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Can Churches Change a Neighborhood? A Census Tract, Multilevel Analysis of Churches and Neighborhood Change

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by

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Abstract

This study examines the role of local churches in neighborhood change, analyzing the relationship between Christian churches and changes in household median incomes from 1990 to 2010 in the census tract in which each church is located. Based on a nationally representative sample of churches from 2006 and 2012, the study uses hierarchical linear modeling and statistical matching techniques to analyze how key church characteristics such as social service involvement, social capital generation, residential patterns of attendees, and demographic composition are related to changes in neighborhoods. Two primary research questions were addressed: 1) How have patterns of church location changed with respect to neighborhood types, and 2) How do churches impact neighborhood change?

Findings indicate an overrepresentation of churches in gentrifying neighborhoods. A "back to the city" movement is occurring as church locational preferences have shifted from up-and-coming higher income neighborhoods in the 1980s to lower-income neighborhoods in the 2000s, reinforcing the overrepresentation in gentrifying neighborhoods. Churches on average are 1.6 times more segregated than our neighborhoods, with 87% of churches being less diverse than the neighborhood in which they are located, a figure that has not changed substantially from 1998 to 2012.

This study finds that churches impact their neighborhoods' socioeconomic trajectory, sometimes positively, other times negatively. Highlights include: 1) a higher

percentage of whites in churches in non-white neighborhoods is associated with more neighborhood gentrification, 2) on average white churches in low-income neighborhoods are responsible for about 10% of the relative income growth required for gentrification, 3) church social services do not reverse neighborhood decline but instead slow down the effects of gentrification by helping low-income residents stay in place, and 4) more geographically dispersed white congregations are associated with less white influx into neighborhoods. While commuter-style churches may not be contributing to gentrification, neither are they helping declining neighborhoods to become healthy.

Dedication

To those who deserve to hear good news…but only see a church parking lot and a cheap sign

To those who are not thriving…because we are too busy doing “spiritual” work

To those who’ve been displaced…forgive us!

To those who want to be a blessing rather than a curse.

Acknowledgements

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My committee was of course indispensable in helping me achieve a work that I know has significant room for improvement, but of which I am nonetheless very proud. I thank Professors Bates, Padin, and Schrock for contributing to my education through numerous classes and seminars, providing valuable guidance throughout my dissertation process, and continuing to believe in the importance of my research. I thank Dr. Paul Metzger for coming into the perhaps slightly foreign land of Urban Studies and helping me see the many possibilities of connecting this and future studies with the faith world.

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1 Introduction

Religious faith is one of the most important sources of meaning in Americans' lives, second only to spending time with family (*Where Americans Find Meaning in Life*, 2018). At the same time, the rapid rise of the religiously unaffiliated (*America's Changing Religious Landscape*, 2015) and the long-term trend of declining church attendance (Saad, 2018) have garnered popular attention and rightly raised concern among Christian leaders. While the overall number of Christians in the US has declined by between 2.8 and 7.8 million from 2007 to 2014 (*America's Changing Religious Landscape*, 2015), tremendous variation between subgroups exists. Mainline Protestants and Catholics have suffered steep declines in church attendance, while those same numbers have remained stable among Black Protestants and, among Evangelical Protestants, have grown. Perhaps surprisingly, the number of local congregations (both Christian and non-Christian) has risen from approximately 336,000 in 1998 to 384,000 in 2012 (Brauer, 2017) with much of this growth coming from non-Christian congregations (16,000 growing to 26,000) and nondenominational Protestant congregations (54,000 growing to 84,000). Religion continues to be vital in the personal lives of Americans, and their religious congregations are an undeniable and still growing institutional reality in communities around the nation.

Church leaders commonly assume that their local congregations[1] provide a generally positive societal impact, but there is very little understanding if or how churches tangibly influence the communities around them. Can churches affect the socioeconomic trajectory of a neighborhood? For example, what is the impact of a predominantly white church in a gentrifying neighborhood whose low-income residents of color are suffering displacement? Can local churches help turn around declining neighborhoods through social services and social capital? Simply asking these questions is a significant step forward as churches must grapple with their relationship and impact on individuals, and with space and social processes.

1.1 Summary of Study

This study examines the relationship between Christian[2] churches and changes in household median incomes from 1990 to 2010 in the census tract in which each church is located. Key church characteristics such as social service involvement, social capital generation, residential patterns of attendees, and demographic composition are analyzed to determine how they are related to changes in neighborhoods. The study also examines changing patterns of church location with respect to neighborhood types, and trends in church and neighborhood segregation.

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[1] "Church" and "congregation" are used interchangeable throughout this document.

[2] While this study is focused exclusively on Christian churches, I want to in no way detract from the growing impact and importance of other religious faiths in our pluralistic society.

1.2 Rationale for Study

Why study the role of churches in neighborhood change? Because local congregations are often the oldest institutions in a neighborhood, and, as one set of researchers notes, "churches are often the last to leave … and the first to return" (Foley, McCarthy, & Chaves, 2001, p. 215). Although some scholars claim that urbanization and gentrification lead to secularization (Ley & Martin, 1993), I agree with Cox (1965) that God never left the city and contend that the reports of religion's death have been greatly exaggerated. Unfortunately, there are large gaps in community development, economic development, and neighborhood change research because the role of religion in general, and local congregations specifically, is either ignored or downplayed. In the introduction to his book on the role of churches in the "new urban America", Numrich (2015, p. 4) notes this hole in sociological and urban studies research, calling for a recognition that "…congregations [are] part of the ensemble of forces creating the new American metropolis." Day (2017) notes that blind spots exist on both the religious and the secular sides, in that religious practitioners and researchers have lost their sense of space and place, even as urban planners, developers, and researchers consider religious groups as "a benign presence (at best), having little agency to impact the urban ecology" (pg. 10). She sounds a hopeful note that "as there is a [spatial] turn in religious research as well as in theological consciousness of urban space, there is an increased possibility of impacting urban policies inclusive of the religious presence" (pg. 11).

While the importance of religious institutions in the United States was observed by Tocqueville nearly two centuries ago, researchers are rediscovering this truth, finding, for example, a resurgence of religious vitality in gentrifying neighborhoods (Cimino, 2011). As discussed below, research has found a positive association between churches and economic impacts (Rupasingha & Chilton, 2009; *The Halo Effect*, 2016), increased civic engagement and local capital accumulation (Tolbert, Lyson, & Irwin, 1998), and reduced poverty levels (Myers, 2016).

Extensive literature exists to illustrate the importance of local institutions, which includes churches, across a wide swath of social science research. For example, researchers have established that local factors such as individual, family, and neighborhood must be incorporated alongside larger market and economic forces to better understand poverty (G. C. Galster, 2010; Katz, 2013; Wilson, 1987). Likewise the two primary theories of gentrification (Ley, 1980; Smith, 1979) as well as general theories of neighborhood change (Baum-Snow & Hartley, 2016; Grigsby, Baratz, Galster, & Maclennan, 1987) include causal factors that operate locally, regionally, nationally, and globally. Critics of global capital have identified place-rooted capital (Bluestone & Harrison, 1982; DeFilippis, 2004) based on strong and diverse local institutions as a necessary corrective to increasing inequality and economic instability. The community development and community organizing literature has long stressed the importance of effective local institutions because “some of the most important and durable social capital is stored in institutions where people gather, learn, debate, struggle, and

strategize together – and, in some cases, where they play and pray, too" (Briggs, 2007, p. 18).

Recent United States political history highlights the ongoing importance of religious institutions. There has been an unmistakable press towards local solutions to community challenges dating back to President Clinton's Charitable Choice legislation and continuing with George W. Bush's faith-based initiatives. This devolution of Federal welfare funding to state and local levels over the last several decades has propelled voluntary associations in general, and religious institutions in particular, to the forefront (Bartkowski & Regis, 2003; Hall, 2006). This has led to rising expectations for churches to take part in community development and safety net strengthening (Farnsley, 2003).

