

Annual Review of Criminology

Gentrification, Land Use, and Crime

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Annu. Rev. Criminol. 2020. 3:121–38

First published as a Review in Advance on
September 30, 2019

The *Annual Review of Criminology* is online at
criminol.annualreviews.org

<https://doi.org/10.1146/annurev-criminol-011419-041505>

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Keywords

gentrification, land use, crime, population change

Abstract

Over the past twenty years, many US cities have seen urban revitalization and population changes associated with an increased desire for urban living among the affluent. As inner-city neighborhoods become gentrified, they are more likely to witness the construction of new buildings and homes, the conversion of industrial spaces to mixed-used developments, expanded access to mass transit, and the arrival of coffee shops and other urban amenities. In this review, we take stock of what is known about the impact of gentrification and land-use changes on neighborhood crime. We summarize research conducted since the period of urban revitalization that started in the 1990s as well as studies that have a quasi-experimental design. We find that gentrification and associated changes to land use tend to reduce crime in neighborhoods. Our findings are tempered by the need for greater conceptual clarity on how to measure when a neighborhood has gentrified and a clearer examination of the spatial displacement of crime. We conclude with a discussion on the need for criminologists to partner with urban planners to study how changes in the land use of cities can be made to generate crime reductions that benefit all places and, finally, detail some promising directions for future research.

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INTRODUCTION

The effects of changing populations and land uses on crime has been a long-standing interest in the field of criminology. Early thinkers on the criminality of place noted the potential importance of what happens when people are clustered near each other in conditions of relative affluence and poverty. Nineteenth-century Belgian astronomer and social statistician Adolphe Quetelet, for example, argued that provinces in France with higher economic inequality had higher rates of crime because the poor were surrounded by temptation and the continual display of luxury and “an inequality of fortune” [Quetelet 1984 (1831), p. 38]. Twentieth-century thinking on the neighborhood dynamics of crime emerged from the Chicago school of human ecology [Park & Burgess 2019 (1925)] and the idea that urban growth patterns structured the location of where the poor lived, the quality of housing, economic opportunities, and the level of neighborly interaction. Land-use patterns were thought to be part of the natural differentiation that took place as cities evolved. Neighborhoods near city centers of commerce and heavy industry were under constant pressure from commercial expansion, making the land less desirable for human habitation. The “smoke and soot” of living near heavy industry made nearby residential neighborhoods “dirty and ugly in appearance” (Shaw & McKay 1972, p. 19). Neighborhoods close to heavy industry saw a devaluing of housing and the settlement of these places by the poorest residents. Today, we know that urban settlement patterns are also shaped by policy decisions about how cities regulate land use, including which residential neighborhoods to protect from heavy industry (Gottdiener & Feagin 1998). At the same time, the basic idea that the environments of places matter remains the dominant perspective of the neighborhood effects on crime literature (Sampson 2012, Sampson et al. 2002).

Urban cores in many large US cities are no longer under the pressure of industrial expansion. Between the 1960s and 1990s, the dominant engines of neighborhood change to center-city neighborhoods were out-migration, vacancy, demolition of abandoned houses, and disinvestment brought on by deindustrialization (Skogan 1986). Starting in the mid-1990s, the dominant pattern of neighborhood disinvestment in center-city neighborhoods began to reverse with a massive federal investment in urban renewal and the movement of people back to city centers. This resettlement pattern of center-city neighborhoods has been referred to as the fifth wave of urban migration and the back-to-the-city movement (Fishman 2005, Hyra 2015). After nearly fifty years of center-city decline and suburban growth in the United States, between 2000 and 2010 more than half of the 50 most populous regions in the United States had center-city growth rates exceed the suburbs (Frey 2015). The dominant change in the past two decades in many urban cities has been redevelopment to accommodate the movement of more affluent people to center-city neighborhoods that were formerly areas of concentrated poverty.

The in-migration of more affluent individuals to poor neighborhoods is commonly referred to as gentrification, a term that Glass (1964) is credited with coining in her study of the transformation of working-class neighborhoods in London in the 1960s. Glass observed that neighborhoods in London were being invaded by middle- and upper-class gentry because of their relative affordability, proximity to the central business district, and architecturally distinctive housing stock. Glass argued that gentrification ultimately led to the displacement of the original working-class inhabitants. In addition to changing the population composition, gentrification can also change the land-use patterns of neighborhoods via zoning changes and infrastructure enhancements that seek to encourage property development and maximize the future tax potential. With higher levels of disposable incomes, neighborhoods undergoing gentrification also witness the shift from low-end retail, restaurants, and bars to more upscale establishments (Glaeser et al. 2018). Thus, gentrification can change a neighborhood from one that barely provides residents with local restaurants

and retail to one that becomes a destination spot for people living outside the neighborhood. The arrival of wealthier households to a neighborhood may also change social norms, generate class envy, and illicit racial tensions. An additional consequence of gentrification is greater inequality of income among neighbors, as the poor live near the wealthy.

The transition of neighborhoods from areas of concentrated poverty to those with relative affluence raises the natural question of the impact of gentrification on crime patterns. If income inequality in urban areas is a main driver of crime rates (Cook 2009), and Quetelet's [1984 (1831)] nineteenth-century observations remain true today, then one would expect to see crime rise in neighborhoods that transitioned from being predominantly poor to those with increasing numbers of wealthy households. However, gentrification could also reduce crime by spurring economic development that reduces urban blight, increasing economic opportunities for the poor, and deconcentrating poverty (Economist 2018).

