MULTIFAMILY UNITS IN THE DISPERSED CITY: MEASURING INFILL AND DEVELOPMENT BY NEIGHBORHOOD TYPE IN THE KANSAS CITY REGION

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ABSTRACT

Multifamily development patterns remain an overlooked aspect of the research examining urban growth and morphology. This study examines multifamily development patterns in the Kansas City Metropolitan Statistical Area from 1990 to 2010. Additionally, this study examines patterns of multifamily infill in order to determine (1) the growth rate of multifamily development within four infill scenarios, (2) whether high density neighborhoods receive disproportionate amounts of multifamily development, and (3) the rates of development in inner city, inner-ring, and outer-ring neighborhoods. This study found that rates of multifamily development were grew at up to twice the rate of single-family development in certain infill areas. Additionally, it found that multifamily development was dispersed throughout the metropolitan region, with prominent development taking place in inner city, inner-ring, outer-ring, and sprawling areas.
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While multifamily housing is often associated with the inner city, several recent studies have noted that multifamily’s presence in suburban neighborhoods has notably increased in the past three decades (Moudon & Hess 2000, Larco 2010). One key reason for this gradual increase in multifamily units throughout the metropolitan region is demographic changes. A combination of retiring baby boomers, a large millennial generation entering the housing market, and shrinking household sizes have increased demand for alternatives to the single-family unit, the housing type that has dominated urban development since the post-World War II era.

But multifamily development patterns remain largely overlooked. It is not known how much multifamily housing contributes to sprawl, or the extent to which multifamily housing contributes to infill. Nor is it known what types of neighborhoods are more likely to receive multifamily development. The goal of this thesis is to answer two questions with regard to regional multifamily development. This study examines (1) how much multifamily development is taking place in neighborhoods throughout a metropolitan
region, and (2) what types of neighborhoods are receiving the most multifamily development.
2.1 Problem Statement

Understanding the patterns of regional multifamily development will be important to planners and policymakers as the suburbs continue to diversify and as more people seek alternatives to the single-family house and homeownership (Myers, Dowell, & Gearin 2001, Nelson 2006). Multifamily housing has the potential to meet the housing needs of many groups that account for a growing share of the population. In addition, multifamily housing is often presented as a cure for a range of urban problems. Many claim that an increased supply of multifamily units can constrain urban sprawl, reduce traffic congestion, reduce pollution, increase neighborhood diversity, revitalize declining neighborhoods, and expand access to affordable housing (Biddle, Bertola, Greaves, & Stopher 2006, Colton & Collignon 2001, Hess 2005, Larco 2009, NAHB 2002). Multifamily developments are often presented as ideal infill projects, especially in declining neighborhoods (Haughey 2003). Yet many suburban municipalities in the United States severely hinder multifamily development
through exclusionary zoning and restrictive building codes (Chakraborty, Knaap, Nguyen, & Shin 2009, Danielson, Lang, & Fulton 1999, Levine 2006). Despite these barriers, multifamily units have steadily grown as a share of the suburban housing stock. In 1973, the first year of the American Housing Survey, multifamily units accounted for 9% of all suburban units. By 2005, that share had risen to 14% (Larco 2010, U.S. Census 1973).

Regional multifamily development has been largely overlooked in urban planning literature. Smaller multifamily units may be better-suited for the smaller households that have accounted for a growing share of the suburban population, including single-person households, childless couples, single-parent families, and empty nesters. Additionally, multifamily housing allows for greater opportunities for alternative transportation, which can accommodate low-income residents and retirees. The low level of commitment that comes with signing a lease can accommodate younger and more mobile residents, and the relative affordability of multifamily housing can accommodate low- and moderate-income residents. The foreclosure crisis that began in 2006 and subsequent recession has increased demand for multifamily rental units, and the share of multifamily units in the housing market is expected to increase even as the economy and housing market recover (Freddie Mac 2012). Finally, suburban multifamily housing, if designed with care, can meet many of the goals of sustainability and smart growth advocates (Colton & Collignon 2001, Haughey 2005).

The goal of this study is to gain a better understanding of multifamily development patterns, particularly in existing neighborhoods. This study will examine patterns of residential infill in the 2010 Kansas City Metropolitan Statistical Area (MSA).
First, the amount of multifamily and single-family infill development will be examined. Second, the rates of single-family and multifamily development will be examined in three types of neighborhoods: (1) the inner city, (2) the inner-ring, and (3) the outer-ring.

2.2 Hypothesis

First, this study hypothesizes that multifamily development within the defined infill areas will grow at a faster rate than single-family development. Older, existing areas of the metropolitan region are more likely than new, sprawling, suburban neighborhoods to have the demographic groups that prefer multifamily housing, and these older urban areas may have less restrictive land use policies with regard to high-density development. Second, this study hypothesizes that high-density urban and suburban areas will have higher rates of multifamily infill, as they are the neighborhoods more likely to contain adequate infrastructure and other amenities that attract multifamily residents, and they are less likely to have policies that make multifamily construction difficult. Third, this study hypothesizes that multifamily development will be particularly concentrated in inner city neighborhoods and outer-ring suburban neighborhoods, with little development in inner-ring suburban neighborhoods. This is due to the inner-ring “donut hole” effect as described by Leigh and Lee (2005), which posits that outward sprawl encourages population shifts to outer-ring suburbs, while the “back to the city” movement results in households moving to inner city neighborhoods. Inner-ring suburbs are skipped and will therefore see little new development.
2.3 Study Area

The U.S. Census Bureau (2004) defines metropolitan statistical areas as regions that contain “a core urban area of 50,000 or more population” and “consists of one or more counties and includes the counties containing the core urban area, as well as any adjacent counties that have a high degree of social and economic integration (as measured by commuting to work) with the urban core.”

Bisected by the Missouri River, and with Kansas City (MO) as its central city, the Kansas City MSA consisted of 10 counties in 1990. These were Johnson, Leavenworth, Miami, and Wyandotte counties in Kansas, and Cass, Clay, Jackson, Lafayette, Platte, and Ray counties in Missouri (U.S. Census 1990). Due to population growth and decentralization, Clinton County in Missouri was added to the MSA in 1997 (U.S. Census 1999). In 2003, the MSA was expanded again to include Franklin and Linn counties in Kansas, and Bates and Caldwell counties in Missouri, resulting in a total of 15 counties, with nine in Missouri and six in Kansas (U.S. Census 2004). The 2010 Kansas City MSA contains 134 municipalities and ranks as the fourth most politically fragmented region in the United States, with 10.6 local governments per 100,000 persons (Orfield 2002). In the time period of this study, from 1990 to 2010, the Kansas City MSA grew from 1,637,000 people to 2,035,000 people, or roughly 24%. This is comparable to the 23% rate of growth nationwide in the same time period. The number of residential units in the MSA outpaced population growth, growing from 640,000 in 1990 to 877,000 in 2010, or at a rate of 38%. This is above the national housing unit growth rate of 28% (Kansas City Area Development Council 2011). McClure (2011) found that between 2000 and 2009, the Kansas City MSA added roughly 34,000 units more than the market
demanded. This, and the collapse of the housing market, caused vacancies in the region to nearly double during that time period to 81,000 units in 2009. From 2000 to 2010, the Kansas City MSA’s growth rate of 11% ranked 26 out of the 51 MSAs in the United States with a population of over 1 million people (Renn 2011). Figures 1-3 show the Kansas City MSA in 1990, 2000, and 2010.

Population growth in the past two decades has been fastest in the outer-ring suburban areas of the MSA, particularly in Johnson County (KS), which lies southwest of Kansas City (MO) and includes the fast-growing suburbs of Olathe, Overland Park, and Lenexa. The county’s population increased from 2000 to 2010 by 24%, to 560,000 (U.S. Census 2000, 2010). Kansas City (MO) grew 4% to 460,000 from 2000 to 2010, with most growth was concentrated near the northern and southern edges of the city. The greatest net population losses in the Kansas City MSA have been in the urban core of Kansas City (MO), as well as in neighboring city of Kansas City (KS) (MARC 2001).

These growth patterns are typical of many mid-sized metropolitan regions in the Midwest. Berube, Singer, Wilson, & Frey (2006) noted that Kansas City, along with Midwestern regions like Detroit, St. Louis, Cincinnati, Cleveland, and Milwaukee all added more housing than population in the 1990s and experienced substantial growth at the urban fringe while losing population in the urban core area.
Figure 1. The 1990 Kansas City MSA

Counties in the 1990 Kansas City MSA
Johnson County (KS)
Leavenworth County (KS)
Miami County (KS)
Wyandotte County (KS)
Cass County (MO)
Clay County (MO)
Jackson County (MO)
Lafayette County (MO)
Platte County (MO)
Ray County (MO)

Figure 2. The 2000 Kansas City MSA

Counties added to the 2000 Kansas City MSA
Clinton County (MO)

Figure 3. The 2010 Kansas City MSA

Counties Added to the 2010 Kansas City MSA
Franklin County (KS)
Linn County (KS)
Bates County (MO)
Caldwell County (MO)

= Incorporated Area
= Central City of Kansas City (MO)
2.4 Definition of Terms

2.4.1 Multifamily housing

There is no single definition as to what constitutes a multifamily housing unit or a multifamily housing structure. For example, the U.S. Census (2012a) defines a multifamily unit as any housing unit in a structure that contains two or more units, while the Urban Land Institute (2011) defines a multifamily unit as any unit in a structure with ten or more units. This study uses the definition Larco (2010) and the National Association of Home Builders (2002) use for multifamily housing: As residential units in a structure that contains five or more residential units. This definition will exclude duplexes or smaller townhouse structures, which often share characteristics of both single-family and multifamily housing. Several studies have defined multifamily housing as rental-only housing (Colton & Collignon 2001, Follain 1994), while other studies made no distinction for tenure (Atkinson-Palombo 2010, Haughey 2003, Horowitz 1983, Larco 2010, Moudon & Hess 2000). Because this study focuses on residential development and not tenure, it will follow the latter example and include all owner-occupied and renter-occupied multifamily units. This means that the multifamily units tracked in this study are not necessarily affordable housing. Many newer multifamily units built in suburban areas are luxury condos (Atkinson-Palombo 2010, Colton & Collignon 2001). But since multifamily units have the potential to be affordable, this study may point to areas that could potentially be open to affordable housing development (Carruthers 2003, Pendall 2006).
2.4.2 Single-family housing

Defining single-family units is a bit easier. In this study, single-family units will be defined as any residential units in a structure that contains no other units, or is attached to one other unit by an adjacent wall (U.S. Census 2012a). It was necessary to include attached single-family units, which are often called duplexes, as the tables from the 2000 Census and the 2006-2010 American Community Survey used in this study to count the number of housing units built by decade combine single-family detached and attached units. Single-family attached units are “separated from the adjacent unit by a ground-to-roof wall.”