However, the worlds of local government and social service do not readily align with local churches. Church leaders often fail to understand local and regional government dynamics and the complex world of social service delivery. Likewise, government and social service leaders may not understand the unique capabilities and challenges of the faith world. Other contributors to neighborhood change such as global capital, labor markets, and housing markets, are even further removed from the expertise of the local church. Studies such as mine help bridge these worlds by exposing the deliberate and accidental impacts of local congregations on their communities, and by providing new questions to ask and explore before making ecclesial decisions.

1.3 Conceptual Framework for Churches and Neighborhood Change

This study incorporates three conceptualization strategies for churches:

1) Institutions within an ecological framework,

2) Voluntary associations, and

3) Social capital generators.

Emanating from these conceptualizations, quantitative research reviewed below pinpoints four specific pathways between churches and neighborhoods:

1) Direct and indirect economic impacts,

2) Social service provision,

3) Social capital generation, and

4) Demographic composition and residential patterns of attendees.

I explore key church characteristics that may contribute to or inhibit these pathways, with a focus on pathways two, three, and four. The literature on the first pathway, economic impacts, is reviewed, but this study does not research this pathway specifically. Neighborhood change is operationalized as a census tract's relative change in household median income from 1990 to 2010 (Landis, 2016), enabling normalized comparisons across a wide variety of neighborhoods throughout the United States with four types of neighborhood change identified: Gentrification, Upgrading, Decline, and Stable[3]. The study analyzes the four Landis-style change types, the amount of change in percentage of whites ("white influx"), and changes in relative median income ("income

[3] Throughout this document, to distinguish between generic references of neighborhood change and Landis' very specific definitions, the latter are always capitalized.

change"). Figure 1 below provides a graphical representation of the study and key concepts.

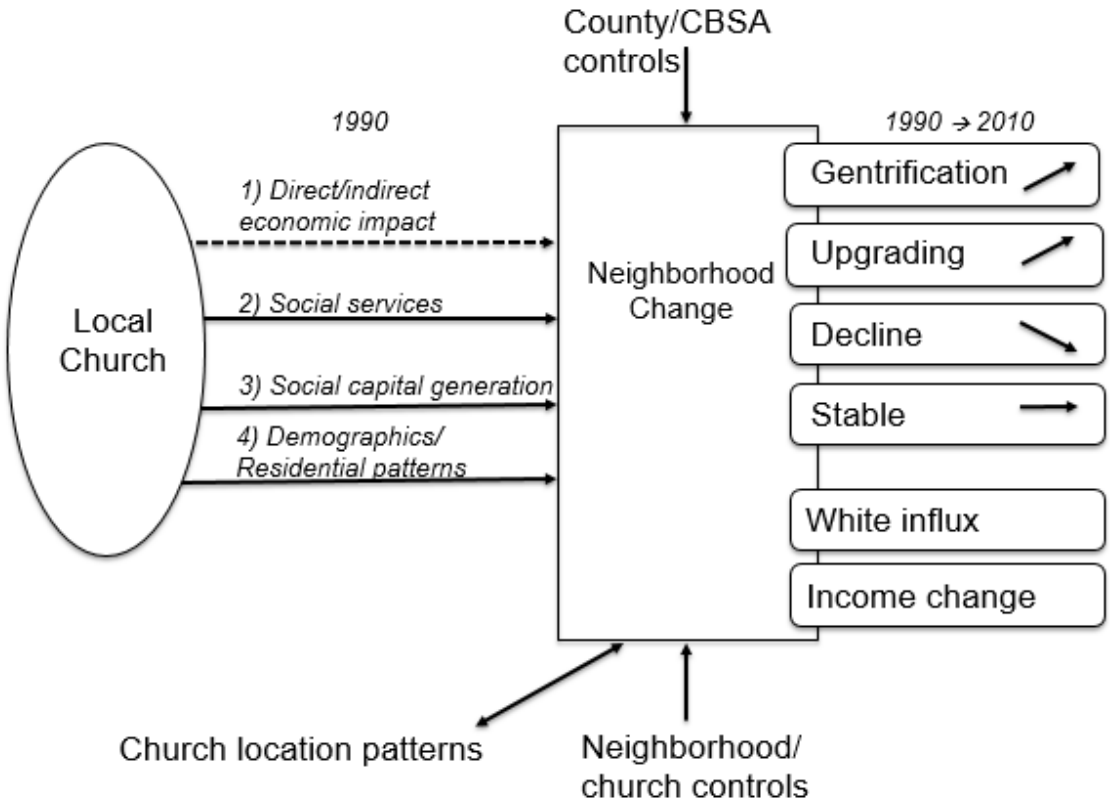

Figure 1: Conceptual framework of study

1.4 Overview of Dissertation

Chapter 2 provides a summary of relevant literature resulting in the formulation of six study hypotheses. Chapter 3 discusses church and neighborhood data sources and methodology, followed by two chapters on results: Chapter 4 provides a variety of descriptive statistics and findings on church location and segregation, while Chapter 5 presents and discusses the primary analysis. Chapter 6 concludes the dissertation.

1.5 Desired Impact of Study

This study advances the state of knowledge by addressing several gaps in the literature, including:

1) Census tract-level analysis to discern localized church impacts

2) Multilevel modeling to separate macro-level effects from church effects and account for CBSA-level variation

3) Analysis of neighborhood change over time instead of point-in-time snapshots;

4) As a large-scale study with nationally representative data, this study complements the excellent case studies which currently dominate this area of inquiry.

The results of this study will help church leaders better understand the range of positive and negative community impacts from local congregations. It will help church leaders, community and economic development practitioners, and local government officials better integrate the faith community into the challenges of addressing important community issues.

While this study cannot provide the handpicked "how-to" inspiration found in the many practitioner-oriented case study books currently available, it will provide insight into the actual impact of the average church in America in the last several decades and help to paint a more accurate picture of how churches have, in fact, contributed to, or detracted from, the welfare of their cities. My personal desire for this research is that it will help church leaders and participants ask hard questions about

their roles in their communities, encourage them to engage in the very real, very "wicked problems" (Rittel & M., 1974) of our day, and spur additional research at the nexus of church and community.

Finally, this study examines only one aspect of the full range of impacts that religious congregations have on society. For example, many churches are involved in establishing nonprofits or funding relief work whose primary impact is in other neighborhoods, cities, states, or countries. Churches are involved in organizing members, locally and across entire denominations, around social causes, with impacts far beyond a single neighborhood. Other churches seek to unite with faith communities across metropolitan areas, raising awareness and funding for citywide initiatives as varied as affordable housing, mass incarceration, and hunger. This study's critical focus on local neighborhood church impacts, which I contend is an understudied area deserving more attention from researchers and practitioners alike, is not meant in any way to minimize the importance of other forms of social impact by churches.

2 Literature Review

The question of how and why neighborhoods change is one of the foundational questions of the urban studies discipline. However, an exhaustive overview and synthesis of neighborhood change theories is not required here, as my specific goal is to establish a plausible role for local institutions in neighborhood change. I review conceptualization and operationalization strategies to define and measure neighborhood change, providing a basis for the dependent variables in the study.

I then turn to a brief review of church conceptualization strategies with a focus on religious ecology, churches as economic actors, churches as social service providers, and churches as social capital generators. Underlying this study is the critical question of where churches are located and how locational patterns correspond with surrounding neighborhood characteristics. My concerns are specifically with the types of neighborhoods in which churches are located, the parameters considered in location decisions by churches, and how this may be changing over time. This review will be followed by a summary of church segregation and diversity research, highlighting a lack of research that compares church segregation and diversity with residential segregation and diversity.