In this review, we examine contemporary urban land development growth patterns in the age of increased gentrification and the impact these changes have on neighborhood crime. We focus on land-use changes that have become more prevalent because of increasing demand for center-city land. This demand is being influenced by changing perceptions of urban living, facilitated by public policy decisions to demolish high-rise public housing, remediate industrial sites, change zoning to accommodate mixed residential and commercial uses, provide tax credits for historic preservation, and fund infrastructure enhancements for pedestrian trails and mass transit. Gentrification typically follows land-use changes to neighborhoods that improve infrastructure, the quality of the housing stock, and urban amenities.

An earlier review by Kirk & Laub (2010) examined the relationship between gentrification, population loss, and crime patterns in the 1970s–1990s. On the basis of the evidence at the time, Kirk & Laub (2010) concluded that neighborhood change, whether in the form of socioeconomic improvements or population loss, results in short-term destabilizing effects that produce more crime in the near term. Their review is based largely on longitudinal studies that find that neighborhoods in the United States and Europe in the 1970s and 1980s with relative rising socioeconomic improvements tended to have greater than average increases in crime. However, it is important to recognize that crime and socioeconomic status of a neighborhood may be endogenously related, thus reverse causality is possible. Crime devalues property, which may lead to increased property speculation in areas that have strong future market potential. Also, when crime rates were particularly high in the 1970s and 1980s, cities were experiencing wide-scale property abandonment. Center-city neighborhoods that remained relatively affluent in these decades may have become increasingly attractive targets for criminal offenders. Kirk & Laub (2010) note that over the longer term, gentrification may lead to declines in crime as residents get to know each other better, civic participation increases, and residents are able to more effectively express norms and advocate for improvements in city services, including more effective police responses to neighborhood crime problems.

We focus this review on more recent studies that examine the impact on crime of the urban redevelopment process related to gentrification—including land-use changes and infrastructure improvements. We emphasize studies that have a quasi-experimental design. We find that land-use changes most often associated with gentrification lead to reductions in crime. However, the causal link between gentrification, land-use changes, and crime remains a bit unclear, as many neighborhoods identified as undergoing gentrification are also experiencing population changes related to immigration (Hwang 2016). Research shows that immigration tends to reduce crime in neighborhoods (Ousey & Kubrin 2018). In assessing the effects of land use and gentrification on crime, it is important not to conflate gentrification with immigration. The revitalization of a significant subset of center-city neighborhoods in the United States has also brought about a new

type of neighborhood change not seen in cities since the transformation of cities that occurred during the early 1900s as part of the development of modern urban planning. The population rebound of core neighborhoods, referred to as a triumph of cities (Glaeser 2011), has resulted in many large cities now having crime rates that are lower than middle-sized cities. Land-use changes associated with urban redevelopment are correlated with reductions in crime, suggesting that gentrification tends to produce crime reductions.

Our conclusions on the crime-reducing impacts of gentrification are tempered by the fact that studies mostly examine short-term changes in crime for areas undergoing urban redevelopment activities. As Kirk & Laub (2010) previously noted, gentrification and associated land-use changes may result in the redistribution of crime to other places. If crime is simply displaced to other locations, then any social welfare benefits of gentrification in poor areas are muted. Few studies, however, make a concerted effort to measure crime displacement.

The rise of income inequality in the United States over the past three decades (Saez & Zucman 2016) has also shown signs of creating greater class divides in urban spaces where enclaves of rich and poor live side-by-side. Urban scholars have noted that the rise of income inequality in close proximity may lead to private efforts to guard wealthy neighborhoods and the erosion of a shared sense of place and civic cooperation. Income inequality in cities has been shown to be associated with higher rates of murder and greater public unhappiness (Glaeser et al. 2009, 2015). Although land-use changes associated with gentrification lead to reductions in crime, the increase in spatial income inequality following gentrification will likely continue to dominate policy discussions surrounding the consequences of urban revitalization (Wyly & Hammel 1999). Additionally, the crime-reduction benefits of gentrification may take on diminished importance in a period of relatively low crime relative to the challenges of providing affordable housing in center-city neighborhoods that have become increasingly desirable places for the affluent to live.

In the following sections, we first examine how scholars measure gentrification and its likely consequence on urban revitalization and neighborhood populations. Second, we provide a structured review of studies that examine the impact that changes in land use associated with gentrification have on crime. Third, we discuss the need for conceptual clarity on how to measure gentrification and suggest some ways that future research can more clearly quantify gentrification and estimate its impact on crime. Finally, we conclude by suggesting a research agenda for studying how gentrification impacts the spatial patterns of crime.

GENTRIFICATION AND CRIME

Measuring Gentrification

Research on gentrification typically focuses on studying how it leads to neighborhood population changes, consumption tastes, and the displacement of long-term residents (Freeman 2005, Ley 1996, Zukin 1987). There has been an increased focus in sociology and urban studies on developing consistent measures for documenting the occurrence of gentrification. Most metrics try to capture Glass's articulation of an upper-class movement into lower-income neighborhoods by including socioeconomic markers related to income, education, and housing values (Atkinson 2003, Bostic & Martin 2003, Wyly & Hammel 1998). A common measure of gentrification, for example, is the relative growth in median household income in a census tract over time relative to the city or area average. Scholars, however, recognize that census data are slow to change (e.g., every ten years) or provides insufficient estimates (e.g., two- or five-year samples from American Community Survey) to capture the dynamic characteristics of neighborhoods undergoing gentrification (see Ding et al. 2016). Wyly & Hammel (1998) use block-by-block field surveys of neighborhoods in several cities to ground census indicators of population change (e.g., college

graduates, family income, homeownership, professional/managerial workers) that could be proxies for neighborhood gentrification. Scholars have turned to secondary sources to capture more dynamic measures of income changes in neighborhoods, such as home mortgage disclosure data (HMDA), which tracks changes in the volume and value of mortgage loan applications across neighborhoods (Kreager et al. 2011).