2.4.3 Sprawl

This study compares rates of residential sprawl to residential infill development. While many studies have focused on sprawl, a concrete definition remains elusive. Wheeler (2008) noted that sprawl is a phenomenon that many can't articulate, but “they know it when they see it.” Sprawl is primarily driven by new residential development on the urban fringe (Hammer, Stewart, Winkler, Radeloff, & Voss 2004). As such, it is the physical manifestation of population decentralization. This first part of this study is concerned with determining the effects of infill and it will try not to include sprawling development in the analysis. For this study, sprawl will be defined as any residential development that occurs within the Kansas City MSA that is outside one of the defined infill scenarios.
2.4.4 Infill

Like sprawl, infill has been a popular topic in recent planning literature, but a concrete definition remains elusive. Generally, infill is regarded as development in urbanized areas that results in a more intensive land use. In other words, infill is development in built-up areas that increases housing and population density. High rise development, medium density housing, redevelopment, and urban consolidation have all been used to describe infill (Biddle, Bertola, Greaves, & Stopher 2006). Infill in this study will be defined as residential development that occurs within one of the four infill scenarios defined in Chapter IV. These scenarios will determine areas of infill based on population density, residential density, neighborhood age, and by the borders of Kansas City (MO).

There is also no settled definition as to the types of development that should qualify as infill. Some authors define infill as new developments on vacant parcels (Farris 2001, Steinacker 2003, Wiley 2007). Other authors have defined infill as redevelopment of existing properties (Charles 2011, Dye & McMillen 2007, Rosenthal & Helsley 1994). The data sources for this study—the 2000 U.S. Census and the 2006-2010 American Community Survey—do not count redeveloped units. As such, this study will use the former definition and count only new residential developments as infill.

2.4.5 Neighborhoods

Chapter IV in this study measures residential development in three neighborhood types: (1) inner city neighborhoods, (2) inner-ring neighborhoods, and (3) outer-ring neighborhoods. These neighborhoods are determined by the era in which they
experienced the highest levels of residential development before 1990. In other words, these classifications ignore residential development that occurred from 1990 to 2010. The classification method was adapted from Leigh & Lee (2005).

2.4.6 Inner city neighborhoods

Inner city neighborhoods are all Census tracts that saw their peak residential development prior to 1950. In other words, inner city neighborhoods do not have to be in the urban core of the MSA, nor do they have to be in the central city of Kansas City (MO). This classification also captures older suburban neighborhoods that developed prior to 1950, but these suburbs share important characteristics with urban core areas in that they developed in when walking or streetcars were the primary mode of transportation. As a result, the suburban and urban neighborhoods in this classification tend to have higher residential densities, offer better access to public transportation, and include more alternatives to the single-family house (Hayden 2003, Jackson 1985).

2.4.7 Inner-ring neighborhoods

For the purposes of this study, inner-ring neighborhoods are defined as Census tracts that saw their peak of residential development between 1950 and 1969. The suburbs that developed during this era are different from the neighborhoods that developed prior to 1950. Namely, they were unplanned, auto-oriented, and predominantly single-family. As their classification method suggests, inner-ring neighborhoods grew in the immediate postwar decades, as economic prosperity and easy access to mortgages spurred a home building boom (Hayden 2003, Lee & Leigh 2007).
2.4.8 Outer-ring neighborhoods

Outer-ring neighborhoods are defined as Census tracts that saw their era of peak residential development between 1970 and 1989. The neighborhoods that developed in this era tend to be even lower-density than inner-ring neighborhoods, as both houses and lots are larger, and residential development patterns are characterized by high levels of leapfrog development. Like inner-ring neighborhoods, outer-ring neighborhoods are generally unplanned, auto-oriented, and predominantly single-family (Hayden 2003, Lucy & Phillips 2000).
CHAPTER III
REVIEW OF LITERATURE

3.1 Introduction

This study examines rates of multifamily infill within the 2010 Kansas City MSA, and the types of neighborhoods that receive the most infill development in the region. This literature review covers two broad topics: (1) the history multifamily housing in the United States, and (2) urban growth patterns.

3.2 Multifamily Housing

3.2.1 Multifamily History

Outside of inner city neighborhoods, multifamily housing is typically viewed as a secondary, or inferior, form of housing only suitable for households unable to afford to purchase a single-family unit (Baar 1992, Glaeser 2011). The second-class status of multifamily housing is the result of longstanding beliefs of the superiority of the single-family house, as well as antiurban biases within Anglo and American culture. These
historic sentiments were exacerbated in the United States as the industrial revolution of
the nineteenth century brought factories to central cities. This led to densely-populated
cities that were noisy, polluted, congested, and crime-ridden. In the late nineteenth
century, the writings of educator Catherine Beecher acclaimed the virtues of domesticity,
while the single-family designs of Andrew Jackson Downing and Calvert Vaux helped
establish the single-family house as the only acceptable venue for raising a happy and
healthy family. In contrast, shoddily-built multifamily tenements that housed immigrants
and factory workers were perceived to lead to vice, poverty, and disease (Hayden 2003,

Despite this prevailing popular preference for the single-family home on a large
lot, many Americans in the first half of the twentieth century were generally confined to
cities and multifamily housing out of necessity. The lack of widespread automobile
ownership and a dependency on streetcars and other forms of public transit constrained
most households to living in high-density urban areas (Hayden 2003, Jackson 1985). But
this changed after World War II, as returning GIs and a prosperous economy led to a
sharp increase in housing demand, and a suburban housing construction boom. For the
first time in American history, single-family houses were accessible to a large segment of
the population. And while single-family houses consisted of a majority of units built in
these new suburbs, multifamily structures weren’t ignored. Multifamily development
quadrupled from 1955 to 1963, and half of all multifamily units built in the 1960s were
built in the suburbs (Schafer 1974).

Multifamily development remained steady into the 1970s, but demand greatly
dropped in the 1980s and early 1990s, as the less-populous “baby bust” generation
entered the housing market (Colton & Collignon 2001, Larco 2010, Myers & Pitkin 2009). Multifamily construction increased in the late 1990s and into the 2000s, an uptick attributed to changing demographics, easy access to finance, relatively low construction costs, and an increase in demand for luxury multifamily units. Roughly 350,000 multifamily units were built each year from 1997 to 2007 (Ewing 1997, JCHS 2011b, Myers & Pitkin 2009).

The collapse of the housing market in 2008 did not affect multifamily construction as severely as single-family construction, but multifamily development still dropped by more than 50% in 2009 and remained low in 2010 (JCHS 2011a, Myers & Pitkin 2009). 2011 saw a slight increase in multifamily building permits, suggesting that the market may have begun to recover (U.S. Census Bureau 2012). The foreclosure crisis of the mid 2000s and subsequent recession produced an increased demand for rental units and for multifamily rentals in particular (ULI 2011). Some of the states most affected by the foreclosure crisis, including California and Florida, experienced the largest increases in multifamily construction starts (JCHS 2011b, U.S. Census Bureau 2012).

Although still a fraction of suburban single-family construction, the suburban multifamily housing market has steadily grown as a share of the overall housing market. In 1973, there were 3.5 million multifamily units in the suburbs, making up 9% of the total suburban housing stock (U.S. Census Bureau 1973). In 2005, there were 9 million multifamily units in the suburbs, accounting for roughly 14% of the total suburban housing stock. An additional 5 million units are projected to be added by 2030 (Larco 2010). Many predict that changing demographics, increased demand for alternative
housing types, and changing policies will lead to an increased supply of multifamily housing in the suburbs (Danielson & Lang 1998, Myers & Pitkin 2009, Nelson 2006).

3.2.2 Multifamily development patterns

Multifamily development patterns have been generally overlooked in planning literature, with the exception of a few recent studies. Moudon & Hess (2000) found patterns of unplanned clustering of multifamily housing in the suburbs of the Seattle metropolitan area. While these clusters challenged traditional depictions of suburban growth as continually decentralizing, the authors noted that these clusters often developed in unincorporated areas that incorporated at a later period. This was because the county governments that oversaw land use in unincorporated areas were more receptive to multifamily development than nearby incorporated suburbs, which had policies that restricted multifamily development. The authors did not address whether or not these clusters contributed to sprawl.

Others have found that multifamily development dispersed in a similar manner as single-family development. Atkinson-Palombo (2010) and Gober & Burns (2002) examined sprawling residential development patterns in the Phoenix metropolitan region in the 1990s and early 2000s. They found that multifamily units were typically not a part of residential development on the urban fringe, but rather they “filled in” empty parcels after the initial wave of single-family suburban development. These findings are in accord with Ohls & Pines’ (1975) model of infill, where skipped-over parcels increase in value, making high-density development the most economically-feasible choice.
Other studies described certain characteristics of multifamily housing. Suburban multifamily developments are often designed to be inconspicuous or outright hidden. This is often the result of strict zoning codes for multifamily units, as well as a general desire to avoid “not-in-my-backyard” (NIMBY) resistance from community members (Moudon & Hess 2000). In addition, suburban multifamily units are typically built along arterial roads and adjacent to retail, often serving as buffers between retail and single-family neighborhoods. Precedence for treating multifamily units as peripheral or as buffers dates to Clarence Perry’s neighborhood unit design and Clarence Stein’s plan for Radburn, New Jersey. These early twentieth century plans placed multifamily units on the outer edges of their respective neighborhoods, while single-family units populated the center. These plans contributed to the popular notion that multifamily units were inferior or undesirable. In addition, the plans established the pattern of separated land uses that characterized most suburban development in the post-World War II era. These plans’ influence on the contemporary urban landscape can be seen in the placement of multifamily units in areas deemed inappropriate for single-family or commercial uses (Gravin 2002, Hess 2005).

3.2.3 Barriers to multifamily development

Historical prejudices regarding multifamily housing still linger, and they have a great influence on the location of multifamily housing. That zoning codes and other local ordinances seriously restrict suburban multifamily development is widely acknowledged (Choppin 1994, Levine 2006, Schuetz 2008). Policy aimed at restricting the construction of new multifamily housing goes back to the 1890s, when cities began to adopt stringent
building codes, such as height regulations or strict fire codes that made multifamily construction unfeasible. Zoning that differentiated between single-family and multifamily land uses emerged in the 1910s in reaction to concerns that multifamily development would invade and sully predominantly single-family neighborhoods (Baar 1992). In 1926, the Supreme Court upheld the constitutionality of zoning in *Euclid v. Ambler Realty*, a case that dealt specifically with multifamily housing development. Exclusionary zoning was justified under the nuisance law, an established element of Anglo-American common law (Levine 2006). In the majority opinion, the court famously compared a multifamily structure to “a parasite” that could negatively impact the “residential character of a neighborhood.” In the ensuing years, state and local courts developed a zoning hierarchy that placed single-family housing units at the top (Hess 2005).