2.1 Conceptualizing and Operationalizing Neighborhoods

2.1.1 Local Institutions and Neighborhood Change

The importance of local institutions in the process of neighborhood change goes at least as far back as Grigsby's (1963) model of neighborhood decline. Grigsby did not accept

decline and succession as natural events as did previous researchers (Park, Burgess, & McKenzie, 1925). Rather, neighborhood change was the result of decisions to invest (or not) in existing property which in turn depended on numerous factors including community assets and local institutions. This was later formalized in a framework for neighborhood change (Grigsby et al., 1987) focused on housing submarkets that incorporated housing suppliers, market intermediaries, and neighborhood groups. More recent analysis of neighborhood change places the importance of local institutions in the dual forces of neighborhoods as 1) sites of struggle for identity, and 2) sites of domination, exclusion, and containment (Betancur & Smith, 2016). As an example of the first, when describing the first "openly gay neighborhood" of Halsted North in Chicago, the authors reference progressive churches alongside "a liberal lakefront, and an expansive arts community" as the necessary components of a "relatively tolerant environment" (pg. 137). In describing the transition of Englewood from an all-white suburb of Chicago to a Black ghetto, the authors describe the second force of domination, exclusion and containment emanating from the existing network of local institutions and associations, including many churches, which were off-limits to incoming Blacks. In the end, many of these churches and other institutions simply chose to relocate rather than embrace their new neighbors. A recent empirical study by Landis (2016, p. 16) claims rather confidently that "the determinants of neighborhood change are more local than metropolitan in origin," again highlighting the importance of local institutions in neighborhood change.

Local institutions play a prominent role in both general theories of neighborhood change, and in more focused accounts, as seen in the two primary schools of thought on gentrification: the cultural/consumption model (Ley, 1980) and the critical/structural model (Smith, 1979). Although ostensibly focused on gentrification, these theories shed light on the overall phenomenon of neighborhood change because of the cascading effect of neighborhood change on the network of neighborhoods in metropolitan regions (G. Galster, 2001). Ley (1980, 1994) documents the emergence of a "cultural new class" marked by quality of life concerns and a search for urban diversity and localness. For Ley, local institutions and associations were key components of what made central city neighborhoods not only desirable, but centers of resistance against big business and government growth, production, and efficiency. Whereas Ley stresses culture and consumption, Smith (1979) posits that structural forces of production based on the economics of capital accumulation drive gentrification. According to Smith, preference for central city living is only stimulated once local actors such as builders, developers, landlords, lenders, government agencies, and real estate agents have produced gentrified space. As I demonstrate below, churches are influential local economic actors, as land owners, landlords, and even developers. Although diametrically opposed in their explanation of gentrification, both theories posit important roles for local institutions in the process of neighborhood change, laying the theoretical foundation for this study of the role of the local church in neighborhood change.

2.1.2 Neighborhoods and Neighborhood Change

Defining a "neighborhood" is logically necessary before we can speak of measuring neighborhood change. However, the concept of "neighborhood" is highly contested, ranging from the traditional ecological approach of natural groupings (Park et al., 1925) to critical approaches recognizing the power and structure behind the explicit production of neighborhoods (Betancur & Smith, 2016; Smith, 1979). The simplicity of assigning neighborhoods to artificial geographic boundaries has also been questioned (Bridge, 1994; G. Galster, 2001), with researchers such as Galster (1986, 2001) arguing for a multifaceted, multi-spatial definition of neighborhood that incorporates characteristics of building structure, infrastructure, demographics, class, environment, proximity, politics, and the social-interactive which includes local institutions and voluntary associations. However, urban scholars have generally eschewed these more complex definitions of "neighborhood" (Reibel, 2011). While there are exceptions (E. C. Delmelle, 2015; E. Delmelle, Thill, Furuseth, & Ludden, 2013; A. Owens, 2012), more typical are studies based on easily available census data, using census tracts and similar geographic constructs (see Baum-Snow & Hartley, 2016; Hwang, Lin, & Lin, 2016; Landis, 2016; Lucy & Phillips, 2006).

Depending on research objectives, researchers of neighborhood change may choose between simpler measurement constructs that work across a wide variety of metropolitan areas and neighborhood trajectories, or complex, special purpose measures that may be geography specific or focus only on certain types of

neighborhood change such as gentrification (Voorhees, 2014), ascent (A. Owens, 2012), and urban decline (Weaver & Bagchi-Sen, 2013). Landis (2016) takes up the challenge "to consistently identify the extent and spatial incidence of gentrification and other forms of substantial neighborhood socioeconomic change" (pg. 3) with what he calls the double-decile difference (3-D) method. Relying on readily available census data on median income levels and census tract boundaries, Landis develops a methodology capable of analyzing and categorizing neighborhood change across all U.S. metropolitan areas. Given this study's interest in the association between churches and a variety of types of neighborhood change across the US landscape, Landis' methodology is used and will be described in more detail in the Methodology section below.

While previous studies have explored religious impacts on larger geographic areas such as counties (Blanchard, Bartkowski, Matthews, & Kerley, 2008; Myers, 2016; Rupasingha & Chilton, 2009; Tolbert et al., 1998) and countries (Barro & McCleary, 2003; Torgler, 2006), my concern is not with how the general religious environment impacts a given geographic area, but rather how the characteristics of an individual church may impact the immediate neighborhood in which it is situated. In full view of the limitations and debates in the literature summarized above, "neighborhood" is here operationalized as a census tract.

This study conceptualizes neighborhood change as change in socioeconomic status over time rather than point-in-time snapshots of poverty levels (Myers, 2016), income, inequality, and unemployment (Tolbert et al., 1998), per-capita income and

income inequality (Hoyman, McCall, Paarlberg, & Brennan, 2016), and annual economic impact (Daly, 2016; *The Halo Effect*, 2016). Although in the minority, some studies have explored the relationship between churches and neighborhood change over time, including changes in economic growth over 10 years (Rupasingha & Chilton, 2009), and changes in neighborhood viability over 20 years (Kinney & Combs, 2016). My study extends the literature along the lines of these later studies, exploring changes in relative household median incomes over a 20-year timeframe.

2.1.3 Normative Appraisals of Neighborhood Change

The literature on neighborhood change is diverse in conceptualization and operationalization strategies, and contains a multiplicity of normative stances. For example, Slater (2006, 2008) highlights a "pro-gentrification lobby", rooted in both the confusion and complexity related to measuring displacement and the ongoing debates around social mixing, and more fundamentally tied to an uncritical acceptance of neo-liberalism. Scholars such as (Hyra, 2016) consider gentrification a potentially redeemable process that can be transformed into "equitable gentrification", while (Landis, 2016), whose operationalization strategies are central to my study, is rather sanguine about the prospects of neighborhood upgrading and gentrification, recommending that rather than trying to slow the processes, planners should focus on redistributing the benefits by limiting rising property taxes for longtime homeowners, providing housing vouchers for existing low-income renters, and leveling punitive taxes to discourage house flipping.

My study will not advance the normative debates on neighborhood change as I accept the critical view that gentrification and neighborhood decline are interrelated processes with significantly negative long-term impacts on the poor (Betancur & Smith, 2016; Smith, 1979). My operationalization strategy based on Landis (2016), therefore, offers a primarily descriptive approach to categorizing neighborhood change, a theme picked up below where my neighborhood change methodology is discussed (see section 3.1).