Hwang & Sampson (2014) provide one of the most comprehensive measures of gentrification by combining census data with block-by-block visual pictures captured by Google Street View. They rely on Google Street View pictures of blocks to measure the presence of urban revitalization and the movement of upper-class residents by coding visible signs of rehabilitation, beautification, and lack of disorder in Chicago neighborhoods. Specifically, they code the presence of new structures and building rehabilitations, a lack of decaying properties, new signs or structures controlling traffic (e.g., bike lanes and pedestrian crossings), new public courtesies (e.g., street lamps, bus stops, bike racks), property frontage and vacant-space beautification upkeep, signs discouraging disorder (e.g., antilittering), and a lack of burned out, boarded up, and abandoned structures.

Studies have more recently turned to using changes in retail spaces, restaurants, and other local land uses to measure gentrification. Housing values appear to increase after the arrival of new coffee shops, cafes, and other upscale amenities that attract a professional class. Glaeser et al. (2018), for example, find that the opening of Starbucks coffee shops is associated with higher housing values in the future. The share of the population that is college educated also increases with the growth in the number of cafes, bars, restaurants, and other businesses that are categorized as expensive.

Although the dominant focus of the literature on gentrification is studying its consequences on neighborhoods (Brown-Saracino 2017), it remains unclear when a neighborhood qualifies as gentrifying. After all, remodeling and construction of residential housing are ongoing processes in most cities, so at what point is the level of revitalization a sign of neighborhood gentrification? Yet there is a general heuristic sense of gentrification that is often documented through individual observations (Brown-Saracino 2017, Brown-Saracino & Rumpf 2011) of the rise of upscale commercial establishments in lower-income neighborhoods, as one New York Magazine article noted (Davidson 2014):

Gentrification: New Yorkers can sense it immediately. It plumes out of Darling Coffee, on Broadway and 207th Street, and mingles with the live jazz coming from the Garden Café next door. An algae bloom of affluence is spreading across the city, invading the turf of artists and ironworkers, forming new habitats for wealthy vegans.

Although the exact definition of gentrification remains unclear, most scholars focus on the consequences that the revitalization of poor neighborhoods have on residents once a more prosperous population arrives. Crime is a relatively rare focus in gentrification studies, yet it is logical to think that crime patterns will change as land use and population composition change.

Gentrification Effects on Crime

The gentrification and revitalization of distressed neighborhoods lead to the natural question of what impact this has on crime. Prior reviews have focused on cross-sectional studies because of the data limitations faced by scholars in the 1980s and 1990s (Kirk & Laub 2010, McDonald 1986). There were a few longitudinal studies in this period that found rising neighborhood socioeconomic status relative to overall city averages was associated with relative increases in neighborhood crime (Bogges & Hipp 2016, Covington & Taylor 1989, Van Wilsem et al. 2006). As geospatial data have become more readily available to researchers over the past two decades,

studies on the impact of gentrification on crime have become more refined and expansive. More recent studies that measure the relative change in housing values find that crime on average tends to decrease as neighborhoods experience gentrification (Branic & Hipp 2018, Kreager et al. 2011). Velez et al. (2012), for example, found that neighborhoods with increasing mortgage investments over a 27-year period had greater reductions in violent crime.

Lee (2010) uses the 1994 earthquake that hit the Northridge section of Los Angeles as a natural experiment to examine the effect of gentrification on neighborhood crime. Property owners in Northridge were provided low-interest loans to rebuild homes after the earthquake. The low-interest loans spurred a rise in the purchase of homes by upper-income households in low- and moderate-income neighborhoods in Northridge. These neighborhoods subsequently experienced a small increase in robbery, assault, and auto theft. However, the association between the earthquake and changes in the number of upper-income home buyers was small, and the majority of crime categories did not change, suggesting there was only modest gentrification and no change in overall crime.

Barton (2016) examined the effects of gentrification in New York City sub-boroughs, i.e., clusters of census tracts comprising at least 100,000 residents, on changes in assault, homicide, and robbery rates between 1989 and 1991, 1999 and 2001, and 2005 and 2009 (NYC Health 2019). Census tracts were classified as gentrifying if they had an average household income and newer housing stock that was below the median for the city at the beginning of the decennial census and showed subsequent residential growth in college degrees, family incomes, homeownership rates, and nonminority populations. These metrics were also corroborated with *New York Times* mentions of the word gentrification for each neighborhood. Using this definition, roughly 7% of New York tracts qualified as gentrifying. Sub-boroughs with a relatively higher share of census tracts that gentrified had significantly lower assault, homicide, and robbery rates over time.