Historical patterns of suburban development resulted in a popular association between the suburbs, detached single-family houses, and safety, stability, good schools, low crime, and low taxes. At the same time, multifamily units carried a popular association with central cities, and as the houses of low-income residents (Danielson & Lang 1998, Hess 2005). These perceptions often fuel NIMBY opposition to multifamily development in suburban communities, and affect where multifamily development can and cannot occur. Homeowners have a strong vested interest in maintaining the value of their house and property, as it is often their largest financial asset. Notable changes to their neighborhood are often viewed as a potential threat to their property’s value (Downs 2005). Despite a gradually increasing demand for multifamily units, NIMBY opposition often leads to local regulatory policies that severely limit the potential for multifamily development in suburban municipalities (Glaeser 2011). Suburbs tend to zone land for
multifamily use only if it is not suitable for single-family housing (Levine 2006, Schmitz 2000).

Most studies that assess the impact of new, nontraditional residential developments on surrounding single-family property values have focused on affordable housing, and not explicitly on multifamily housing. But three recent studies did solely examine multifamily developments. Goetz, Lam, & Heitlinger (1996) examined the impact of subsidized multifamily units developed by community development corporations within the urban core of Minneapolis. They found that these developments resulted in a modest increase of surrounding property values. Pollakowski, Ritchay, & Weinrobe (2005) analyzed seven mixed-income multifamily rental developments in suburban Boston neighborhoods built between 1980 and 2000. They concluded that none of the seven developments affected the values of surrounding homes. Von Hoffman (2003) found that the presence of multifamily units correlated with higher single-family home values in low- and moderate-income communities between 1970 and 2000.

In addition to exclusionary zoning and other restrictions on multifamily development, federal policy has valued single-family homeownership over all other alternatives. Federal policy innovations like the secondary mortgage market for single-family homes and the federal mortgage interest tax deduction have made single-family homes the most attractive residential investment. These policies divert the amount of capital available for multifamily investment (Glaeser 2011, Larco 2010). Beginning in the Great Depression, institutions like the Federal Housing Administration and the Federal Home Loan Bank focused on expanding single-family homeownership by insuring mortgages. At the same time, multifamily housing was addressed through a
public housing program. In 1937, the federal government began to provide multifamily housing directly to low- and moderate-income households. These two vastly different policy approaches further cemented multifamily housing as the perceived inferior housing type in the minds of many Americans (Schmitz 2000, Schwartz 2006).

Advocates for the status quo argue that zoning is the embodiment of free market forces. Since low-density, single-family sprawl has characterized residential development in the post-World War II era, the results of that development—including social homogeneity and homogeneity of housing type—must be the urban form desired by a majority of Americans (Easterbrook 1999, Garreau 1991, O’Toole 1999). Others argue that exclusionary zoning is economically inefficient, as it distorts local housing markets, and that there is a large demand for alternatives to single-family housing that are not being met (Calthorpe 1993, Danielson & Lang 1998, Levine 2006).

Downs (1992) argued that federal and state governments must work to counteract these barriers. He suggested that HUD offer federal tax credits and mortgage revenue bonds to local governments that repeal exclusionary zoning policies. Glaeser (2011) argued that the federal government can reduce exclusionary zoning though litigation. As an example, he cites HUD’s successful case against Westchester County, New York, as well as the New Jersey Supreme Court’s Mount Laurel decisions. These cases mandated the inclusion of affordable housing in communities that were found to have excluded units for low- and moderate-income households by design.
3.2.4 Suburban Multifamily Choice and Demographics

Follain (1994) noted that those who choose multifamily units over single-family units are making a tradeoff of reduced privacy for other amenities. These amenities can include reduced responsibility for maintenance, ease of relocating, or a preferable location. In addition, multifamily developments spread the costs of land across several units, potentially allowing for more affordable housing units. In many locations, multifamily units are the only available affordable housing for low- and moderate-income households (Downs 1992). Luxury or upscale multifamily structures include amenities aimed at attracting middle- or upper-income professionals. These include on-site office space, meeting rooms, fitness facilities, cafes, restaurants, and concierge service (Danielson & Lang 2008, Skaburskis 1988, Zeitz 2003).

Myers & Ryu (2008) argued that scholars tend to overlook the impact of demographic trends on urban form. It is interesting, then, that the major studies of suburban multifamily development have focused on demographics (Horowitz 1983, Larco 2010, Schafer 1974). Schafer attributed increases in suburban multifamily development to the arrival of the baby boom generation into the housing market. Horowitz identified young people, childless couples, the elderly, and the divorced as the primary markets for suburban multifamily housing. Larco added racial and ethnic minorities and immigrants to the groups that choose suburban multifamily housing. In addition, Larco noted that as the suburbs have grown increasingly diverse in recent decades, suburban multifamily housing has captured a disproportionate share of that diversity. These groups are expected to grow as a share of the suburban population in the near future, and many have predicted an imminent shift in housing preferences as a result

3.3 Urban growth patterns

3.3.1 Historical Models

Several models of urban growth patterns have been proposed to explain the changing urban form. Based on ecological models, Burgess (1925) noted the heterogeneity of urban areas with an urban growth model that depicted a series of concentric circles that emanated from the city center. Each circle represented a type of residential land use. This model sought to explain the spatial configuration of a city through free market processes such as succession and competition. Moving from areas nearest to the central city to the farthest, the zones were: I. The central business district; II. The transitional zone; III. The working class zone; IV. The residential zone; and V. the commuter zone. This early model depicted a residential form that would be common among metropolitan areas in the United States throughout much of the twentieth century. Namely, the most affluent residents lived farthest from the city center, while successively less-affluent residents lived in rings closer to the city center.

Hoyt’s (1939) model was based on Burgess’ concentric model, but the concentric circles are less important to determining land use than Hoyt’s “sectors,” which depicted land uses expanding outward from the city center along corridor-like patterns. Harris & Ullman (1945) addressed the growing complexity of the urban form with a multiple-nuclei model of urban land use. This model depicts an urban area with several nodes, instead of a single central business district (CBD). Clark’s (1951) model uses population
density gradient to depict urban areas. As distance from the urban core increases, population decreases.

Cycles of urban growth in the past century have largely been a series of booms and busts, which are closely linked to population booms and eras of economic expansion. Each boom cycle adds a growth ring to a metropolitan area, and the size of the ring depends on the relative size of the building boom and the type of housing units built during that boom (Adams 1970). Each ring expresses the relative consumer income levels, spending habits, and other preferences that were dominant during that boom era.

In particular, the dominant transportation mode had a strong influence on the density and spatial structure of each growth ring. Jackson (1985) noted that technological innovations like the ferry boat, steam railroads, electric trolleys, and automobiles all allowed urbanized areas to expand beyond what was previously feasible.

While industrial and commercial land uses made up large portions of developed land in earlier boom eras, the majority of urban development in the post-World War II era has been for residential land uses (Adams 1970). This means that urban growth patterns are largely shaped by the residential choices of middle- and upper-income families with children (Filion, Bunting, & Warriner 1999). In the United States, new urban development is concentrated on the edge of the metropolitan area known as the urban fringe. Urban fringe development consists of low-intensity, traditionally rural land uses that are replaced by relatively higher intensity, traditionally urban land uses (Adams 1970, Hart 1991, Mills 1992, Muth 1985). In other words, urban fringe development is sprawling development.
Like Burgess’ model, Lee & Leigh’s (2007) metropolitan model is also concentric, with a central city surrounded by inner-ring and outer-ring suburbs. But instead of a gradually increasing succession of affluence with distance from the city, Lee and Leigh use their model to point out decline in the older, inner-ring suburban neighborhoods. At the center is the prosperous downtown, followed by a blighted inner city, distressed inner-ring suburbs, and prosperous outer-ring suburbs.

3.3.2 Suburbanization and Sprawl

Discussion of urban growth in the United States in the twentieth century cannot exclude mention of sprawl. In the past thirty years, most metropolitan areas have added urbanized land faster than they have added population (Fulton, Pendall, Nguyen, & Harrison 2001). Sprawling residential development has led to the deconcentration of population and employment in most metropolitan areas in the United States.

While sprawl is a widely-addressed topic in planning literature, there is currently no settled definition for sprawl. Some literature defines sprawl as a particular kind of urban growth (Downs 1998), while others label all new urban development as sprawl (Fodor 1999). But most agree that sprawl occurs in nonurban, or greenfield areas and is characterized by unplanned, scattered site, low-density, single use, and auto-oriented development (Bengston, Fletcher, & Nelson 2004, Downs 1998, Ewing 1997, Galster, Hanson, Ratcliffe, Wolman, Coleman, & Freihage 2001, Hasse & Lathrop 2003). Sprawl is not restricted to fast-growing metropolitan areas. Faster-growing metropolitan areas may consume more total area than slower-growing metropolitan areas, but Fulton,
Pendall, Nguyen, & Harrison (2001) found that slower-growing metropolitan areas tended to consume more land per capita.

Blumenfeld (1954) developed an early model of sprawl similar to Burgess’ concentric ring model. Measuring residential development in the Philadelphia region, he identified six concentric zones. The first and outermost was the rural zone. The second was the pioneer settlement zone, which was sparsely-populated area at the edge of the urban fringe. The third was the peak development zone. Fourth was the infill zone, which had fallen from its peak development levels but was still seeing some development. Fifth was the built-up zone, which saw relatively little new development.

There are several forces that fuel sprawl. Because sprawl is primarily driven by new residential development, the greatest drivers are middle- and upper-income households and their preference for large, new houses on large lots, as well as for quality schools (Colton & Collignon 2001, Hammer, Stewart, Winkler, Radeloff, & Voss 2004, Steinacker 2003). Many have argued that sprawl is not the result of natural market forces, but rather the result of federal and local policies (Ewing 1997). The federal home mortgage deduction encourages households to buy larger homes, as the amount available for deduction increases with the size of a mortgage (Glaeser 2011). Outer-ring suburban municipalities encourage sprawl because it boosts the local tax base, spreads the costs of infrastructure, and enriches the local economy (Lucy & Phillips 2006). Metropolitan areas with high levels of political fragmentation are associated with higher levels of sprawl (Fulton, Pendall, Nguyen, & Harrison 2001).

The environmental impacts of sprawl include the overconsumption of land and a reduction in open space, excessive automobile dependency, increased congestion,
increased pollution, increased infrastructure costs, a lack of affordable housing, and disinvestment in older urban and suburban neighborhoods. In addition, the larger house sizes and increase in vehicle miles traveled consume more energy and produce more carbon emissions (Downs 1999, Glaeser 2011, Hasse & Lathrop 2003, Lucy & Phillips 2006). The lack of pedestrian options and the overwhelming automobile dependency that characterizes sprawling development produces negative health outcomes, such as increased obesity and morbidity (Ewing, Schmid, Killingsworth, Zlot, & Raudenbush 2008, Lucy & Phillips 2006).

While sprawl inspires strong negative reactions from environmental groups, planners, and urbanists, it also has many defenders. Kotkin (2011) argues that sprawl increases the supply of housing units, thereby reducing the price of housing, which expands homeownership to more households. In addition, the benefits of owning a detached single-family house are not trivial. Single-family homeowners have relatively greater privacy and space, and homeownership has historically been a relatively safe investment, as homes have generally increased in value (Nelson 2006).

