research is needed to find out exactly what types of industries and occupations the in-movers to such neighborhoods are associated with.

On the whole, the reinvestment model indicates that the change in central city income was the only significant positive predictor of gentrification. Other variables, such as housing appreciation and the addition of professionals were insignificant. The link between central city vibrancy, diversity and general health seems to be explicit when alternative models are estimated. Central city areas that were generally more well off than they were ten years ago are much more likely to experience gentrification than those that did not. The control variables, while not of theoretical interest were significant in all three models. As previously mentioned, gentrification is much more likely to occur in heavily populated areas. Perhaps another link between population density and gentrification exists, yet the link between population size and gentrification has not been fully examined as of yet.
CONCLUSIONS

This analysis has established a baseline national estimate of gentrification and explained the probability as a function of metropolitan features. Lacking a national estimate, this project has filled that void of knowledge by providing a valid and reliable measure of gentrification that can be used across a variety of metropolitan contexts. While individual case studies provide the richness of detail, such studies often cannot place gentrification in the larger metropolitan context. Given the factors that produced significance in the logistic regression models, we now know much more about the role of metropolitan areas the process of gentrification. Furthermore, this project has adequately demarcated the boundaries of gentrification on a national scale in a manner that allows for applications much further beyond the field of sociology. Because these measurements were taken at the neighborhood level, it may even be possible to reaffirm many of the qualitative case studies by matching them to the locations deemed as gentrified in this analysis. Using the methods presented here, researchers may now begin to answer these fundamental questions using a much larger scale than a handful of metropolitan areas, providing much more validity to questions of causality. Examining questions such as displacement, racial studies and collective efficacy may be made much easier by employing this method of identifying gentrified neighborhoods.
The prevalence of gentrification during the 1990s was very selective; on average three percent of metropolitan neighborhoods experienced such a transition during the time period, yet the total number of gentrified neighborhoods varied significantly between cities. Alternative indicators of gentrification did produce some variability in the frequencies, yet the same metropolitan areas showed high levels on all the alternative measures. Cities such as Chicago and New York have a high level of gentrification and seem to fit into the theoretical model; they are older metropolitan areas that generally gained professionals from 1990 to 2000 and have a relatively strong central city area. Other variation in cities such as Portland, Seattle and San Francisco may be explained by the city as consumption model; such cities are generally identified as catering to “The Creative Class” (Florida, 2002) and have amenities catering to such a class. It should be remembered that this analysis only captures gentrification that occurred during the 1990s, and cities that had experienced it prior to this decade are not included.

Disinvestment and subsequent reinvestment both seem to be integral parts of the gentrification process; based upon the results of the logistic regression, metropolitan age and poverty are both significant positive predictors of gentrification. Older areas with large concentrations of poor people are at a much greater risk of gentrifying than newer cities with a relatively little poverty. The change in income between the central city in 1990 and the same area in 2000 was also a significant positive predictor, indicating that central city areas that are in the process of becoming more affluent are also more likely to
experience gentrification. Central city population was also significant, and many of the most gentrified areas during the 1990s were medium to large sized central cities. The segregation index was not statistically significant, yet this relationship warrants further attention due to the nature of gentrification. Given that gentrification runs contrary to the traditional homogenous housing patterns of a metropolitan area, future research should not ignore the role of stratification systems in the process of gentrification.

Examining levels of gentrification over time may also provide answers that a single time period may not; a time-series analysis of gentrification levels from 1970-2000 is an important step for future research. Furthermore, a multinomial logistic regression also may be appropriate for such analyses, given that a third of the metropolitan areas experienced no gentrification, another third only had 1 neighborhood gentrified and the final third had 2 or more neighborhoods gentrified. Future analyses should also explicitly examine the link between larger systems of stratification and neighborhood change; no neighborhood transition exists in a vacuum, and understanding the influence of the metropolitan area in which it resides should clearly be extended into gentrification studies.
REFERENCES


Vigdor, Jacob. 2002.”Does Gentrification Harm the Poor” Brookings-Wharton papers on urban affairs 133-1715