Autor et al. (2019) rely on the elimination of rent control in Cambridge, MA, in 1995 to estimate the impact of gentrification on crime. After lifting rent control, working-class neighborhoods in Cambridge saw a rise in rents of 40%–80%, a spike in new construction, and an influx of more affluent residents (Autor et al. 2014, 2017). Autor et al. (2019) calculated the number of units on a block that were under rent control before the change in the law. Blocks with more rent-control units (eligibility for gentrification) experienced significantly larger reductions in crime than other blocks in Cambridge. Lifting rent control was responsible for a 16% decrease in yearly crime per block. The findings were not the result of differential preexisting crime trends in blocks with more rent-control units. The reduction in crime also occurred within one year of the elimination of rent control and remained persistently lower thereafter (1996–2005).

Autor et al. (2017) also found that the elimination of rent control in Cambridge was associated with larger reductions in crime than most similarly sized cities (populations between 75,000 and 150,000) during the same time period. Cambridge ranked 13th in size of crime drop out of 147 similarly sized cities. There was also no evidence of a citywide displacement of crime, as crime rates did not rise in other nearby cities. The case study of Cambridge provides the most convincing evidence of the effects of gentrification on reducing neighborhood crime. However, it is important to acknowledge that Cambridge is unlike most other cities. Few cities of comparable size are home to two leading research universities (Harvard University and Massachusetts Institute of Technology) as well as many global medical and technology firms, which can create widespread demand for housing and lead to the gentrification of working-class neighborhoods.

In general, studies that examine changes in housing and population measures linked to gentrification tend to show that gentrification is associated with greater reductions in crime. But studies that rely on housing and population have difficulty establishing time order, so reverse causality (e.g., $\Delta\text{crime} \rightarrow \Delta\text{housing}$, $\Delta\text{population}$) and simultaneity bias (e.g., housing and crime change

together and are caused by an omitted variable) are possible. For example, high rates of crime in one period in a neighborhood can depress housing values (Lacoe et al. 2018, Pope & Pope 2012, Tita et al. 2006) and encourage real estate speculation. Higher crime then leads to gentrification of neighborhoods that are seen as good future real estate investments. Alternatively, when crime falls in center-city neighborhoods, these places may become more attractive for the affluent (Ellen et al. 2017). Under either scenario, crime causes neighborhoods to gentrify. Studies that focus on land-use changes associated with urban revitalization provide a clearer design to assess the impact of gentrification on crime. The exact timing of land-use changes can be documented and used to assess how crime changes after neighborhoods experience urban revitalization compared to similarly situated neighborhoods that do not.

In the 1990s, billions of federal dollars were spent to stimulate redevelopment of downtrodden center-city neighborhoods. The intent of these federal interventions was to remove blight and concentrated poverty by razing distressed high-rise public housing, provide low-income housing tax credits to property developers to build affordable housing in more scattered site locations, attract middle- and upper-income families to new mixed-income developments, and incentivize the movement of private businesses to inner cities (Hyra 2015). Federal policies also began to devote resources to urban cities to revitalize and expand public transit systems, city parks, and historic districts that attract tourists. These efforts helped spur the development of housing for affluent residents to return to urban cities (Hackworth 2002). For neighborhoods to experience gentrification, there needs to be the demolition or rehabilitation of existing public or private housing, the construction of new housing stock, or the conversion of industrial spaces to mixed-use developments. These land-use changes provide useful proxies for measuring when gentrification occurs and its impact on neighborhood crime.

CHANGES IN LAND USE AND CRIME

This review focuses on studies that estimate the impact on crime of changes in neighborhood land use associated with urban revitalization and compares those neighborhoods to ones that do not experience land-use change. These quasi-experimental studies make a plausible case that conditional on differences in land use, the treatment and control areas would have similar crime trajectories. Quasi-experimental studies also can control for historical effects that are common to areas that receive a land-use change and those that do not. This review follows a similar structure as Kondo et al.'s (2018) review of neighborhood interventions to reduce violence, but we emphasize land-use effects associated with gentrification rather than any change in the built environment of places. **Table 1** provides a brief summary of the studies reviewed that examine land-use changes and their association with neighborhood crime.

Demolition of Public Housing

Two studies examined the impact of the demolition of high-rise public housing developments on crime in Chicago. Aliprantis & Hartley (2015) examined trends in homicides and police calls for service by census block from 1999 to 2011 in Chicago before and after the closing and demolition of high-rise public housing projects. Closing high-rise public housing was associated with a 63% drop in homicides in blocks where they were located, a 39% drop in the blocks within a half-mile, and significant reductions in police calls for service for gunshots, assault and battery, gang activity, drugs, and prostitution. There was no evidence of the displacement of crime into adjacent census blocks, but there was evidence of crime being displaced to blocks where the residents of the demolished housing projects moved. Importantly, a comparison of the crime-reduction and