Some have argued that the collapse of the housing market and subsequent recession will result in less sprawl and may even lead to new development patterns more in line with the goals of the smart growth and New Urbanism movements (Badger 2011, Nelson 2009). But Schultz (2012) examined 12 large metropolitan areas and found no notable reversal in population decentralization patterns between 2007 and 2010, indicating that sprawl continues to be the dominant form of urban development in the United States.
3.3.3 Infill

Along with sprawl, infill development has also been a widely-discussed topic in planning literature in recent decades. But defining infill can be just as difficult as defining sprawl. To many, infill is the opposite of sprawl. Infill has been defined as residential, commercial, or industrial development on vacant land in urban areas where there is existing access to sewers and other public services (Hudnut 2001, Landis, Hood, Li, Rogers, & Warren 2006, MRSCW 2012, Wiley 2007). Some also include the redevelopment of existing structures in urban areas (Biddle, Bertola, Greaves, & Stopher 2006).

While the concept of infill dates back at least to the urban renewal projects of the 1950s and 1960s, it is still a novel and relatively unconventional development (Downs 2001). Recent studies of infill have generally underscored its rarity. Farris (2001) defined infill as any residential development within central cities and found that only 5.2% of residential development in the metropolitan areas of 22 older cities between 1989 and 1998 was infill. But Steinacker (2003) noted that central city areas are typically a small share of their entire metropolitan region. When land area is controlled for, infill rates in the central cites of the largest consolidated metropolitan statistical areas from 1996 to 2000 were three times higher than rates of development outside central cities. Wiley (2007) defined infill as development within priority funding areas (PFAs) of Montgomery County, Maryland. PFAs were areas where the state government would not restrict funding for new development. Wiley found that 80% of all new residential development occurred within PFAs, and that lot sizes for single-family units were smaller in PFAs, and that more multifamily units were built in PFAs. Hagerty (2012) developed
four methods for measuring infill in the Atlanta region between 2000 and 2009 based on (1) population density, (2) unit density, (3) neighborhood age, and (4) central city boundaries. He found that infill rates can vary based on the method used, but that sprawl outpaced infill in all methods tested. These studies highlight the difficulty in determining an appropriate area to measure infill.

While infill is often presented as a solution to sprawl, sprawl increases the potential for infill. The low-density, leapfrog development patterns that characterize sprawl create a larger urbanized area with many new undeveloped parcels (McConnell & Wiley 2010). Additionally, some urban development models posit that leapfrog development patterns may be more efficient than planned or sequential development because the value of skipped-over parcels increase as a result of surrounding development. This in turn makes them more likely to be developed at relatively higher densities, as those may be the only economically feasible choice (Ohls & Pines 1975). But these higher-density infill projects are only possible if there are no local restrictions on residential development density, or there is no strong resistance from current community residents.

The difficulty in pursuing infill development has been a recognized problem since at least the early twentieth century (Walker & Wright 1938). Infill faces three types of barriers: (1) economic, (2) environmental, and (3) political.

The economic barriers to infill are primarily due to the fact that greenfield development is usually far cheaper than infill. Land assembly in urbanized areas may include dealing with several landowners, whereas development on the urban periphery may only include only one or two property owners. In addition, land assembly in
urbanized areas often includes costs for relocation, demolition, clearance, and site preparation. In urbanized areas, these may amount to $15 per square foot. In contrast, land assembly in greenfield locations can range between $.25 and $4 per square foot (Farris 2001). Finally, the infill market has not been as well-researched and is not as well-understood relative to other real estate markets (Lang, Hughes, & Danielson 1997).

Environmental factors also impede infill development. Often, the neighborhoods that would benefit the most from infill development are the same neighborhoods that lack the conditions that make profitable infill possible. These include aging infrastructure, a lack of adequate municipal services, and a lack of retail or grocery stores (Farris 2001). Sutchman & Sowell (1997) noted that infill projects in declining neighborhoods must be large if they are spur greater environmental improvements. While many point to infill’s efficient use of existing infrastructure, Farris (2001) noted that infrastructure in older neighborhoods is often obsolete. Additional drainage, alleys, and underground cable may be required (Simons & Sharkey 1997). Finally, many unused parcels in built up areas are brownfields, areas that contain hazardous pollution or waste. Even with the range of policy tools provided to clean up brownfields, the costs of development, along with the perception of brownfields as dangerous and unattractive, remain barriers to redevelopment (DeSousa 2000, McCarthy 2002).

Infill development faces political barriers similar to multifamily development. Residents fear increased congestion, increased demand for local services, the reduction of open space, and lower property values. Additionally, residents fear that proposed infill projects are an indication that the neighborhood is declining (Wiley 2007, McConnell & Wiley 2010). On the other hand, infill in declining or depressed neighborhoods may also
raise concerns of gentrification and displacement. An infill project designed to house an income group that is higher than the current median income of the neighborhood risks community resistance. Gentrification remains a paradox in many declining neighborhoods. It has the potential to raise surrounding property values, but it also has the potential to displace current residents (Wyly & Hammel 1999).

In addition to community resistance, infill can be stymied by local regulations, restrictions, and social programs. Central cities and older suburbs, the main receivers of infill, are more likely than newer, outer-ring suburbs to have longer permitting processes and policies like linkage fees or social programs that require hiring of city residents, and requirements to set aside a certain number or units for affordable housing (Farris 2001, Porter 1995).

Considering the many barriers to infill development, Farris (2001) concluded that only developers who specialize in the infill process will have the knowledge and resources to overcome them. These developers already exist, and many of them are not solely motivated by profit, but also by the desire for neighborhood revitalization, historic preservation, or sustainability.

3.3.4 Changing Suburbs

Along with demographic changes addressed previously in this Chapter, the underlying cause of this growing suburban heterogeneity is the fact that some suburbs have prospered while others have declined. A more nuanced depiction of urban development patterns shows that newer, outer-ring suburbs grow at the expense of both central city and older, inner-ring suburbs (Lee & Leigh 2007, Lucy & Phillips 2006). Suburban decline has only recently begun to receive widespread attention. Recent literature has found patterns of the same fiscal and social problems in many inner-ring suburbs similar to those found in central cities (Hudnut 2003, Jackson 1985, Lucy & Phillips 2000, Orfield 1997). Orfield (2002) argued that suburban decline is inextricably linked to sprawl. New housing developments in outer-ring suburbs attract higher-income residents, who in turn abandon inner-ring suburban homes, which are then occupied by relatively lower-income households. The general result is that these inner-ring neighborhoods become poorer (Bier 2001, Downs 1981, Galster 1996, Grigsby 1963, Hoyt 1939, Lowry 1960).

Suburban decline is characterized by a slow or negative population growth, a rise in concentrated poverty, a reduction of local resources, a declining local economy, declining schools, an aging housing stock, aging infrastructure, stagnating property values, deindustrialization, high vacancy rates, and an aging population (Hanlon 2008a, Short, Hanlon, & Vicino 2007, Skaburskis & Moos 2008). Lucy & Phillips (2006) found that many inner-ring suburbs declined faster than their central cities in the 1990s.

Inner-ring suburban decline is also associated with an increase in the number of low-income residents and an increase in the number of minorities (Vicino 2008). Hanlon (2008a) found an association between declining white population and overall suburban
decline. Additionally, many inner-ring suburbs have become new immigrant gateways (Singer 2004). But changing demographics are not the sole driver of inner-ring suburban decline. Smith, Caris, & Wyly (2001) found that neighborhood disinvestment precedes racial and ethnic transition. Due to continuing discrimination in the housing market and a lack of affordable housing in stable or thriving suburbs, declining inner-ring suburbs have become a destination for minority groups.

In other words, many of the groups that account for a growing share of the suburban population and a disproportionate share of suburban multifamily housing units also account for a growing share of inner-ring suburban population. But the relationship between suburban type and housing unit type has been largely unexamined in planning literature.
CHAPTER IV

METHODOLOGY

4.1 Introduction

While associated with high-density, inner city areas, multifamily housing can be found in a range of neighborhoods and throughout most metropolitan regions (Atkinson-Palombo 2010, Larco 2010, Moudon & Hess 2000). But there has been little examination of regional multifamily development patterns. For example, multifamily’s role as either a driver of sprawl or infill has been largely unexplored. First, this section provides a methodology for the four infill scenarios in this study, which identifies the amounts residential infill using different calculation methods. Second, this section provides the methodology for determining neighborhood type and for identifying rates of multifamily development in different neighborhoods within the 2010 Kansas City MSA.

4.2 Data Sources

The source for all population, housing, unit, and Census tract data used in this study was obtained from the U.S. Census, specifically the 1990 Census, the 2000 Census,
and the 2006-2010 American Community Survey. GIS shapefiles of 1990, 2000, and 2010 Census tracts were obtained from the National Historic Geographical Information System at the University of Minnesota website, while population and housing unit data was collected from the Census.gov website. Census tracts were chosen as the unit of analysis, as they are the smallest geographic area used by the Census that distinguishes between single-family and multifamily units. ArcGIS was used to map each infill scenario and each neighborhood type in the 2010 Kansas City MSA.

4.3 Methodology for Measuring Residential Infill

While infill has been a widely-discussed topic within planning literature, there is still no consensus as to what type of development qualifies as infill. Infill is often presented as the opposite of the equally difficult-to-define sprawl. This section will provide the methodology for determining infill in the 2010 Kansas City MSA through four infill scenarios adapted from Hagerty (2012). The different infill scenarios are based on population density, residential density, neighborhood age, and central city boundaries.

4.3.1 Infill Scenario 1: The 1990 Urbanized Area

The first scenario is based on population density and classifies infill as all new residential development that took place in the between 1990 and 2010 that is within the Census-defined 1990 urbanized area of the 2010 Kansas City MSA. As such, any residential development outside the 1990 urbanized area boundaries between 1990 and 2010 will be considered sprawl, while all residential development within the urbanized area will be considered infill. This infill scenario is similar to the methodology that

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1 1990 was chosen as it is the beginning year of this study’s analysis.
Figure 4. Infill Scenario 1, The 1990 Urbanized Area

Figure 5. Infill Scenario 2, Residential Density

Figure 6. Infill Scenario 3, Residential Age

Figure 7. Infill Scenario 4, The Central City
Sandoval & Landis (2000) used to measure potential infill areas in the San Francisco metropolitan region. In addition, the 1990 urbanized area is the area currently used by the Mid-America Regional Council, the regional planning organization in the Kansas City metropolitan area, to define the “redevelopment area” within the MSA (MARC 2012).

The U.S. Census (1995) defines urbanized areas as a geographic region with a core “central place” and all adjacent areas with a population of at least 50,000. The size of the urbanized area outside of the central place consists of all contiguous Census blocks with a population density of at least 1,000 people per square mile, including any noncontiguous blocks of over 1,000 people per square mile connected to the central city by an arterial road.

ArcGIS was used to map population density among Census tracts in the 2010 Kansas City MSA and to identify all tracts above the 1,000 people per square mile threshold. This means that the definition for this study was modified from the U.S. Census definition.²

The urbanized area creates a particularly large area for infill, which may result in overbounding, or including areas that should be considered sprawling. But there are advantages to using the 1990 urbanized area boundary. First, it is relatively simple to calculate and can be easily applied to any metropolitan area. In addition, the urbanized area makes no distinctions between incorporated and unincorporated areas, making it useful for comparing regions with different levels of incorporation.