2.2 Conceptualizing Churches

A brief review of church conceptualization strategies identifies three broad views: churches as institutions, churches as voluntary associations, and churches as social capital generators. There is a rich history of social science research on churches and local congregations dating back to at least 1935 with the publication of "The Protestant Church as a Social Institution" (Douglass & Brunner, 1935). It is no surprise that Douglass and Brunner held an ecological view of church formation, adaptation, and survival, given the contemporaneous urban ecological-framework of Park et al. (1925). Douglass and Brunner identified the creation of "social fellowship" and social service programs as key methods of adaptation, with congregations comprised of 1) participants, 2) programs, 3) resources, and 4) leadership (Roozen, 2002, p. 8). More generally, their religious ecological perspective on churches can be placed within a broader view of churches as institutions that adapt to changing environments, and fulfill important transformative roles as economic, cultural, and political actors.

Roozen also notes that Douglass and Brunner presage more modern notions of voluntary associations with their observation that congregations fulfill an important role as selective affinity groups for new urbanites who had lost the sense of place and community from their rural roots. Conceiving of churches as voluntary community associations (Ammerman, 1997; Putnam, 2001) leverages the basic sociological principle of homophily, conceptualizing congregations as groupings of individuals along an axis of affinity. This concept will help explain how church planters make locational decisions and highlight the role of churches as "cultural amenities" implicated in neighborhood demographic changes.

Robert Putnam has famously contended that "faith communities in which people worship together are arguably the single most important repository of social capital in America" (Putnam, 2001, p. 66). Foley, McCarthy, & Chaves (2001) provide valuable analysis of how local congregations build social capital through 1) extended, denser social networks, 2) broader social linkages to resources outside of the neighborhood, 3) information flows on community challenges, resources, and information outside of the community, 4) training, 5) referral to social services, 6) provision of free spaces, 7) socialization, community service, and political participation, and 8) authority and legitimacy to bolster the power of community activities and energize mobilization. Their analysis includes the well-known distinction between bonding and bridging social capital in which the former refers to linkages primarily between group members while the later refers to linkages to different groups (Adler & Kwon, 2002; Putnam, 2001). My study

also incorporates the distinction of "bridging" between those of relatively similar social and political power, versus "linking" between those of unequal power (Szreter, 2002; Woolcock, 1998). Krishna & Shrader (1999) differentiate between cognitive and structural social capital: the former is less tangible, related to individual values and beliefs such as trust and solidarity, while the latter refers to the practices and networks that comprise local institutions. This theory of structural social capital forms the basis for this study's operationalization of social capital into a set of indices based on church characteristics and activities.

Referring to Figure 1 on page 7, my study leverages all three conceptualizations to derive the four pathways between church and neighborhood. Pathway 1 (direct/indirect economic impact) leverages the institutional/ecological conceptualization of churches. The literature review below expands on churches as economic actors, but my study does not directly research this pathway. Pathway 2 (social service provision) is also based on the institutional/ecological framework. Pathway 3 (social capital generation) is derived directly from the conceptualization of churches as social capital generators. Pathway 4 (demographic composition and residential patterns of attendees) draws on a combination of the institutional/ecological framework, as well as the view of churches as voluntary associations. These varied views are expanded upon below and developed into six study hypotheses.

2.2.1 Religious Ecology

Numerous studies examine religious institutions in an ecological framework by applying concepts such as niches, competition, specialization, and adaptation. Religious ecology provides a basis for examining how churches respond to changing neighborhoods (Dougherty & Mulder, 2009; Form & Dubrow, 2005) and how they play a role in influencing neighborhood change (Blanchard, Bartkowski, Matthews, & Kerley, 2008; Cimino, 2011; Kinney & Combs, 2016; Kinney & Winter, 200 6; Mulder, 2012, 2015). In his study of the interaction between gentrification and congregations in two Brooklyn, New York neighborhoods, Cimino (2011) develops a threefold congregational typology: lifestyle enclaves, neighborhood social centers, and ethnic/religious enclaves. Lifestyle enclaves are planted intentionally in gentrifying neighborhoods, and primarily intended to attract a certain gentry demographic with few ties to longtime residents and neighborhood organizations. A particular church culture is "transplanted" into the neighborhood, rather than being derived from the neighborhood. Cimino's research reveals that lifestyle enclaves may be feeding gentrification by ignoring existing residents and norms, and instead transplanting norms to appeal to newcomers only. When we combine the observation that neighborhood change can often be explained as a closure of the gap in social distance (Musterd, van Gent, Das, & Latten, 2014), and the aforementioned view of churches as voluntary associations along an axis of affinity, we arrive at the first of several hypotheses for my study:

- Churches in which the percentage of white attenders is higher than the percentage in the surrounding community will be associated with increased neighborhood gentrification.
- Churches in which the percentage of college graduates is higher than the percentage in the surrounding community will be associated with increased neighborhood gentrification.

2.2.2 Churches as Economic Actors

There is a growing body of literature on the economic impact of churches, including studies of historic "sacred places," which estimates $1.7m - $4.5m in annual economic impact per congregation (Daly, 2016; *The Halo Effect*, 2016). Because these studies are not representative of the clear majority of churches in the US, more relevant for this study than the actual dollar values are the pathways of economic impact this line of research reveals, including direct spending in the form of salaries and capital improvement projects, the "magnetic effect" of attracting visitors to the neighborhood who in turn spend money on local businesses, and the value of community services, volunteer time, and free space use. Research on the overall economic contribution of religious organizations to the United States economy estimates that such institutions contribute between $378 billion and $4.8 trillion annually when taking into account the household incomes of religiously affiliated Americans (Grim & Grim, 2016). Cnaan (2009) estimates that the average urban congregation generates nearly $500,000 in economic value to the local economy from multiple sources including operating budget,

social services, crime prevention, property values, church schools, and housing and economic development. Other research shows that a higher density of churches at the metropolitan level which match resident religious preferences results in higher levels of church attendance and higher income levels (Gruber, 2005). Rupasingha & Chilton (2009) produce different results with their county-level analysis that looks at the relationship between religious adherence rates and per capita income growth, finding positive but non-significant effects for Evangelicals, positive and significant effects for Catholics, and negative and significant effects for Mainline Protestants. This study notes that spillover effects may be present as church attendance and reach do not abide by official census boundaries. Further, income growth in one county may be related to an adjacent counties' income growth. The general spatial model is used in their study to account for spatial correlation and informs the decision to incorporate spatially lagged variables in this study (see more details in the Methodology section below).

These studies on the relationship between churches and economic growth, although they provide mixed results, nonetheless point to real impacts on economic outputs and neighborhood change. Based on the above, a tentative hypothesis is "the presence of a church in a neighborhood will be associated with increased neighborhood upgrading and gentrification." However, I will formally introduce this hypothesis below when the role of social capital and civic engagement is recognized.

2.2.3 Churches as Social Service Providers

Research shows that churches provide many social services. While service recipients grade congregations above public welfare agencies in terms of effectiveness (Wuthnow, Hsu, & Hackett, 2004), the long-term impacts of these social services on poverty are not born out by research (M. Chaves & Tsitsos, 2001; Fulton, 2016; M. L. Owens & Smith, 2005; Vidal, 2001). Fulton's (2016) study of church trends since the 1990s finds that overall social service activity is increasing, from 70% of congregations in the 1990s providing social services, to 78% as of 2012. He also notes a decline in political participation, raising concerns that this will limit the ability of churches to pursue long-term strategies with long-term impact. Other research based on the same National Congregation Survey data finds that most congregations engage in social services aimed at short-term needs (M. Chaves & Tsitsos, 2001), with median spending of $1500/year (Mark Chaves & Eagle, 2016), a small amount compared to the large-scale challenges of addressing poverty in a neighborhood. Even congregations located in low-income neighborhoods tend not to provide services that are likely to help people get out of poverty, with a focus on short-term needs and a lack of holistic services (M. L. Owens & Smith, 2005). On a more positive note, 10% of congregations have started separate nonprofits, nearly 17% have at least one paid staff member who spends more than 25% of their time on social services, and 75% report collaborating with other congregations or social service organizations for their most important programs (Mark Chaves & Eagle, 2016). These and other factors are indicative of a congregation’s commitment to social

services and will be developed into a "social service index" as described in the Methodology section below and incorporated as an explanatory variable in my primary analysis.