Table 1 Summary of findings of quasi-experimental studies of land use and crime

Citation	Location	Study period	Study design	Unit of analysis	Land-use change	Control	Findings
Demolition of public housing							
Aliprantis & Hartley 2015	Chicago, IL, USA	1990–2011	Pre–post comparison	Census block	Closure and demolition of high-rise public housing projects on 90 blocks	393 relocation blocks with no public housing; 168 relocation blocks with low-rise public housing	Significant decrease in homicides, shots fired, assault and battery, gang activity, drugs, and vice and prostitution around demolitions
Sandler 2017	Chicago, IL, USA	1999–2010	Pre–post comparison	City blocks 0.25, 0.5, 0.75, and 1 mile from demolished public housing buildings	Demolition of 22 high-rise public housing projects	All blocks located within a 3-mile radius of demolished public housing buildings	Significant decrease in total crimes at 0.25–0.75 miles. Significant decrease in murder, robbery, assault, burglary, and theft on blocks within 0.25 miles. Decreases are lower in magnitude as distance increases
Demolition or rehabilitation of vacant homes							
Spader et al. 2016	Cleveland, OH, USA; Chicago, IL, USA; Denver, CO, USA	2008–2013	Pre–post comparison	Buffers of 250 feet around 1,027 properties in Cleveland; 264 properties in Chicago; 129 properties in Denver	NSP-funded vacant property demolitions and rehabilitations	Buffers between 250 and 354 feet from NSP properties; between 354 and 433 feet from NSP properties	Significant reduction in property crime in Cleveland and no change in violent crimes in any city from demolitions; rehabilitations had no impact on any crime
Kondo et al. 2015	Philadelphia, PA, USA	2011–2013	Pre–post comparison	Kernel density weighting of crime around 676 buildings that complied with ordinance; 241 that filed for renovation permits	Vacant buildings that complied with the doors and windows ordinance or filed for renovation permit	676 noncompliant vacant buildings; 964 noncompliant vacant buildings	Significant reductions in gun assaults, assaults, and nuisance crimes
Wheeler 2018	Buffalo, NY, USA	2007–2016	Pre–post comparison	Parcels and buffers of 100, 500, 1,000 feet	Demolition of vacant buildings on 1,949 parcels	1,949 parcels matched based on preexisting levels of crime	Significant effect on violent and nonviolent crime and on police calls for service at parcel and 500- and 100-foot buffers

(Continued)

Table 1 (Continued)

Citation	Location	Study period	Study design	Unit of analysis	Land-use change	Control	Findings
Mixed-use development							
Anderson et al. 2013	Los Angeles, CA, USA	2006–2008	Quasi-experimental	Neighborhoods (police reporting districts)	180 neighborhoods that had 361 zoning change designations	776 neighborhoods that did not change zoning designation	Decrease in total crime, mostly driven by reductions in auto theft and thefts from automobiles
Twinam 2017	Chicago, IL, USA	2008–2013	Quasi-experimental	Blocks	19,330 city blocks	Variation caused by historic zoning	Significant reduction in robbery and assaults with increasing mixed-use density
Mass transit							
Liggett et al. 2003	Los Angeles County, CA, USA	1991–1999	Quasi-experimental	Neighborhoods within 0.5 miles of stations	12 station stops	12 larger areas surrounding stations	Small significant increase in crime in 6 out of 12 station stops; no overall crime increase
Ihlanfeldt 2003	Atlanta, GA, USA	1991–1994	Quasi-experimental	Census tracts within 0.5 miles of stations	4 station stops	Census tracts within 0.5 miles of stations	Small significant increase in crime in two of the downtown stations and reductions in two of the suburban stations
Billings et al. 2011	Charlotte, NC, USA	1998–2008	Pre-post comparison	Neighborhood statistical areas	26 new light-rail stations	15 proposed light-rail stations	No statistical difference in total crimes
Cerdá et al. 2012	Medellin, Colombia	2003–2008	Pre-post comparison	Districts	25 districts that received a cable-propelled gondola system	23 districts with comparable socioeconomic levels and amenities	Significant reductions in homicides and reports of violence in a victimization survey
Ridgeway & MacDonald 2017	Los Angeles, CA, USA	1990–2012	Quasi-experimental	Neighborhoods (reporting districts) within 200 m	116 neighborhoods within 200 m of a new rail station	165 neighborhoods between 200 and 1,000 m of a new rail station	No statistical difference in total crimes
Urban amenities (e.g., coffee shops)							
Papachristos et al. 2011	Chicago, IL, USA	1992–2005	Quasi-experimental	333 neighborhood clusters	Neighborhood clusters opening coffee shops	Neighborhood clusters not opening coffee shops	Significant reduction in homicide and robbery rates

Abbreviation: NSP, neighborhood stabilization program.

displacement effects shows that homicide, gunshots, assault and battery, and vice and prostitution significantly decreased citywide as a result of the closing and demolition of high-rise public housing projects. Approximately 2.5%–5% of the total citywide reduction in homicide in Chicago during the study period can be attributed to the demolition of these public housing projects. There is some evidence that gang activity calls increased as a result of the public housing demolitions, but this may reflect citizens' perceptions of former public housing residents moving into new areas and not the result of actual gang behavior.

Sandler (2017) also examined the closing and demolition of 22 high-rise public housing projects in Chicago and found a significant 8.8% reduction in total crime within 0.25 miles of the developments that occurs at the time that residents were evicted from properties prior to their demolitions. The largest reductions in crime occurred in lower-income areas and developments that received poor housing inspection ratings by the US Department of Housing and Urban Development. These findings suggest that run-down and poorly maintained public housing developments are the most criminogenic.

The evidence points to the negative impact of land use related to high-rise public housing on crime. These few studies suggest that it is the nature of concentrating poverty in poorly maintained buildings that facilitates crime. But these studies speak mostly to the criminogenic effect of concentrating poverty in high-rise public housing and not to whether gentrifying neighborhoods through the depopulation and demolition of public housing impacts crime. Research finds that the migration of public housing residents through the provision of rental vouchers does not lead to significant rises in crime in their new neighborhoods (Ellen et al. 2012). Future research should examine what happens in areas that have demolished high-rise public housing and created upscale housing for new residents. Does crime rise in these neighborhoods after the arrival of new, affluent residents, or does it continue to decline as neighborhoods transition from settings of homogeneous poverty to mixed income?