² Census tracts were used instead of Census block groups, as tracts were the unit of analysis chosen for this study. Census tracts are larger than most Census block groups, but the aggregate differences between the two are slight in this case; the 1990 Kansas City MSA urbanized area based on Census tracts was only 10 square miles, or just 2.4%, larger than the urbanized area based on block groups.
4.3.2 Infill Scenario 2: Residential Density

The second infill scenario is based on residential density and classifies infill as all residential development that occurs in a Census tract with a housing unit density greater than two units per acre. This method is similar research done by Landis, Hood, Li, Rogers, & Warren (2006) and Wiley (2007). Landis, Hood, Li, Rogers, & Warren used varying residential density thresholds to examine potential infill in California, which ranged from a low threshold of 2.4 units per acre in most rural areas to a high residential density threshold of 4.0 residential units per acre in urban areas. The threshold of 2 residential units per acre was used by both Wiley (2007), in a study of infill in Montgomery County, Maryland, and Hagerty (2012), in a study of infill in the Atlanta MSA. The two units per acre threshold was chosen in this study because it offered a good contrast to Infill Scenario 1.³

There are drawbacks to using housing unit density to classify the area of infill. The density may not accurately reflect the density throughout the entire tract, especially with regard to larger tracts. But the high-density Census tracts in the 2010 Kansas City MSA tend to be smaller than average. 170 of the 183 Census tracts in this infill scenario were smaller than the median MSA tract area of 1.53 square miles. Classifying housing unit density at the block group level may provide a more accurate assessment of residential density within the MSA.

³ A threshold of 1.5 units per acre provided an area too similar to the Infill Scenario 1, while thresholds of 2.5 or 3 units per acre resulted in an area confined primarily to the urban core of Kansas City (MO).
4.3.3 Infill Scenario 3: Residential Age

Infill Scenario 3 classifies infill as all residential development that occurs in Census tracts where the median year for all residential structures built is earlier than 1957. This method is similar to Hagerty (2012), who used neighborhood age to classify infill areas of the Atlanta MSA. Hagerty noted that this infill scenario can be used as a way to compare or contrast infill scenarios based on population or residential unit density, like those in Infill Scenarios 1 and 2. The area captured may differ from those, as older, built up neighborhoods may display low densities due to the presence of parks, water, or nonresidential land uses.

The most important decision in this infill scenario is choosing an adequate year as the threshold. Again, this study adapts Hagerty’s (2012) methodology. First, a map of the 2010 Kansas City MSA was generated to determine the median year of structure built in all Census tracts in 1990. As expected, Census tracts with older median years were concentrated around the urban core, while Census tracts with more recent median years were located in many of the outer suburban areas, as well as in many rural areas. The next step was to determine an appropriate threshold year. This was done by calculating an MSA-wide median year of structure built using a weighted average based on population for all 15 counties in the 2010 Kansas City MSA. The result was an MSA-wide median year between 1956 and 1957. As a result, Census tracts with a median year of residential structure built prior to 1957 were chosen as the infill scenario.4

There are drawbacks to using a median year of structures built to determine infill. First, the year chosen for the threshold will always be somewhat arbitrary. The weighted

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4 Some Census tracts that were clearly rural were included in this classification. In order to ensure that only tracts within the urban area of the 2010 Kansas City MSA were included, the selection was limited to tracts within incorporated areas.
average method appeared appropriate for Hagerty’s (2012) study of the Atlanta region, as well as for this study of the 2010 Kansas City MSA. But it may not be appropriate in all metro areas. Second, this median year applies to an entire Census tract. Just as with Infill Scenario 2, it may not accurately reflect the makeup of the entire tract, especially if there has been recent infill activity within that tract.

4.3.4 Infill Scenario 4: The Central City

The fourth infill scenario uses the boundary of Kansas City (MO), the central city in the Kansas City MSA, as the area for infill. This is the simplest classification method and has been used in previous infill studies (Farris 2001, Steinacker 2003). Kansas City (MO)’s boundaries present an interesting alternative to the previous infill scenarios, as they are not determined by any housing or population characteristics, but rather by political demarcation. This classification method makes it easy to examine infill development for a number of metropolitan areas at once.

The drawbacks of using city boundaries for infill is that they are have often developed arbitrarily. For example, Kansas City (MO) annexed large amounts of land several times from 1940 to 1970. But state boundaries prevented expansion westward, while existing municipalities restricted expansion eastward. As a result, Kansas City (MO) extended to the north and south, and is currently much longer than it is wide. Kansas City (MO) includes both older and newer neighborhoods, as well as many areas that are suburban in character. In other words, the political boundaries of Kansas City (MO) contain various types of neighborhoods. This method for counting infill also excludes residential development in older, inner-ring municipalities like Independence.
(MO) and Kansas City (KS). Finally, while using the central city boundary may be the simplest method to classify infill and compare development between several metropolitan areas, central cities can vary vastly in their share of land area and population of the greater metropolitan area. To use two extreme examples, the City of Boston is only 48 square miles and primarily consists of older neighborhoods, while the City of Jacksonville is 874 square miles and consists of many recently-developed neighborhoods.

4.4 Methodology for Measuring Development by Neighborhood Type

This section defines three neighborhood types based on their era of peak residential development: (1) inner city neighborhoods, (2) inner-ring neighborhoods, and (3) outer-ring neighborhoods. Then it defines an additional classification for rural tracts that are excluded from this analysis. This section provides the rationale for choosing these types, then the methodology for choosing each is explained, along with classification’s strengths and weaknesses.

4.4.1 Neighborhood Types

The process for identifying neighborhood types was adapted from Leigh & Lee (2005), who classified Census tracts based on their era of peak residential development. This study classifies Census tracts as inner city, inner-ring, or outer-ring based on the 1990 Census. Census tracts that had the greatest share of housing units built prior to 1950 were classified as inner city neighborhoods. Census tracts that had the greatest share of housing units built between 1950 and 1969 were classified as inner-ring suburban
Figure 8. Neighborhood Types in the 2010 Kansas City MSA
neighborhoods. Census tracts that had the greatest share of housing units built between 1970 and 1989 were classified as outer-ring suburban neighborhoods.

These neighborhood classifications provide a finer level of assessment compared to classification on the municipal level. As mentioned above, Kansas City (MO) annexed land between 1940 and 1980. As a result, it functionally contains inner city, inner-ring, and outer-ring neighborhoods. At the same time, suburbs like Kansas City (KS) and Independence (MO) were settled in the mid-nineteenth century, and contain dense, urban areas despite their common classification as suburbs. In other words, classification at the municipal level can overlook the range of different neighborhoods that exist within a single municipality.

4.4.2 Inner City Neighborhoods

These Census tracts generally saw their peak residential development in the years before World War II. Most of these tracts developed prior to widespread automobile usage and as a result, they tend to have developed more diverse residential types, high residential densities, a greater land use mix, and better access to public transportation (Calthorpe 1993, Hayden 2003). As such, these tracts should be attractive for multifamily infill development. But these inner city tracts may be built out and may offer few adequate available parcels for infill development, multifamily or otherwise.

4.4.3 Inner-Ring Neighborhoods

Census tracts classified as inner-ring neighborhoods grew rapidly in the 1950s and 60s, and many have experienced decline relative to outer-ring suburbs in recent
decades (Vicino 2008). In contrast to inner city neighborhoods that developed along mass transit lines, inner-ring suburbs primarily developed when the automobile was the dominant form of transportation. The housing stock in many of these inner-ring neighborhoods is considered small and outdated, and is in danger of becoming obsolete (Hanlon 2008b). In contrast, the prewar housing stock in many inner city tracts are still in popular, while the larger, newer residential units in the outer-ring suburbs are more suited to the preferences of middle-class households. This creates a “donut hole” in terms of housing demand, where inner-ring neighborhoods are passed over in favor of inner city and outer-ring neighborhoods (Lee & Leigh 2007).

4.4.4 Outer-ring Neighborhoods

Census tracts classified as outer-ring neighborhoods saw peak development between 1970 and 1989. Outer-ring suburbs have not experienced decline comparable to their inner-ring counterpart, and are more likely to be either stable or prospering. Outer-ring suburbs are characterized by larger houses on larger lots relative to inner-ring suburbs (Hanlon 2008b).

4.4.5 Rural Areas

The intention of classifying neighborhoods in this study as inner city, inner-ring, or outer-ring is within an urban context. But the 2010 Kansas City MSA is a large area that contains several counties that are still mostly rural (MARC 2006). Including these rural Census tracts, which are sparsely-populated, could produce misleading results. It was necessary to remove all rural tracts from when classifying by neighborhood type.
Figure 9. Neighborhood Type Infill Scenario: Rural Tracts
In a study of exurban development, Theobald (2005) classified block groups as urban, suburban, exurban, or rural based on residential density. This study uses his classification of rural as a Census tract with 16 or more hectares per housing unit. These Census tracts in the 2010 Kansas City MSA were excluded from the neighborhood type section of the analysis.

4.5 Conclusion

This Chapter explained the two methods of inquiry of this study. First, this study assessed levels of single-family development and multifamily development within each infill scenario. Second, this study examined the rates of development within (1) inner city neighborhoods, (2) inner-ring neighborhoods, and (3) outer-ring neighborhoods. The results of the infill scenarios and the residential development by neighborhood type are discussed in the next Chapter.
CHAPTER V
RESULTS

5.1 Introduction

This section discusses the results of the methodologies described in Chapter IV. These were created to (1) determine the levels of single-family and multifamily infill in the 2010 Kansas City MSA, and (2) examine what types of neighborhoods receiving multifamily development.