TABLES

Tab. 1. Prior Operationalizations of Gentrification

<table>
<thead>
<tr>
<th>Author</th>
<th>Year of Study</th>
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<td>1990-2000</td>
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Table 1. Prior Operationalizations of Gentrification

Data Notations:
PSID, Panel Survey of Income Dynamics
NCDB, Neighborhood Change Database
AHS, American Housing Survey
PUMS, Public Use Microdata Sample, U.S. Census

Tab. 2. Construction of Key Measures

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<th>Conceptualization</th>
<th>Operationalization</th>
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<tr>
<td>Central City</td>
<td>Be located in central city</td>
<td>1990</td>
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<tr>
<td>Disinvestment</td>
<td>Median Income less than the median of MSA/C.C., Less than 60,000</td>
<td>1990</td>
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<tr>
<td>Disinvestment</td>
<td>Have a proportion of housing built within last 20 years lower than median of MSA/C.C.</td>
<td>2000</td>
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<tr>
<td>Reinvestment</td>
<td>Increase in educational attainment greater than median of MSA/C.C.</td>
<td>1990-2000</td>
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<tr>
<td>Reinvestment</td>
<td>Have an increase in real housing prices</td>
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Table 2. Construction of Key Measures
### Cross-Tabulation of Measures

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<tr>
<th>Relative To All</th>
<th>Gentrified</th>
<th>Non-Gentrified</th>
<th>Suburban</th>
<th>Total</th>
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<td>Non-Gentrified</td>
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<td>17,460</td>
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<td><strong>Total</strong></td>
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<td><strong>18,062</strong></td>
<td><strong>32,200</strong></td>
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</table>

*Correlation between measures is .96

Table 3. Initial Comparison of Alternative Models of Gentrification
Table 4. Within Neighborhood Changes in Selected Metropolitan Sub-areas, taken as mean value from each tract in the analysis.
Table 5. Logistic Regression Analysis Results

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<td>Coef</td>
<td>Odds Ratio</td>
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*** p<0.01, ** p<0.05, * p<0.1, Two Tailed Test
Figures

Figure 1. Results between metropolitan areas and by method of identification.

<table>
<thead>
<tr>
<th>Levels of Gentrification</th>
<th>Frequency</th>
<th>Percent</th>
<th>Cum. Percent</th>
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<tbody>
<tr>
<td>None</td>
<td>124</td>
<td>38.12</td>
<td>38.97</td>
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<tr>
<td>One Neighborhood</td>
<td>74</td>
<td>22.76</td>
<td>60.88</td>
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<td>One to Ten Neighborhoods</td>
<td>98</td>
<td>30.15</td>
<td>91.03</td>
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<td>Ten or More Neighborhoods</td>
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<td>8.92</td>
<td>100</td>
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Total 325

Figure 2. Levels of Gentrification
APPENDIX A
Normalizing of Census Tracts
Taken from the Geolytics website (www.geolytics.com)

To illustrate the estimates of change that the NCDB produces, take Pima county Arizona and a tract within that county which experienced a large growth in population from 1990 to 2000. In 1990 the structure of the census tracts (avg. ~4000 people) looked like this in 1990:

The same county and census tract re-drawn in the Year 2000 to maintain an optimal number in each tract, loosing estimates of true change for the same geographical area unless normalized boundaries are used.
APPENDIX B
Gentrification within Columbus, Ohio Neighborhoods

The red lines indicate the census tracts (i.e. neighborhoods) that were defined as gentrified by the model relative to all central city tracts. Areas in Columbus have been well documented for their gentrification; German Village, a neighborhood directly south of the downtown area has experienced a great degree of neighborhood change and was identified by the model as being gentrified from 1990-2000.
APPENDIX C
Descriptive Statistics for Logistic Regression Analysis

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<th>Variable</th>
<th>Observations</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min.</th>
<th>Max.</th>
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<td>Gentrification Indicator (1=Yes, 0=No)</td>
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<td>.6184</td>
<td>.4865</td>
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<td>Metropolitan Older Housing Stock (1=Yes, 0=No)</td>
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<td>Percent of C.C. Homes Vacant</td>
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<td>Percent of C.C. Black</td>
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<td>Percent of C.C. in Poverty</td>
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