Demolition or Rehabilitation of Vacant Housing

The demolition and rehabilitation of vacant housing is another form of land use that can facilitate the gentrification of neighborhoods by reducing vacancy and providing land for developers to build new housing. Four studies have examined what happens when vacant housing is demolished or rehabilitated on a fairly large scale, comparing changes in crime in areas around vacant houses to those nearby with similar preexisting levels of crime.

Kondo et al. (2015) examined compliance with an ordinance passed in Philadelphia in 2011 that required property owners to install operating doors and windows on vacant properties. They found small but statistically significant reductions in crime around the properties that complied with the ordinance ($n = 626$) compared to properties that did not comply but were in the same sections of the city. Larger crime reductions were found for the subset of houses ($n = 241$) that filed for renovation permits after being cited, suggesting that redevelopment of properties may lead to more meaningful changes in crime than simply removing signs of vacancy and abandonment.

Spader et al. (2016) examined the demolition and rehabilitation of vacant housing spurred by the Neighborhood Stabilization Program (NSP)—a federal program that supplied \$7 billion in federal funds to local governments and nonprofits to finance the demolition or rehabilitation of vacant or distressed housing as part of the Housing and Economic Recovery Act of 2008. They compared changes in crime in a 250-foot radius around properties targeted by NSP (treatment ring) to the 250–354-foot adjacent area (control ring). The demolition of vacant housing in Cleveland was associated with a small reduction in property crime in the treatment ring, but there was no reduction in violent crime. Additional analyses in Cleveland estimated the change in crime in

the treatment ring and control ring to an adjacent third ring buffer. This analysis showed no evidence of crime being displaced from the treatment to the control ring. In Chicago, the demolition of vacant housing did not lead to any meaningful changes in crime in the treatment ring. In Cleveland, Chicago, and Denver, the rehabilitation of properties from NSP funds did not lead to any meaningful changes in crime nearby. It is worth noting that far fewer properties in neighborhoods were rehabilitated with NSP funds than were demolished, and the program had little impact on deconcentrating poverty.

Wheeler et al. (2018) examined the impact of the demolition of 1,949 properties on crime in Buffalo, NY. Demolitions of vacant properties led to significant reductions in crime at distances of 500 and 1,000 feet compared to properties with similar preexisting levels of crime. Crime did not rise in the comparison properties, suggesting that the crime-reduction benefits of demolishing vacant properties did not lead to displacement.

Larson et al. (2019) estimated the effect on the city of Detroit's demolition of more than 9,000 vacant homes between 2010 and 2014. They found that block groups that experienced more demolitions had greater reductions in crime between the year 2009 and 2014. Their analysis relies primarily on a cross-sectional change score analysis; thus, it is hard to know whether the demolitions' association with lower crime was not simply an artifact of areas having different crime trends.

Although all four studies provide useful evidence of the impact of demolishing or rehabilitating vacant housing on crime in neighborhoods, they are mostly studies of city-level efforts to address blight in extremely poor neighborhoods. These studies do not examine the type of demolition, rehabilitation, and construction likely to be seen in neighborhoods undergoing gentrification, such as the building of mixed-use developments, the conversion of industrial spaces to upscale lofts, and the construction of condominiums and new, upscale housing.

Mixed-Use Development

Two studies have examined changes in crime associated with changes in land use from residential, industrial, or commercial to mixed-use development. The city of Los Angeles enacted zoning changes that involved the introduction of significantly more mixed-use zoning designations across 180 neighborhoods between 2006 and 2010. Anderson et al. (2013) examined changes in crime rates within these neighborhoods to those that did not have zoning changes but had similar prezoning crime trajectories and were in the same regions of the city. Adding mixed-use zoning designations to a neighborhood was associated with a 7% reduction in overall crime in neighborhoods. The total crime reduction was driven primarily by a reduction in thefts from motor vehicles and of automobiles. A limitation of this study is that it examined only the zoning changes and not changes in actual buildings constructed in neighborhoods.

Twinam (2017) examined the impact of mixed land use on assault and robbery per street segment in Chicago from 2008–2013. The study relied on the 1923 Chicago zoning laws, which did not predict the variation in homicides in Chicago in the 1920s, to predict present-day differences in land uses. Blocks with greater mixed uses were associated with lower assaults and robbery between 2008 and 2013 compared to blocks in the same community areas of Chicago. Blocks with higher commercial uses and less residential density, by contrast, had significantly elevated levels of assault and robbery. The effect of commercial uses of land on assaults and robbery appeared to be primarily the result of the presence of liquor stores, restaurants, and bars open late at night. This study provided compelling evidence of the legacy impact of zoning laws on current land uses, but it does not observe blocks actually changing from different forms of land use. The observed differences in crime on streets with commercial land uses may be due to preexisting changes already occurring.

Expansion of Mass Transit

The building or expansion of rail or other mass transit is another change of land use likely to have an effect on gentrification. The opening of new transit stops often leads to mixed-use development nearby, rising rental prices, and changes to the nearby residential population (Zuk et al. 2018). Transit opening or expansion provides a useful way to examine whether this form of land use is associated with changes in crime in neighborhoods. Five studies examined the impacts of new transit system station openings on crime using comparable control areas.

Liggett et al. (2003) examined changes in crime within a 0.5-mile radius of twelve Los Angeles County rail stations for the five years before and after their opening of rail transit (1991 to 1999). Reported crimes increased in 6 out of 12 station stop areas relative to adjacent sections of Los Angeles County. But it is unclear from this study whether the preexisting crime trends in the station stops and adjacent areas were comparable. Overall, the findings indicate that the new stations did not significantly increase crime.