The second section will summarize the general results of study. The third section will summarize the general results of the neighborhood classification process. The fourth section will discuss the results of each infill scenario. The fifth section will describe the results of the residential development by neighborhood type.
5.2 General Summary

Table I. Characteristics of All Infill Scenarios in 1990

<table>
<thead>
<tr>
<th>Infill Scenario</th>
<th>Area (mi²)</th>
<th>% of 2010 MSA</th>
<th>Total Housing Units 1990</th>
<th>% of Housing Units in 1990 MSA</th>
<th>Total Single-Family Units in 1990</th>
<th>% of Single-Family Units in 1990 MSA</th>
<th>Total Multi-family Units in 1990</th>
<th>% of Multi-family Units in 1990 MSA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infill Scenario 1: Urbanized Area</td>
<td>424</td>
<td>5%</td>
<td>458,769</td>
<td>72%</td>
<td>328,797</td>
<td>69%</td>
<td>89,177</td>
<td>87%</td>
</tr>
<tr>
<td>Infill Scenario 2: Residential Density</td>
<td>142</td>
<td>2%</td>
<td>264,287</td>
<td>42%</td>
<td>179,503</td>
<td>38%</td>
<td>60,853</td>
<td>60%</td>
</tr>
<tr>
<td>Infill Scenario 3: Residential Age</td>
<td>148</td>
<td>2%</td>
<td>173,546</td>
<td>27%</td>
<td>125,644</td>
<td>27%</td>
<td>30,597</td>
<td>30%</td>
</tr>
<tr>
<td>Infill Scenario 4: Central City</td>
<td>315</td>
<td>4%</td>
<td>181,396</td>
<td>29%</td>
<td>121,842</td>
<td>26%</td>
<td>43,567</td>
<td>43%</td>
</tr>
<tr>
<td>Total (2010 Kansas City MSA)</td>
<td>7,952</td>
<td>100%</td>
<td>636,216</td>
<td>100%</td>
<td>473,945</td>
<td>100%</td>
<td>102,086</td>
<td>100%</td>
</tr>
</tbody>
</table>

In terms of total area, Infill Scenario 1 was the largest. It consisted of 424 square miles, or roughly 5% of the total 7,952 square miles of the 15 counties that make up the 2010 Kansas City MSA. It was followed in area by Infill Scenario 4, the boundaries of Kansas City (MO) at 315 square miles, or nearly 4% of the entire MSA. Infill Scenario 2, based on residential density and Infill Scenario 3, based on residential age, were considerably smaller, at 141 and 148 square miles respectively, or about 2% of the entire MSA. The only infill scenario that completely fell within another scenario was Infill Scenario 2, based on residential density. All of Scenario 2’s tracts were also a part of Infill Scenario 1, the urbanized area. Interestingly, Infill Scenario 3, which contained tracts with the oldest residential units, captured tracts that were not in the scenarios based on population and residential density. In other words, the oldest Census tracts are not necessarily the densest.
Residential growth rates for all four scenarios differed greatly. Infill Scenario 4, the boundaries of Kansas City (MO), had the highest growth rates for total units and single-family units, while Infill Scenario 4 and Infill Scenario 1, based on population, had the highest growth rates for multifamily units. Infill Scenario 1 had the second-highest growth rates for total units and single-family units, while Infill Scenarios 2 and 3, which had comparable growth rates for all unit types, had the lowest growth rates of all scenarios.

<table>
<thead>
<tr>
<th>Infill Scenario</th>
<th>Total Unit % Change: 1990-2010</th>
<th>Single-Family Unit % Change: 1990-2010</th>
<th>Multifamily Unit % Change: 1990-2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infill Scenario 1: Urbanized Area</td>
<td>16.11%</td>
<td>13.63%</td>
<td>20.82%</td>
</tr>
<tr>
<td>Infill Scenario 2: Residential Density</td>
<td>6.66%</td>
<td>4.32%</td>
<td>10.77%</td>
</tr>
<tr>
<td>Infill Scenario 3: Residential Age</td>
<td>5.70%</td>
<td>3.86%</td>
<td>10.13%</td>
</tr>
<tr>
<td>Infill Scenario 4: Central City</td>
<td>22.12%</td>
<td>21.77%</td>
<td>20.90%</td>
</tr>
<tr>
<td>Total (2010 Kansas City MSA)</td>
<td>37.85%</td>
<td>37.67%</td>
<td>30.76%</td>
</tr>
</tbody>
</table>

The ratio of single-family to multifamily units in all infill scenarios in 1990 was below the MSA average, meaning that there were more multifamily units for every single-family unit in all infill scenarios than in the greater MSA. And while the single-family to multifamily unit ratio grew in the entire MSA from 1990 to 2010, it declined in all infill scenarios except for Infill Scenario 4. Infill Scenarios 2 and 4 had the lowest single-family to multifamily ratio in 2010. Infill Scenario 3 had the highest ratio of single-family to multifamily units. This was unexpected, as older areas are often associated with density and more multifamily units.
Table III. 1990 and 2010 Single-Family to Multifamily Ratio by Infill Scenario

<table>
<thead>
<tr>
<th>Infill Scenario</th>
<th>Single-Family to Multifamily Unit Ratio 1990</th>
<th>Single-Family to Multifamily Unit Ratio 2010</th>
<th>Single-family to Multifamily Unit Ratio % Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infill Scenario 1: Urbanized Area</td>
<td>3.69</td>
<td>3.47</td>
<td>-5.96%</td>
</tr>
<tr>
<td>Infill Scenario 2: Residential Density</td>
<td>2.95</td>
<td>2.78</td>
<td>-5.76%</td>
</tr>
<tr>
<td>Infill Scenario 3: Residential Age</td>
<td>4.11</td>
<td>3.87</td>
<td>-5.84%</td>
</tr>
<tr>
<td>Infill Scenario 4: Central City</td>
<td>2.80</td>
<td>2.82</td>
<td>0.71%</td>
</tr>
<tr>
<td>Total (2010 Kansas City MSA)</td>
<td>4.64</td>
<td>4.91</td>
<td>5.82%</td>
</tr>
</tbody>
</table>

5.3 Infill Scenario 1: The 1990 Urbanized Area

This scenario defined infill as any residential development that took place inside the 1990 urbanized area, which is defined as any Census tract contiguous with the urban core with a population of at least 1,000 people per square mile, as well as noncontiguous Census tracts with the same population density connected to the central city by an arterial road.

5.3.1 Area Captured

Capturing 327 tracts, Infill Scenario 1 was 424 square miles, or roughly 5% of the 2010 Kansas City MSA. It was the largest in total land area of the four infill scenarios, and it included most of Kansas City (MO), but excluded large portions of the city’s northernmost and southernmost areas. The urbanized area also included parts of older neighboring cities like Independence (MO), and Kansas City (KS). In addition, the
Figure 10. Infill Scenario 1, The 1990 Urbanized Area
urbanized area included many newer suburban municipalities in the MSA. Notably, it included parts of Overland Park (KS), Olathe (KS), and Lee’s Summit (MO). These were three of the fastest-growing cities in the region between 1990 and 2010.

5.5.2 General Findings

Table IV. Infill Scenario 1, The 1990 Urbanized Area: Units Built 1990-2010

<table>
<thead>
<tr>
<th></th>
<th>Total Units</th>
<th>Single-Family Units</th>
<th>Multifamily Units</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Units Built 1990-2010</td>
<td>% Change 1990-2010</td>
<td>Units Built 1990-2010</td>
</tr>
<tr>
<td>Inside Infill Scenario</td>
<td>73,923</td>
<td>16.11%</td>
<td>44,805</td>
</tr>
<tr>
<td>Outside Infill Scenario</td>
<td>166,913</td>
<td>94.06%</td>
<td>136,467</td>
</tr>
</tbody>
</table>

Because Infill Scenario 1 was the largest of all scenarios in total area, it is not surprising that it contained the most in total residential units built, as well as the most single-family and multifamily units built of any scenario. 74,000 total residential units were built in Scenario 1 between 1990 and 2010, amounting to 31% of all residential development. The residential growth rate inside Infill Scenario 1 was 16%, compared to a growth rate of 94% outside the infill scenario.

Table V. Infill Scenario 1, The 1990 Urbanized Area: Share of Units Built 1990-2010

<table>
<thead>
<tr>
<th></th>
<th>% of Total Units Built</th>
<th>% of Total Single-Family Units Built</th>
<th>% of Total Multifamily Units Built</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inside Infill Scenario</td>
<td>30.69%</td>
<td>24.72%</td>
<td>59.21%</td>
</tr>
<tr>
<td>Outside Infill Scenario</td>
<td>69.31%</td>
<td>75.28%</td>
<td>40.88%</td>
</tr>
</tbody>
</table>
18,500 multifamily units were built inside the infill scenario, amounting to 59% of all multifamily development in the MSA. This was the only infill scenario where the number of multifamily units constructed inside the zone of infill was greater than those built outside.

### 5.4 Infill Scenario 2: Residential Density

This scenario defined infill as residential development that took place within a Census tract with a minimum housing density of 2 units per acre.

#### 5.4.1 Area Captured

Infill Scenario 2, based on housing unit density, captured 183 Census tracts. Although the smallest of all infill scenarios, at 141 square miles, Infill Scenario 2 was comparable in size to Infill Scenario 3’s 148 square miles. All Census tracts classified in Infill Scenario 2 were also contained in Infill Scenario 1. This is not surprising, since both classification methods are based on density, and population residential density are likely related. Both Scenarios 1 and 2 cover the urban core of the 2010 Kansas City MSA, but Scenario 2 does not extend as far into the northern and southern suburbs. Infill Scenario 2 included some areas of the fast-growing suburbs in the southern suburban municipalities, including Overland Park (KS) and Lee’s Summit (MO), but notably not the Census tracts within those municipalities that saw the largest amounts of residential development from 1990 to 2010.
Figure 11. Infill Scenario 2, Residential Density
5.4.2 General Findings

Table VI. Infill Scenario 2, Residential Density: Units Built 1990-2010

<table>
<thead>
<tr>
<th></th>
<th>Total Units</th>
<th>Single-Family Units</th>
<th>Multifamily Units</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Units Built</td>
<td>% Change 1990-2010</td>
<td>Units Built</td>
</tr>
<tr>
<td>Inside Infill Scenario</td>
<td>17,606</td>
<td>6.66%</td>
<td>7,755</td>
</tr>
<tr>
<td>Outside Infill Scenario</td>
<td>223,230</td>
<td>60.02%</td>
<td>173,517</td>
</tr>
</tbody>
</table>

Although Infill Scenario 2 was slightly smaller than Infill Scenario 3, which was based on neighborhood age, substantially more residential units were built in Infill Scenario 2 between 1990 and 2010. 18,000 total residential units were built inside Infill Scenario 2, or 7% of all units built in the MSA. The total unit growth rate was 7%, compared to 60% outside the infill scenario.

Table VII. Infill Scenario 2, Residential Density: Share of Units Built 1990-2010

<table>
<thead>
<tr>
<th></th>
<th>% of Total Units Built</th>
<th>% of Total Single-Family Units Built</th>
<th>% of Multifamily Units Built</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inside Infill Scenario</td>
<td>7.31%</td>
<td>4.28%</td>
<td>20.88%</td>
</tr>
<tr>
<td>Outside Infill Scenario</td>
<td>92.69%</td>
<td>95.72%</td>
<td>79.12%</td>
</tr>
</tbody>
</table>

7,000 multifamily units were built inside the infill scenario, amounting to 21% of all multifamily development in the MSA. Multifamily development inside the infill scenario grew at a rate of 10%.
5.5 Infill Scenario 3: Residential Age

This scenario defined infill as any residential development that took place in Census tracts within incorporated areas where the median year built of the housing stock was earlier than 1957.

5.5.1 Area Captured

Infill Scenario 3, based on residential age, captured 151 Census tracts. While the second-smallest infill scenario, at 148 square miles, it is comparable to Infill Scenario 2’s 141 miles, and made up just 2% of the total 2010 Kansas City MSA. As such, interesting comparisons can be drawn from scenarios 2 and 3. While both predictably include the older parts of Kansas City (MO) Infill Scenario 2 expands from the central city to the southwest, while Scenario 3 includes greater portions of older suburbs like Kansas City (KS) and Independence (MO). In other words, there are notable differences between classifications of unit density and neighborhood age. In addition, this scenario includes two large Census tracts along the Missouri River that are primarily industrial in land use and one large, sparsely-populated tract in the satellite city of Bonner Springs (KS).