In a study of faith-based economic development in Detroit, Reese (2004) finds very few congregations engaged in long-term economic development activities such as job training, entrepreneurial support, and providing startup loans. She finds that one third of the congregations provide child care and other charitable services, but fewer than half of those also offer economic development services. Other research shows that African American churches are significantly more likely to offer economic development services (Littlefield, 2010). Reese notes that amongst predictors of which congregations offer economic development services, neighborhood-based membership is critical, as are church size (staff and membership), and public-sector funding.

Related literature exists, largely outside of the academic realm, on churches as agents of community development. For example, the Christian Community Development Association (CCDA) is a fairly large and successful movement of churches and related organizations based on concepts of long-term community empowerment in under-resourced communities (Essenburg, 2000). Numerous books highlight successful CCDA and related faith-based organizational frameworks (DeYmaz, 2017; Gordon, Perkins, & Frame, 1995; Lupton, 2005). While useful for practitioners as aspirational case studies, this literature lacks academic rigor and does not consider the broad-based

effects of churches on neighborhoods and the generalizability of the case studies highlighted.

Developing hypotheses based on the mixed results of the literature above is difficult; the generally positive case study results of the non-academic books contrast with the primary literature that questions the long-term impacts of church-based social services. My study tests whether neighborhoods positively benefit from church-based social services with less chance of decline:

- Churches with higher levels of social services will be associated with less neighborhood decline.

2.2.4 Churches as Social Capital Generators

There is a robust literature on the role of churches as generators of bonding and bridging social capital, with a lesser literature testing the impact on economic outcomes. In his well-known and heavily cited work, Putnam (2001) observes that the primary Christian religious traditions in America are marked by different forms of social capital, such that Mainline Protestant and Catholic congregations are generally characterized by bridging social capital, and Evangelical and other conservative Protestant groups are marked by bonding social capital. While some have based their research on these high-level religious tradition distinctions (Beyerlein & Hipp, 2005; Myers, 2016), others have dug below the surface to determine the congregational characteristics that contribute to bonding and bridging linkages (Beyerlein & Hipp, 2006; Hoyman et al., 2016; Schwadel, 2005; Tolbert et al., 1998). For example, “civically engaged” congregations

have been defined as those with adherents having an above-average number of voluntary association memberships (Tolbert et al., 1998). Beyerlein & Hipp (2006) extend and elaborate Tolbert et al. (1998) by examining the effect of participation in *linking* voluntary organizations as the hallmark of bridging congregations. They find that participation in non-religious activities at church (not simply religious service attendance) is the best predictor of participation in linking organizations, and that this is much less likely to occur in Evangelical Protestant congregations: mainline Protestants are 40% more likely, black Protestants 65% more likely, and Catholics 52% more likely, than Evangelical Protestants. Likewise Schwadel (2005) confirms lower civic engagement for conservative congregations, defined as congregations with high levels of Biblical literalism and within-church friendship (typical of most Evangelical churches). His analysis reveals a negative association between within-church ties and civic engagement. However, other research finds that higher levels of bonding social capital within churches is a predictor of social justice participation (Houston & Todd, 2013).

Given the general findings above which show an association between "bridging congregations" (defined in various ways) and enhanced civic engagement, what are the economic impacts? Tolbert et al. (1998) finds that local institutions, both economic (such as small manufacturing firms) and non-economic (such as civically engaged congregations), are associated with positive socioeconomic outcomes at the county level. The analysis focused specifically on contrasting the local orientation and engagement of these local institutions with the global capitalist perspective of large

enterprises that are divorced from the local culture and economy. Myers (2016) also finds socioeconomic benefits associated with increased adherence rates in bridging congregations (Mainline Protestant and Catholic), with a 1% increase in adherence associated with a 0.3% decrease in likelihood of poverty. Results across the literature are mixed, however. Hoyman, McCall, Paarlberg, & Brennan (2016) find that bridging congregations are associated with reduced income inequality, but negatively associated with per capita income. They also find that overall higher densities of congregations (not distinguishing between bridging and bonding congregations) were negatively associated with per capita income, and positively associated with higher inequality. They explain these later findings by positing that most churches are likely characterized by more bonding, as opposed to bridging, social capital.

This literature points to a complex set of relationships between congregational social capital, economic outcomes, and the potential impacts on neighborhood change. There is a significant gap in the literature providing an operationalization strategy for church social capital generation beyond using simple religious tradition categorization. To this end, I develop several indices to measure a church's bonding and bridging social capital generation (as described in the Methodology section below) and incorporate these indices as explanatory variables in my primary analysis. Based on the above review of literature, I provide the following hypotheses on the impact of churches incorporating social capital generation:

- Higher bridging social capital generation in a church will be associated with increased neighborhood upgrading and gentrification.
- Higher bonding social capital generation in a church will be associated with increased neighborhood stability and increased decline.

2.3 Church and Geography

There is a well-established geography of religion literature that provides insight into the impacts of nationwide (Bauer, 2012; Warf & Winsberg, 2008) and regional (Scheitle & Dougherty, 2008) adherence and church density patterns, typically at the level of denomination and religious tradition. This study's focus, however, is at the neighborhood level, with a specific interest in the factors that contribute to church location decisions and church impacts at the neighborhood level. Below, I review the literature on residential patterns of church attendees, church locational decisions, and church segregation and diversity.

2.3.1 Church and Residential Patterns of Attendees

My primary geographical concern, aside from the actual location of the church, is the residential dispersion of church attendees. The literature differentiates between parish-based congregations and so-called "commuter congregations". As summarized by Ebaugh, O'Brien, & Slatzman Chafetz (2000), Ammerman (1997) lays out the key differences between the two. Characteristics of a parish church include: 1) geographical division of a larger religious body (such as Catholic dioceses divided into parishes), 2) congregants living within boundaries of the parish, and 3) a tendency for the

congregation to be an actor in local community affairs. Characteristics of a commuter congregation include: 1) members dispersed throughout a metropolitan area, 2) specialized congregational identity, 3) little to no competition for members from similar congregations, 4) strong member social networks as a key to word-of-mouth recruitment. Change in church composition from pre-20th century neighborhood- and community-based churches towards commuter churches is consistent with an overall societal trend away from proximity-based toward affinity-based relationships (Sinha, Hillier, Cnaan, & Mcgrew, 2007). In their study of nearly 1400 congregations in Philadelphia, Sinha et al. (2007) identify three types of congregations: 1) residential (similar to "parish" above) in which more than 50% of members live within 10 blocks of a congregation's building (40% of sample), 2) city commuter in which fewer than 50% live within 10 blocks, and fewer than 50% live outside of city limits (approximately 50% of sample), and 3) suburban commuter in which more than 50% live outside city limits (less than 10% of sample). A key finding for my purpose is that residential congregations tend to be located in census tracts that are more stable, while city commuter congregations are found in declining neighborhoods that experienced white flight and later middle-class black flight. Numrich (2015) develops a similar three-part spatial typology of churches and finds evidence that neighborhood churches have a relatively stronger urban impact than the other, more geographically diffused, church types.