Ihlanfeldt (2003) examined the expansion of four transit locations in Atlanta between 1991 and 1994 on crime in census tracts located within 0.25 miles of the station stops compared to a wider radius of 0.5 miles. There was a significant rise in crime in the areas around downtown stops and a reduction in the suburban locations. The study was underpowered to detect differences, as the sample size included only four transit stops located in nine census tracts that experienced rail transit expansion. It is also unclear whether the changes in crime near transit stops in downtown were a result of other factors, such as a declining commercial business environment in Atlanta during this time.

Cerdá et al. (2012) compared changes in homicides per capita and the prevalence of self-reported witnessing and experiencing violence in twenty-five districts in Medellín, Colombia, that received a cable-propelled gondola system connecting low-income areas to the city center to twenty-three comparable districts that did not receive the new transit system. The introduction of gondolas was associated with a 66% decline in homicide and a 75% drop in overall reported violence relative to comparison districts. These findings suggest that providing poor neighborhoods with access to wealthier center-city areas may help reduce the concentration of violence, but it is not likely that these mountaintop areas were gentrified, as they found no evidence of an increase in neighborhood amenities after the installation of the gondola.

Billings et al. (2011) examined the impact of the announcement and opening of a new light-rail transit system in Charlotte, NC, on crime. They compared changes in crime in 26 neighborhoods in South Charlotte near the light-rail transit to 15 neighborhoods in proposed future expansion corridors that had similar income, housing, race, and crime characteristics. The announced opening of rail transit in 2001 was associated with a 9% reduction in monthly property crimes in the South Charlotte neighborhoods that were located near the system relative to comparison neighborhoods proposed for future expansions, but there was no impact on crime after the rail transit actually opened in 2007. The 2001 announcement of the future opening of light-rail transit spurred an increase in the sales prices for single-family and condominium housing between 2003 and 2008 (Billings 2011), suggesting that the anticipation of a future rail system that could facilitate commuting to downtown Charlotte led to gentrification. Together, these findings suggest that the economic development associated with the planning of a new rail transit system reduced crime in neighborhoods.

Ridgeway & MacDonald (2017) estimated the effect of transit station openings in Los Angeles between 1990 and 2012 on crime in 281 neighborhoods located within 1 km of a transit location. During this period, Los Angeles opened commuter rail and incorporated six new lines. Measuring the changes in crimes per quarter in 116 neighborhoods within 200 m of transit stops compared to 165 neighborhoods further away (200–1,000 m) within the same sections of Los Angeles, they

found the opening of rail transit did not impact the number of crimes. Many of the areas that received rail transit also were experiencing economic redevelopment (e.g., South Central Los Angeles), providing strong evidence that rail transit, although spurring gentrification, did not lead to short-term changes in crime.

Urban Amenities

Papachristos et al. (2011) operationalized gentrification by measuring the opening of coffee shops in Chicago neighborhoods between 1991 and 2005, and their association with the changes in neighborhood counts of robbery and homicide. The opening of coffee shops was associated with a reduction in homicides and robberies relative to neighborhoods that do not have coffee shops. Majority-black neighborhoods saw an increase in robberies after coffee shops opened. But it is worth noting that there were only a handful of majority-black neighborhoods with coffee shops opening, and these were located in high-poverty sections of Chicago not undergoing gentrification. The study provides good descriptive evidence of an urban amenity being associated with a reduction in serious crime, but there is no comparison group of neighborhoods with similar pre-existing crime trends not receiving coffee shops. Future studies should build from this work and examine crime in neighborhoods before and after the opening of urban amenities compared to neighborhoods with similar preexisting levels of crime but without new urban amenities.

DISCUSSION

A small number of studies have examined the effects of gentrification and land-use changes in neighborhoods on crime. The most consistent evidence suggests that land-use changes associated with gentrification, including the demolition of high-rise public housing and the addition of mixed-use developments to neighborhoods, lead to short-term reductions in crime. Several studies also show reducing the blight in neighborhoods through the demolition or rehabilitation of abandoned housing reduces crime. Demolition and rehabilitation of vacant housing can facilitate gentrification. But there is no direct evidence linking housing demolition or rehabilitation and gentrification to neighborhood changes in crime. Infrastructure changes to urban spaces, including building jogging trails, bike lanes, and expanding mass transit, also attract gentrification. Transit expansions do appear to raise property values near newly created stations (Billings 2011) but have no discernible impact on crime. There is, however, sparse evaluation of the link between transit expansion and income changes in neighborhoods and neighborhood changes in crime. Finally, there is some evidence that an increase in urban amenities that are a sign of gentrification (e.g., coffee shops) are associated with reductions in crime. More studies are needed that examine neighborhood changes in crime after upscale urban amenities are built compared to neighborhoods that do not experience these upgrades.

The displacement of crime may also play a role in many land-use changes associated with gentrification and lower crime in neighborhoods, but studies that examine nearby crime displacement find little evidence of its occurrence. More can be done, however, to examine the displacement of residents and crime. Studies that have examined what happens to neighborhoods that receive displaced residents from demolished public housing or housing vouchers provide a good guide. Future research could more carefully examine whether land-use changes spur out-migration and what happens to crime in places to which displaced residents move.