5.5.2 General Findings

Table VIII. Infill Scenario 3, Residential Age: Units Built 1990-2010

<table>
<thead>
<tr>
<th></th>
<th>Total Units</th>
<th>Single-Family Units</th>
<th>Multifamily Units</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Units Built</td>
<td>% Change</td>
<td>Units Built</td>
</tr>
<tr>
<td>Inside Infill Scenario</td>
<td>9,888</td>
<td>5.70%</td>
<td>4,852</td>
</tr>
<tr>
<td>Outside Infill Scenario</td>
<td>230,948</td>
<td>46.22%</td>
<td>235,984</td>
</tr>
</tbody>
</table>
Figure 12. Infill Scenario 3, Residential Age
Of all the scenarios, Infill Scenario 3 had the fewest overall units built from 1990 to 2010. 10,000 total units were built, amounting to 4% of all residential development in the MSA. The total residential growth rate in Infill Scenario 3 was 6%, compared to a growth rate of rate of 46% outside the infill scenario.

4,900 single-family units were built inside Scenario 3, amounting to 2% of all single-family development in the MSA. 3,000 multifamily units were built inside the infill scenario, amounting to 10% of all multifamily development within the MSA.

<table>
<thead>
<tr>
<th>Infill Scenario 3, Residential Age: Share of Units Built 1990-2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of Total Units Built</td>
</tr>
<tr>
<td>------------------------</td>
</tr>
<tr>
<td>Inside Infill Scenario</td>
</tr>
<tr>
<td>Outside Infill Scenario</td>
</tr>
</tbody>
</table>

Only 3,000 multifamily units were built inside this infill scenario, amounting to 10% of all multifamily development in the MSA.

5.6 Infill Scenario 4: The Central City

This scenario defined infill as any residential development that took place inside the boundaries of Kansas City (MO), the central city of the Kansas City MSA.

5.6.1 Area Captured

Infill Scenario 4, based on the boundaries of Kansas City (MO) was the second largest of the infill scenarios. It captured 230 Census tracts for a total of 315 square miles,
or 4% of the total 2010 Kansas City MSA. Kansas City (MO) includes many different neighborhoods that developed in different eras. In fact, some of these tracts do not have a high enough population density to be included in Infill Scenario 1, the 1990 urbanized area.

5.6.2 General Findings

**Table X. Infill Scenario 4, The Central City: Units Built 1990-2010**

<table>
<thead>
<tr>
<th></th>
<th>Total Units</th>
<th>Single-Family Units</th>
<th>Multifamily Units</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Units Built 1990-2010</td>
<td>% Change 1990-2010</td>
<td>Units Built 1990-2010</td>
</tr>
<tr>
<td>Inside Infill Scenario</td>
<td>40,121</td>
<td>22.12%</td>
<td>26,530</td>
</tr>
<tr>
<td>Outside Infill Scenario</td>
<td>200,715</td>
<td>44.13%</td>
<td>214,306</td>
</tr>
</tbody>
</table>

From 1990 to 2010, Kansas City (MO) added 40,000 residential units, amounting to an infill share of 17%. In total units, Infill Scenario 4 experienced just over half as much infill compared to Infill Scenario 1, the urbanized area. The residential growth rate in Kansas City (MO) was 16%, compared to a growth rate of 44% outside the city’s boundaries.

**Table XI: Infill Scenario 4, The Central City: Share of Units Built 1990-2010**

<table>
<thead>
<tr>
<th></th>
<th>% of Total Units Built</th>
<th>% of Total Single-Family Units Built</th>
<th>% of Multifamily Units Built</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inside Infill Scenario</td>
<td>16.66%</td>
<td>11.02%</td>
<td>29.00%</td>
</tr>
<tr>
<td>Outside Infill Scenario</td>
<td>83.34%</td>
<td>88.98%</td>
<td>71.00%</td>
</tr>
</tbody>
</table>
Figure 13. Infill Scenario 4, The Central City
9,000 multifamily units were built inside the infill scenario, amounting to 29% of all multifamily development within the MSA. This was the second-highest share of multifamily units of all infill scenarios.

5.7: Neighborhood Type Scenario

Five Census tracts in the 1990 Kansas City MSA amounting to 11 square miles contained no residential units in 1990 and were left unclassified and removed from further analysis. Two were areas along the Missouri River with primarily industrial land uses, and three were in the central business district of Kansas City (MO), with primarily commercial land use. The remaining tracts were classified as either one of three neighborhood types: Inner city tracts, inner-ring tracts, or outer-ring tracts.

The successive pattern of inner city, inner-ring, and outer-ring tracts radiating from the city center in the Kansas City MSA depicted in Figure 14 is typical to most metropolitan regions in the United States (Leigh and Lee 2005).

<table>
<thead>
<tr>
<th>Table XII. Neighborhood Type Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Census Tracts</td>
</tr>
<tr>
<td>Inner City Neighborhoods</td>
</tr>
<tr>
<td>Inner-Ring Neighborhoods</td>
</tr>
<tr>
<td>Outer-Ring Neighborhoods</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

5.7.1 Inner City Neighborhoods

These tracts experienced peak residential development in the years before World War II. As expected, the inner city Census tracts made up much of the urban core of the
Kansas City (MO). In addition, inner city tracts made up large parts of Kansas City (KS), Independence (MO), and the satellite city of Leavenworth (KS).

5.7.2 Inner-Ring Neighborhoods

The Census tracts classified as inner-ring neighborhoods grew rapidly in the 1950s and 60s. As expected, the inner-ring Census tracts in the 2010 Kansas City MSA resembled a ring around the inner city tracts. Inner-ring tracts are found in the central city of Kansas City (MO), as well as in the surrounding suburbs of Independence (MO), Kansas City (KS), and Overland Park (KS), among others. Some inner-ring tracts can also be found in Lee’s Summit (MO) and Olathe (KS), two of the fastest-growing municipalities of the Kansas City MSA in the past 20 years. What is interesting about the inner-ring tracts in these suburbs is that they are not contiguous with the swath of inner-ring tracts that surround the inner city tracts. Rather, these inner-ring tracts seem to lie at the center of the surrounding suburb, suggesting that these inner-ring tracts could be the older, denser core areas of these booming suburbs.  

5.7.3 Outer-ring Neighborhoods

Census tracts classified as outer-ring suburbs saw peak development between 1970 and 1989. Outer-ring Census tracts also included large areas in the northern and southern parts of Kansas City (MO), as well as the older suburbs of Kansas City (KS) and Independence (MO). In addition, many larger suburbs either mostly or entirely consisted of outer-ring suburban Census tracts, such as Shawnee City (KS) and Lenexa (KS).

---

5 Whether these “suburban core” areas are similar in character to the other inner-ring tracts, or outer-ring tracts, or a mixture of the two is an interesting question that could be addressed in the future.
Figure 14. Neighborhood Types within Nonrural Census Tracts
5.7.4 General Findings

Table XIII. Units Built by Neighborhood Type, 1990-2010

<table>
<thead>
<tr>
<th>Neighborhood Type</th>
<th>Total Units</th>
<th>Single-Family Units</th>
<th>Multifamily Units</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Units Built 1990-2010</td>
<td>% Change 1990-2010</td>
<td>Units Built 1990-2010</td>
</tr>
<tr>
<td>Inner City Neighborhoods</td>
<td>9,235</td>
<td>6.83%</td>
<td>4,233</td>
</tr>
<tr>
<td>Inner-Ring Neighborhoods</td>
<td>17,840</td>
<td>8.73%</td>
<td>10,665</td>
</tr>
<tr>
<td>Outer-Ring Neighborhoods</td>
<td>161,842</td>
<td>75.77%</td>
<td>123,026</td>
</tr>
<tr>
<td>Total</td>
<td>188,917</td>
<td>34.15%</td>
<td>137,924</td>
</tr>
</tbody>
</table>

Outer-ring neighborhoods built far more single-family and multifamily units than the inner city and inner-ring neighborhoods. Outer-ring neighborhoods also saw the greatest growth rates for both housing types. This is not surprising, because (1) the boundaries of this scenario were intended to capture the rapidly-developing urban fringe, and (2) outer-ring neighborhoods accounted for 69% of the land area in this scenario. To correct for land area, residential development was calculated after adjusting for area. First, the number of units built from 1990 to 2010 in a neighborhood was divided by the total number of units built in the scenario. Then the result was divided by the area in square miles of the neighborhood type divided by the area in square of the total non-rural land in this scenario, as depicted below:

\[
\frac{1990-2010 \text{ units built in neighborhood}}{1990-2010 \text{ units built in total scenario}} \times \frac{\text{Area (sq. mi) of neighborhood type}}{\text{Area (sq. mi) of entire scenario}}
\]
A result of 1.00 would indicate that the percentage of units built in this area equaled the neighborhood’s land area percentage. A result greater than one indicates that the neighborhood type produced more units than its land area percentage, while a result less than one indicates that the neighborhood type produced fewer units than its land area percentage.

**Table XIV.** Area-Adjusted Number of Housing Units Built by Neighborhood Type, 1990-2010

<table>
<thead>
<tr>
<th>Neighborhood Type</th>
<th>Total Units Built 1990-2010</th>
<th>Single-Family Units Built 1990-2010</th>
<th>Multifamily Units Built 1990-2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inner City Neighborhoods</td>
<td>0.45</td>
<td>0.29</td>
<td>0.90</td>
</tr>
<tr>
<td>Inner-Ring Neighborhoods</td>
<td>0.46</td>
<td>0.37</td>
<td>0.71</td>
</tr>
<tr>
<td>Outer-Ring Neighborhoods</td>
<td>1.25</td>
<td>1.30</td>
<td>1.10</td>
</tr>
</tbody>
</table>

Even when controlling for area, outer-ring neighborhoods produced more single-family and multifamily units from 1990-2010. While inner city and inner-ring neighborhoods produced nearly the same number of units when adjusting for area, the inner-ring produced more single-family units, while the inner city produced more multifamily units.

**Table XV.** 1990 and 2010 Single-Family to Multifamily Ratio by Neighborhood Type

<table>
<thead>
<tr>
<th>Neighborhood Type</th>
<th>Single-Family to Multifamily Unit Ratio 1990</th>
<th>Single-Family to Multifamily Unit Ratio 2010</th>
<th>Single-Family to Multifamily Unit Ratio % Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inner City Neighborhoods</td>
<td>3.17</td>
<td>3.01</td>
<td>-4.95%</td>
</tr>
<tr>
<td>Inner-Ring Neighborhoods</td>
<td>5.70</td>
<td>5.26</td>
<td>-7.74%</td>
</tr>
<tr>
<td>Outer-Ring Neighborhoods</td>
<td>3.52</td>
<td>4.18</td>
<td>18.66%</td>
</tr>
<tr>
<td>Total</td>
<td>4.03</td>
<td>4.61</td>
<td>14.39%</td>
</tr>
</tbody>
</table>
Finally, the ratio of single-family to multifamily units was calculated for each neighborhood type. Inner-ring neighborhoods had the highest ratio of single-family to multifamily units in both 1990 and 2010, although outer-ring neighborhoods saw the greatest percent change. At the same time, inner-ring neighborhoods also saw the largest decrease in the single-family to multifamily ratio.