In their study of the impacts of church closures, Kinney & Combs (2016) find that Catholic and other geographically oriented churches that closed had the most significant impact on neighborhood vitality. They theorize that place or community attachment varies by a church's geographical orientation, noting that church attendance tended to embed people into their communities (citing Tolbert et al., 1998). In a study predicting social service provision by churches, M. L. Owens & Smith (2005) note that churches in poor neighborhoods may no longer be technically "residential congregations" because many of the members who used to live in the neighborhood may have moved away. They nevertheless maintain strong ties with the church neighborhood. Although not statistically significant, their study hints that more locally rooted members belong to congregations providing more social services. Reese (2004) emphasizes this point in her study of faith-based community and economic development in Detroit: "The connection to neighborhood appears critical to the extent that congregations are active in both economic development and education activities; commuter parishes are less active in community development efforts across the board" (pg. 62). A more recent study distinguished between "embedded" (intense, local focus) and "disembodied" (scattered, fragmented) congregational-neighborhood interaction (Mulder & Jonason, 2017). The authors find that disembodied churches were overwhelmingly suburban, with dispersed congregations. These churches were still participating in social service programs, but not in the neighborhoods immediately surrounding their church.

Based on the general direction of findings summarized above, my study posits that commuter congregations will have less impact on the immediately surrounding neighborhoods:

- Churches with more geographically dispersed attendees will be associated with less neighborhood change.

2.3.2 Church Location Influences

Research has documented the parallel suburbanization of churches and members that started as far back as the 1920's (Miller, 2017) as well as the white flight of churches coinciding with the white flight of church members beginning in the 1970's (Mulder, 2015). A countertrend has emerged wherein churches are re-urbanizing, especially amongst white middle-class Evangelicals who are reacting against the phenomenon of suburban megachurches specifically, and suburban culture in general (Bielo, 2011). The common theme of these and similar analyses is that residential preferences of leaders and adherents are key determinants of church location. These preferences may be driven by demographic changes within the metropolis, or more elusive cultural considerations such as a reaction against homogenous suburban culture. Form & Dubrow (2008) encapsulate this phenomenon within a religious ecology perspective, finding that churches generally locate in areas that match the socioeconomic characteristics of their members.

While the above studies draw connections between church location and large-scale settlement patterns, a more specific look at the church location decision

framework is provided by Benesh (2011). His research, although not statistically representative, nonetheless provides insight into the influences on location choice. His findings indicate the three most common reasons given by those starting new churches: 1) God's call, 2) being an "unchurched area", and 3) cultural compatibility. Leaving reason number one to theologians and mystics, I operationalize the second as church density, and the third in terms of neighborhood socioeconomic and demographic characteristics. I incorporate these considerations into my Statistical Matching analysis to develop covariates for statistical balancing purposes. More research is needed to untangle the complex of reasons that influence locational decisions and how these may impact the types of neighborhoods church planters choose.

2.3.3 Neighborhood and Church Segregation

I will allude to, but not participate in overquoting Dr. Martin Luther King's well-known observations on societal segregation at a particular hour of the week. Even in the decades before the Civil Rights movement, researchers and social commentators observed that as barriers were starting to fall in society, and "scores of nationwide and local secular organizations and agencies [were] working earnestly for better race relations….last in the procession, behold the Church, the spotless Bride of Christ, reluctantly dragging her heels." (Burns, 1949, p. 123). 70 years later, Burns' hope in general society was perhaps too optimistic, but his judgement against the Church is sadly still relevant. From a general societal standpoint, researchers were still debating how to define and measure segregation nearly 40 years after Burns' pronouncement

and 25 years after King's "I Have a Dream" speech, with Massey & Denton (1988, p. 282) observing that the "field of segregation studies is presently in a state of theoretical and methodological disarray." The added complexity of multigroup segregation, especially important in the ongoing diversification of America, was taken up by Reardon & Firebaugh (2002). They evaluated various conceptualizations and measurement strategies for segregation, in the end recommending Theil's information theory index, H, for the most robust measurement of segregation. I follow Reardon and Firebaugh in using Theil entropy-based measures of segregation and the related concept of diversity for both churches and neighborhoods (see the Methodology section below for details.)

In addition to operationalization challenges, theory may be inhibiting progress on stubbornly persistent residential segregation. Referring to the "Big Three" theories on segregation (racial differences in human capital, out-group avoidance/in-group affinity, and discriminatory housing markets), researchers point to the largely ignored processes that operate to produce different levels of awareness and perception of community choice across race/ethnic groups: "Racial disparities in knowledge of, experience with, and perceptions about metropolitan communities themselves are likely generated by racial and ethnic differences in daily activities and geographic experiences that arise out of segregated patterns of *social-spatial interaction*" (Crowder & Krysan, 2016, p. 20 emphasis added). As I argue in much of this study, local congregations are important neighborhood actors and facilitators of what Crowder and Krysan call "social-spatial interaction." In his county-level study, Blanchard (2007) explores the role of

church social capital generation in residential segregation, finding that conservative Protestant congregations contribute to a "closed social environment in that the institutional mechanisms that integrate blacks and whites through informal social or formal structural processes are weakened" (pg. 420). Both Blanchard and Crowder & Krysan establish a link between church segregation and residential segregation through mechanisms of social capital generation.

This leads to an understudied question: How is church diversity related to the diversity of the neighborhood in which it is embedded? Congregations in the Western region of the United States are more diverse than congregations in the Midwest and South, with "higher residential segregation linked to less diverse religious communities" (Dougherty & Dougherty, 2003). Schwadel (2009) finds, perhaps unsurprisingly, that the average congregation is significantly less diverse than the United States as a whole, while a later study finds that the average congregation went from eight times less diverse than its neighborhood in 1998, to four times less diverse in 2006 and 2012 (Dougherty & Emerson, 2018).

I will not formally test church location, segregation, and diversity hypotheses but will instead focus on reporting trends and developing explanatory variables for inclusion in subsequent analysis. Descriptive analysis will reveal the types of neighborhoods where churches are being planted, and how this may be changing over time. The literature is very sparse, with no nationwide systematic analyses found in my literature

search. This research will provide context for the questions and hypotheses discussed above and help illuminate the changing nature of church impacts on neighborhoods.

2.4 Summary of Research Questions and Hypotheses

My study has two primary research questions:

R1: How have patterns of new church formation changed over time with respect to neighborhood change?

R2: How do churches impact neighborhood change?

Based on the above literature review, following is a summary of the six formal study hypotheses:

- H1: Churches in which the percentage of white attenders is higher than the percentage in the surrounding community will be associated with increased neighborhood gentrification.
- H2: Churches in which the college graduation rate of attenders is higher than the percentage in the surrounding community will be associated with increased neighborhood gentrification.
- H3: Higher bridging social capital generation in a church will be associated with increased neighborhood upgrading and gentrification.
- H4: Higher bonding social capital generation in a church will be associated with increased neighborhood stability and increased decline.
- H5: Churches with higher levels of social services will be associated with less neighborhood decline.

- H6: Churches with more geographically dispersed attendees will be associated with less neighborhood change.

3 Methodology and Data Sources

3.1 Neighborhood Change

This study utilized the double-decile difference (3-D) method developed by Landis (2016) to construct the dependent variables of neighborhood change. In his study of neighborhood change across the 70 largest US metropolitan areas from 1990 to 2010, Landis explores methodological concerns, asking if it is possible to use census data to develop a consistent measurement methodology to detect and track gentrification and other forms of "substantial neighborhood socioeconomic change". Here, a "substantial" change is a two or more decile change over a 20-year period in median household income at the census tract level, relative to the surrounding metropolitan area. The 3-D method defines three types of neighborhood change: 1) Upgrading: a two or more decile increase in relative median income, 2) Gentrifying: a two or more decile increase, starting in the bottom four deciles, and 3) Declining: a two or more decile decrease[4]. A fourth category of "Stable"[5] is implicit. Note that the method utilizes census tract-level income deciles relative to the Core-Based Statistical Area (CBSA), therefore

[4] Landis distinguishes between core areas and suburban areas to produce six types of neighborhood change. I do not distinguish between core and suburban areas as my interest is not in exploring general neighborhood change, but the relationship of neighborhood change with churches.