Finally, it is worth noting that this review has focused on examining crime changes in neighborhoods as they are measured by existing studies. Some studies attempt to estimate rates of crime per population and rely on census data estimates (e.g., Twinam 2017), whereas others use the number of crimes per land area (e.g., Aliprantis & Hartley 2015, Ridgeway &

MacDonald 2017). The demolition of public housing and the expansion of transit, however, may reduce or increase the level of crime without changing the actual rate of victimization per population. If the demolition of public housing leads to fewer people in an area then the total volume of crime will drop without having an impact on the actual rate per population. Similarly, the expansion of transit may add new people to an area and raise the overall level of crime without actually impacting the overall rate of victimization. When crime is measured at lower levels of geography, it is preferable to rely on the distribution of crime per neighborhood (land area), as it is difficult to know the actual population in an area without knowing where people spend time. Furthermore, the number of reported crimes per area captured by census block, block group, or tract boundaries are effectively a rate per unit of residential population. At the same time, the rate of crime per residential population may mechanically change when land uses change in ways that impact the residential or daily population. Therefore, it is important to focus on how the crime per land area changes in places that gentrify compared to similarly situated places that do not experience gentrification.

Future Directions

There are several challenges in studying the relationship between gentrification, land use, and crime. First, there is a lack of conceptual clarity on what exactly constitutes a gentrifying neighborhood or even when a neighborhood is eligible to be gentrified (Wyly & Hammel 1998). One approach to addressing the lack of conceptual clarity on measuring gentrification is to say it is a process that can be captured from linear approximations of changes in populations, incomes, land uses, and urban amenities. Yet a large relative change in the demographic makeup of a neighborhood may still constitute a very modest change. For example, the construction of upscale condominiums and the opening of new coffee shops and restaurants in a neighborhood that is predominantly poor and minority may seem to qualify as an example of gentrification. Oftentimes, however, this form of land-use change is relatively modest and may result in only a 10% change in the race and class characteristics of a neighborhood's residential population. Better conceptual clarity on what constitutes gentrification would facilitate the use of combined measurement approaches, including linking changes in populations (e.g., race, age, and income), land uses (e.g., housing and commercial construction, sales prices, property tax assessments), and urban amenities (e.g., number of upscale restaurants, shops, parks, jogging trails) together to measure its occurrence (Hwang & Sampson 2014). Having greater conceptual clarity and measurement of gentrification would also facilitate a better understanding of its consequence for crime in neighborhoods.

Future research could examine the impact of changes in land use on different metrics of gentrification. For example, from open data sources in many cities, one can now count the number of building permits for construction and rehabilitation, zoning changes for mixed-use developments, and the location and timing of commercial licenses for upscale restaurants and bars. One could then link these land-use changes to visual evidence of urban revitalization captured by Google Street View or other systematic observation methods over a few years. Then one could see whether these land-use changes spur population measures of gentrification, such as relatively poor neighborhoods experiencing an appreciable rise in income (Ellen & O'Regan 2011), moving from the bottom quintile of the median income of a city to upper quintiles (McKinnish et al. 2010), or where there is evidence in confidential geocoded census data of the movement of a substantial share of affluent into poor center-city neighborhoods (Ellen et al. 2017). Linking land-use changes that measure urban revitalization to population changes that capture gentrification could help elucidate more clearly the link between gentrification and crime.

Displacement

One consequence of gentrification might be that crime is simply displaced to another section of a city or county that poor residents resettle. If gentrification leads to the displacement of crime to new areas, then studies need to document where longer-term residents move. Studies that examine out-migration rates tend to find that residents who own homes are just as likely to stay in a neighborhood after it has undergone some form of gentrification as they are to leave (Martin & Beck 2018). Studies also find lower-income residents are not more likely to move out of gentrifying neighborhoods (Ding et al. 2016, Ellen & O'Regan 2011), and that the racial demographics of the areas do not abruptly change (Sharkey 2012). Immigration to city centers by Asians and Hispanics also appears to be responsible for more displacement of lower-income blacks than the gentrification by upper-class whites (Hwang 2016). However, in the past decade, there is evidence of more center-city neighborhoods that were working-class or predominantly black seeing an influx of higher-income white professionals (Hwang & Lin 2016). These facts suggest that gentrification and displacement of residents in inner-city neighborhoods is increasingly a possibility when successful urban renewal happens. But there are no published studies that examine what happens to crime in these areas relative to the neighborhoods to which longer-term residents are displaced. Future research needs to capture mobility patterns to more effectively examine crime displacement following the gentrification of neighborhoods.

CONCLUSIONS

The revitalization of sections of many urban cities in the United States has renewed interest in understanding whether gentrification has a meaningful impact on neighborhood crime trajectories. Quasi-experimental studies suggest that changes in land use associated with urban revitalization and gentrification reduce crime in the short term. The impact of urban revitalization on overall spatial patterns of crime in cities over the long term remains unresolved. One consequence of the revitalization of urban spaces and changes in populations may be overall reductions in crime in cities but a growing inequality in crime between the safest and most dangerous city neighborhoods. Criminologists should partner with urban planners to study how changes to the land use of cities as part of urban revitalization can be made to generate population-wide crime reductions that benefit all places (MacDonald et al. 2019).

DISCLOSURE STATEMENT

The authors are not aware of any affiliations, memberships, funding, or financial holdings that might be perceived as affecting the objectivity of this review.

ACKNOWLEDGMENTS

Support was provided in part by grants R49CE002474 from the Centers for Disease Control and Prevention and R01AA020331 from the National Institutes of Health.

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