5.8 Conclusion

Overall, these results support the hypothesis that multifamily units grew at a faster rate within infill areas than single-family units. But these results do not support the hypothesis that high-density neighborhoods have higher rates of infill. Whether this is because high-density neighborhoods lack available parcels for infill, or whether there are other characteristics that make infill undesirable is a good question for further study. Finally, these results do not support the hypothesis that multifamily units would grow the slowest in inner-ring neighborhoods. Multifamily units in inner-ring neighborhoods outpaced inner city neighborhoods in total numbers and rate of growth, although inner city multifamily units had a higher growth rate when adjusting for land area.
CHAPTER VI
ANALYSIS

6.1 Introduction

This study examined rates multifamily development through different infill
classification methods and through different neighborhood types in the 2010 Kansas City
MSA. The findings related to the three hypotheses, as well as additional findings, follow.

6.2 First Hypothesis: Multifamily Production will increase in all Infill Scenarios

It was first hypothesized that multifamily development patterns within the infill
scenarios would grow at a faster rate than single-family units. The single-family to
multifamily ratio in 1990 indicated that there were roughly 2 to 4 times as many single-
family units for every multifamily unit in all scenarios. Despite this historical preference
for single-family units, multifamily units grew at higher rates than single-family units in
three of the four scenarios. In Infill Scenario 4, the growth rate of multifamily units
roughly equaled the growth rate of single-family development. There are two reasons that
support this finding. First, the relative ease of greenfield development on the urban fringe
draws single-family unit development away from the relatively older neighborhoods that make up the infill scenarios, where development may be more expensive or time-consuming. The second reason is that land in built-up areas is more expensive, and higher-density multifamily development is often the only economically feasible option. This pattern of multifamily units “filling in” areas not suitable for single-family or any other type of land use is in line with Blumenfeld’s (1954) “zone of infill” theory of urban growth, and was observed by Gober & Burns (2002) and Atkinson-Palombo (2010) in the Phoenix metropolitan area.

Infill Scenario 4, the central city, had a lower single-family to multifamily ratio than scenarios 1 and 3, despite containing some sparsely-populated outer-ring tracts. This may be due to the fact that central cities have less restrictive policies for multifamily development compared to their surrounding suburbs, allowing for more opportunities for multifamily developers.

Finally, the fact that multifamily growth rates in all infill scenarios lagged behind the MSA-wide growth rate of 31% indicates that multifamily units do contribute to sprawl. The best example of this is Infill Scenario 1, the largest infill area. That scenario captured 19,000 multifamily units, the most of any. Yet 13,000 multifamily units were built outside this scenario, in the sprawling area. This means that sprawl is not simply a result of new single-family development, but also multifamily development, and likely other housing types as well.

### 6.3 Second Hypothesis: Multifamily Infill will be Concentrated in Areas with High Residential Densities
It was hypothesized that multifamily development would be concentrated in areas with higher residential densities, as high-density areas may feature infrastructure and amenities that attract multifamily developers and residents. This hypothesis is not supported by Infill Scenario 2, which captured the highest density Census tracts in the 2010 Kansas City MSA. While multifamily units grew at a higher rate than single-family units in Infill Scenario 2, the 10% growth rate of multifamily units roughly matched Infill Scenario 3 as the slowest-growing of the infill scenarios. Additionally, while the single-family to multifamily ratio in Infill Scenario 2 declined, indicating further densification, it did so at a rate comparable to Infill Scenarios 1 and 3. In other words, there is no evidence that multifamily development was more pronounced in higher density Census tracts. There are two explanations for this. First, high density Census tracts may be more built out than others, with fewer open parcels for development. Second, the Census tract may be too large of a geographic unit for identifying high density neighborhoods. An analysis of smaller geographic areas may reveal more meaningful results with regard to development in high density areas, and to the clustering of multifamily housing in particular.

6.4 Third Hypothesis: Multifamily Development will Skip Inner-Ring Neighborhoods

Third, it was hypothesized that multifamily development would be concentrated in the outer-ring and inner city neighborhoods while skipping over the inner-ring neighborhoods. This was also not true. Overall, inner-ring neighborhoods experienced a residential growth rate of 9%, while inner city neighborhoods only experienced a growth
rate of 7%. The growth rate for multifamily units in inner-ring neighborhoods was 16%, compared to 10% in inner city neighborhoods. Additionally, when controlling for area, inner-ring and inner city neighborhoods showed roughly the same rates of residential growth.

An interesting additional finding was that in 1990 and 2010, inner-ring neighborhoods had substantially higher single-family to multifamily unit ratios than outer-ring suburbs. If we accept standard models of urban growth, the outer-ring neighborhoods should have the highest number of single-family units for every multifamily unit. This could indicate different historical patterns of multifamily development within these two neighborhood types. In other words, newer, outer-ring neighborhoods initially developed with substantially more multifamily units than inner-ring neighborhoods. While recent studies support this (Larco 2010), there has been little examination of historical multifamily development patterns, or of the distribution of multifamily houses within a metropolitan region. Additionally, multifamily development could be occurring in outer-ring suburbs at higher rates than in inner-ring suburbs because outer-ring suburbs were built at lower densities and with greater levels of leapfrog development. As such, outer-ring suburbs have more available open parcels for infill. Based on Ohls & Pines’ (1975) model, the value of these empty parcels will increase after the initial first wave of single-family development, and multifamily development becomes the most economically feasible use. Finally, the changing demographics of the suburban population could explain the lower single-family to multifamily ratios. Inner-ring neighborhoods developed in the 1950s and 1960s, when the average household size was larger. But as the average household size in the United States
steadily shrank in the past three decades, it is possible that outer-ring neighborhoods, which developed in the 1970s and 1980s, responded by supplying a greater share of multifamily units (Myers & Gearin 2001).

6.5 Additional Findings

While several studies in the past two decades have attempted to quantify infill, there is still no consensus as to what constitutes desirable, adequate, or even expected infill rates. A large problem lies in fact that defining infill remains difficult, as the various methods used in this study show. Each infill scenario had its advantages and disadvantages. The Kansas City MSA depicts the shortcomings of using the central city as infill boundaries. Like many western cities, Kansas City (MO)’s outskirts include many sparsely-populated Census tracts with very low population and residential densities that should still be considered sprawling. And like many eastern cities, Kansas City (MO) has neighboring suburbs with urban cores nearly as old as the central city. But development within these suburbs would not be classified as infill if only the central city boundaries were used.

The other infill scenarios also have shortcomings. This study shows that an infill scenario based on population or residential density will fail to capture some older areas of the region, and that an infill scenario based on age will fail to capture the denser areas. The best approach would be to combine age and density. That is, combine a method like Infill Scenario 3, based on residential age, with a method like Infill Scenarios 1 and 2, based on population and residential density. This two-step approach would ensure that an infill area will not exclude important parts of the built metropolitan region.
Finally, all infill scenarios appear to be densifying. In terms of total units built, this increase in density pales in comparison to continual outward sprawl, but this pattern should not be overlooked. The thousands of multifamily units added to the infill scenarios in the Kansas City MSA from 1990 to 2010 should be noted by proponents of smart growth and sustainability. But the potential for greater efficiencies and cost-savings may be wasted if these new multifamily units follow the same enclaved and auto-oriented development pattern observed by Moudon & Hess (2000) and Larco (2009).

Additionally, the increased supply of multifamily units in the Kansas City MSA should be of interest to proponents of expanding access to affordable housing. But while multifamily housing is typically associated with affordable housing, the increase in demand for luxury multifamily units in both central city and suburban areas means that an increasing multifamily supply does not necessarily mean an increasing supply of affordable units.
CHAPTER VII

CONCLUSION

This study examined rates of multifamily development from 1990 to 2010 within three infill scenarios as well as within three neighborhood types in the 2010 Kansas City MSA. Kansas City is typical of many Midwestern regions in that it added housing faster than population and experienced population growth on the urban fringe and population decline in the urban core.

This study found that the growth rate of multifamily units in three of the four infill scenarios outpaced the growth rate of single-family units. It also found that higher-density neighborhoods did not have a higher rate of multifamily development, and that inner-ring neighborhoods did not experience lower rates of multifamily development. In other words, the findings of this study point an increasing supply of multifamily housing throughout the region, in both infill and sprawling areas, as well as in inner city, inner-ring, and outer-ring neighborhoods.

Many recent studies of urban growth patterns have focused on sprawl, as it is the dominant form of urban growth in the United States (Breuckner 2000, Ewing 1997,
Fulton, Pendall, Nguyen, & Harrison 2001, Galster, Hanson, Ratcliffe, Wolman, Coleman, & Freihage, Wheeler 2008). And because multifamily units were never considered a substantial part of sprawling development, multifamily development patterns have been an understudied area of planning literature. Schafer (1974) produced the last in-depth study of multifamily development patterns. But as urban morphologies grow more complex, and as demand increases for alternatives to the single-family house, further research concerning the characteristics and location of multifamily development within metropolitan regions is necessary.

While new, sprawling residential subdivisions are easily identifiable products of the built landscape, new multifamily development is largely inconspicuous—sometimes deliberately so. Many developers are still weary of local resistance to new multifamily development. But an awareness and better understanding of the presence of both new and existing multifamily units throughout an urban region could be used by those in favor of increasing the supply of multifamily units. These would include proponents of smart growth, sustainability, and affordable housing.

Multifamily units are high density, efficient in terms of land use and cost, and support alternative forms of transportation. As such, they contribute to many smart growth goals. A better understanding of regional multifamily development patterns, as well as the characteristics of these multifamily developments, is crucial to implementing smart growth and sustainability measures.

Multifamily units can also contribute to increasing the supply of affordable housing. This study did not examine the value of the multifamily properties that were constructed. Recent increases in demand for high-end multifamily units in both inner
cities and the suburbs means that multifamily development does not always equal affordable housing development. But examining where affordable multifamily units are being constructed and where high-end multifamily units are being constructed can be beneficial for implementing policies that expand access to affordable housing.

Finally, this study noted that a large amount of multifamily development in the Kansas City MSA was classified as sprawl. This should raise questions about the nature of sprawl, and whether the presence of multifamily development on or near the urban fringe has a historical precedent. Additionally, it raises questions about the validity of the notion that sprawl is primarily driven by households in search of large single-family units on large lots, and whether densification can be more easily achieved on the urban fringe as opposed to in older neighborhoods. This study presents the case for a reevaluation of multifamily units as a housing type that is not constricted to the inner city, but rather a housing type can be found in all areas of the urban region.


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