[5] Note that while "stable" may have positive connotations, in my usage it simply means that none of the other neighborhood change type thresholds were met. Normative judgements must be context specific, e.g., a high poverty neighborhood experiencing "stability" is much different than a middle-income neighborhood experiencing "stability."

neighborhood changes are relative to the CBSA in which the neighborhood is located. By normalizing neighborhood change to the CBSA, this method provides control for variations in median income and median income trajectories across the USA.

My study extended Landis' method to all 942 CBSAs[6] in the US, not just the 70 largest metropolitan areas in his study. This posed a challenge in calculating relative median incomes with CBSAs that have very small numbers of census tracts. As an extreme example, the Evanston, WY CBSA has only 3 census tracts. Any movement of a census tract in Evanston relative to the other two census tracts would be considered a "substantial" neighborhood change because calculating deciles would be nonsensical with such a small number of census tracts. What is the minimum size for a CBSA to use the standard Landis 3-D method? I chose ten because in a ten (or larger) census tract CBSA, census tracts would have to move up or down relative to at least two other neighborhoods to register as a "substantial" neighborhood change. Using the standard 3-D method on CBSAs with less than 10 census tracts would not filter out smaller fluctuations, resulting in overestimates for neighborhood change. For these smaller CBSAs, rather than calculate the median income relative to the CBSA, I pooled small CBSAs together with all other small CBSAs within each state, and calculated the relative

[6] Based on 2013 Census Bureau definitions available at https://www2.census.gov/programs-surveys/metro-micro/geographies/reference-files/2013/delineation-files/list1.xls

median incomes in reference to these state-specific “small CBSA” pools. This approach recognizes that small CBSAs within a state are more like each other than to large CBSAs in terms of job opportunities, housing prices, and other determinants of economic status. For the vast majority of CBSAs and census tracts, the standard Landis 3-D method was used. Of the 67163 U.S census tracts in 942 unique CBSAs, this small CBSA adaptation was necessary for 1526 census tracts in 217 CBSAs. Out of the 1806 census tracts in 251 CBSAs that contained at least one church from my study, 42 census tracts in 21 CBSAs required this small CBSA adaptation. Since census tracts outside of a CBSA cannot be analyzed using this method, I restricted the analysis of churches and neighborhoods to those within CBSAs.

Landis acknowledges that the 3-D method trades off detail for geographic comprehensiveness, in contrast to other methods that incorporate changes in building stock, comparisons between newcomer or incumbent resident characteristics, or examination of physical, capital or financial investment. While his method ignores these and other important elements of neighborhood change, it is powerful because of the ease of operationalization and the ability to capture multiple types of neighborhood change across the USA with a single method. Application to long periods of time (20 years), along with requiring a two-decile change rather than a one-decile change, also smooths over incidental or short-term fluctuations and allows my study to focus on the long-term impacts of churches.

As discussed above, a variety of normative positions on neighborhood change exist. Because the 3-D method is based solely on changes in relative median income, it leaves open the question of whether these types of neighborhood change are positive or negative for residents. These judgements are even more complex when considering the varying impacts based on class, race, and new versus existing resident status. My study follows a standard critical approach in considering gentrification and decline as ultimately negative for lower-income residents, but my operationalization of neighborhood change does not directly measure these negative impacts. My inclusion of white influx as an additional indicator of neighborhood change attempts to highlight where race-based displacement is occurring, and while providing more nuance than relying solely on Landis' 3-D method, this operationalization of displacement is rather crude and only points to potential direct negative impacts.

3.2 Neighborhood Data

The Longitudinal Tract Database (LTDB) (Logan, Xu, & Stults, 2014) was utilized to provide spatially consistent census-tract level variables for the study. The online open-source Longitudinal Tract Database ("Census geography: Bridging data for census tracts across time," n.d.) provides 2010 boundary-normalized estimates for a large set of variables from 1970 up to and including the 2010 ACS and 2010 Census. Crosswalk tables are also provided to manually calculate 2010 boundary-normalized estimates for variables not included in the LTDB. This manual calculation was necessary for several census tract control variables from the 1990 Census.

3.2.1 Spatial Effects

Landis (2016) calls for future research on neighborhood change to explore the effects of neighboring census tracts on neighborhood change. My study therefore created spatially lagged versions of neighborhood change, based on the proportion of the population in the pool of each census tract's neighboring census tracts that experience Landis-style Upgrading, Decline, or Gentrification. These three surrounding neighborhood proportions were incorporated into the primary regression analysis (see below) as census-level control variable, with the hypothesis that neighborhood change is not spatially independent. To calculate these spatially lagged variables, I utilized a dataset developed by John Logan's Diversity and Disparities Project which provides a list of adjacent tracts (based on Queen's contiguity) for each census tract in the USA ("Census geography: Pooling adjacent tracts to improve reliability of estimates," n.d.; Logan, 2011).

I also created an "aggregated neighborhood" version of the LTDB that expands the definition of neighborhood from a single census tract to a group of tracts that includes the "center" tract and all adjacent tracts (using the same Diversity and Disparities Project dataset described above). This expanded definition of neighborhood was used in exploratory analysis but resulted in very few significant associations and was subsequently discarded.

3.3 Church Data

3.3.1 The National Congregations Study (NCS)

The National Congregation Study Cumulative data file and codebook (Mark Chaves, Anderson, & Eagle, 2014) is a nationally representative sample of congregations in the United States with survey data on both Christian (n = 3926) and non-Christian (n = 145) congregations taken at three different times: 1998 (n = 1234), 2006 (n = 1506), and 2012 (n = 1331). Each of the three survey waves is a nationally representative sample as of the year of the sample, and provides detailed data on church denomination/tradition, staffing, programming, community services, demographics of participants, and finances.

Although the public NCS data files only include the county in which the congregation is located, census-tract identifiers for each church were procured via a restricted access agreement. The LTDB crosswalk tables discussed above were used to translate the census tract identifiers for churches in the 1998 and 2006 waves to the appropriate 2010 census tract identifier (the 2012 wave already used 2010 census tract identifiers). In cases where the census tract simply changed from one id to a new id, the translation was straightforward. In more complex cases (such as the splitting of a census tract into multiple tracts), the LTDB crosswalk tables provided a weighting for the new tract ids. Since the specific address of the church was not available, I assumed the church was in the new census tract with the maximum weight.

My study created a sub-sample of the NCS data ("NCS study churches") by selecting Christian congregations founded in 1990 or earlier, located in a CBSA, which were still in

existence at the end of the analysis period (2010). I used both the 2006 and 2012 waves to maximize the size of the sample, recognizing that some of the congregations from the 2006 dataset may have closed between 2007 and 2010, a reasonable risk tradeoff to increase the study sample size, ameliorated by the fact that these congregations would have been in the neighborhood for at least 17 of the 20 years of my study period. To summarize, the NCS dataset provided 2089 churches for my study, arrived at by the following filtering process:

1. Starting with a total of 2837 churches in the 2006 and 2012 NCS waves, dropping 124 with missing founding dates and 350 founded after 1990[7].
2. Dropping 71 non-Christian congregations.
3. Dropping churches not located in a CBSA, resulting in 2082 churches distributed amongst 240 CBSAs.

Figure 2 below shows the geographical dispersion of the dataset, with the size of the bubbles scaled to the number of sample churches in the corresponding CBSA.

[7] The NCS surveys in 2006 and 2012 only asked about the year the congregation was founded, not the year it started worshiping at the current location. There is therefore a risk that some of the churches in my study were founded prior to 1990, but moved into their current location after 1990.

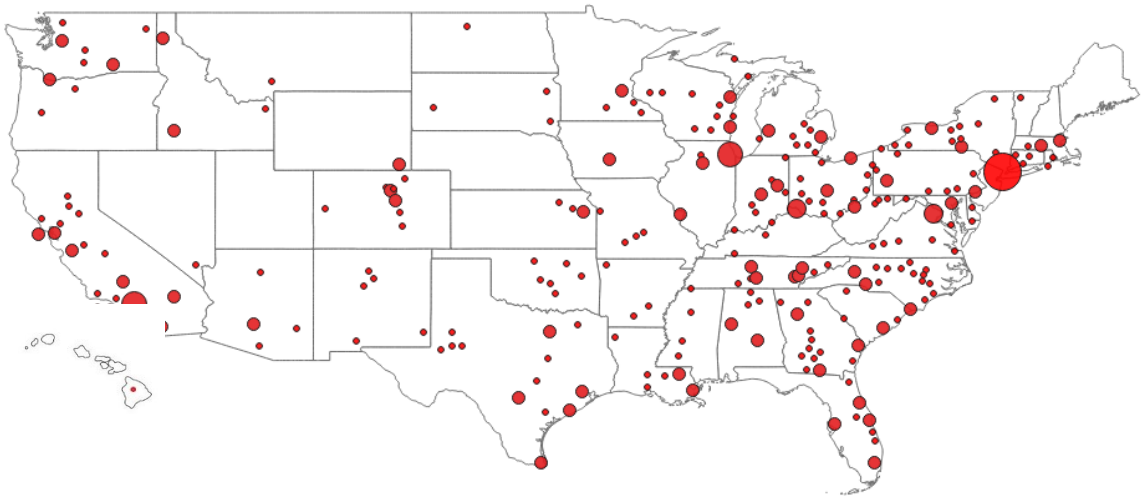

Figure 2: Locations of 2088 sample churches distributed amongst 251 CBSAs

Detailed summaries and descriptive statistics on specific variables from the NCS dataset are provided in the following chapter. Table 1 below provides a brief overview of the primary NCS variables used in my analysis.

Table 1: National Congregation Survey (NCS) variables used in the study

NCS VARIABLE	DESCRIPTION
RELIGIOUS TRADITION	High level categorization of church's religious tradition: Catholic (Roman), Evangelical (white conservative, fundamentalist), Black Protestant, White Liberal (or moderate)
SOCIAL SERVICE INDEX	Index of social service activity (see below)
BRIDGING INDEX – SOCIAL	Index of Bridging (social) capital generation activity (see below)
BRIDGING INDEX – POLITICAL	Index of Bridging (political) capital generation activity (see below)
BONDING INDEX	Index of Bonding social capital generation activities (see below)
WHITEPCT	Percent of adult participants who are non-Hispanic white
BAPCT	Percent of adult participants with four year degrees
POORPCT	Percent of adult participants who live in households with incomes under $25,000(1998 and 2006)/$35,000(2012)
RICHPCT	Percent of adult participants who live in households with incomes over $100,000(1998 and 2006)/$140,000(2012)
LONGDRIVEPCT	Percent of adult participants who live more than a 30-minute drive from church
DIVERSITY	Church diversity based on proportion Whites, Blacks, Asians, Hispanics (see below)
WTA3CNGD	Weighting variable to enable congregation-level view of data.

Because congregations are added to the NCS sample based on nominations of individuals, smaller congregations are less likely to be nominated. To overcome this bias, the NCS dataset includes a set of weighting variables. Where appropriate and possible, the WTA3CNG weighting variable was incorporated into this study's analysis. This enables claims to be made about the "average congregation" in any of the three NCS waves.

3.3.1.1 Limitations of key informant interviews

The NCS relies on key informant interviews, typically clergy or somebody in a leadership function. Independent assessment (Frenk, Anderson, Chaves, & Martin, 2011) has determined that the NCS data accurately captures directly observable information such as congregational demographic composition, but is less accurate with non-observables such as percentage of college educated or beliefs and attitudes. This finding comports with Schwadel & Dougherty (2010) who recommend using key informants only for directly observable data in congregations. The NCS has been guided by these known limitations since its inception and therefore focuses most of its data gathering on directly observable aspects of congregations such as tangible practices rather than beliefs and attitudes (Mark Chaves, Konieczny, Beyerlein, & Barman, 1999). My study's NCS variables (Table 1) are primarily items that are directly observable, such as race, finances, and program offerings. The percentage of college graduates, percentage "rich" and "poor", and the percentage of attendees with 30+ minute drive times are not

directly observable and therefore require caution in their usage (see section 5.2 for more on this).

3.3.1.2 Overview of Indices Derived from NCS Data

Several key church characteristics required the development of index variables that combined multiple NCS variables: the Social Service index, Bridging Index, and Bonding Index. The general methodology for creating these index variables was as follows:

1. Identify relevant variables to include in the index ("component variables") from the NCS data. A core requirement was that the component variables had to be present in a consistent form across all three NCS waves (1998, 2006, and 2012). Although this disqualified some variables, it provides the most flexibility in using the indices to analyze data from all three waves, and maximizes the chances that the same variables will be present in future NCS surveys. Additional criteria for variable selection is described below for each index.
2. Binary variables are coded to 0 (False) and 1 (True). Unless otherwise noted, numeric variables are normalized as percentiles, calculated in reference to the complete dataset from the NCS wave to which it belonged. The complete dataset (as opposed to the study sub-sample described above) is used to insure index values are calculated with respect to the nationally representative sample.
3. Missing data from the component variables is imputed using multiple imputation by chained equations (MICE).

4. Except for the Bonding Index, each index is modeled using Confirmatory Factor Analysis (CFA), calculating the appropriate loadings for each of the component variables that comprise the index (or "factor" in CFA). A separate model is calculated for each NCS wave using the complete NCS data.

I utilize Krishna & Shrader's (1999) aforementioned conceptualization of "structural social capital" to operationalize a church's social capital into Bridging and Bonding Indices, focusing on a church's practices to measure social capital generating capabilities as opposed to attempting to measure the individual cognitive social capital of its attendees, as in Williams (2008). As such, my Bridging and Bonding indices are measures of the relative amounts of structural social capital generated in churches, which in turn serves to generate cognitive social capital in attendees and neighborhood residents. The cognitive social capital of individuals within the orbit of church influence is not measured in my study and remains an area for future research.

The following sections describe the construction of each index, including modeling fit statistics. Overall descriptive statistics on the indices is provided in the next chapter along with other NCS variables.

3.3.1.3 Social Service Index

The Social Service Index (SSI) measures the relative strength of a church's social service activities. Included NCS component variables are those that indicate an action or characteristic oriented towards helping the material well-being of attendees and

community members. Table 2 below shows the seven component variables that comprise this index.

Table 2: Social Service Index component variables

COMPONENT VARIABLE	DESCRIPTION	TYPE OF VAR
SJOB	Program to help people obtain jobs	Binary
ASSESS	Group met to plan or conduct assessment of community needs	Binary
NUMPROG	Total number of social service projects or programs, past year	Numeric
SPSOCSRV	Representative of social service org spoke during worship in past 12 months	Binary
LRNENGL	Class met for congregants to learn English in past 12 months	Binary
PRGS1	Paid staff who spent more than 25% time on social service programs	Binary
PRGCS	Dollar amount spent on social service programs in past 12 months	Numeric

A two-factor model (social service actions and social service funding) was explored but dropped for a simpler one-factor model because of similar fit statistics and very high correlation between the two factors in the two-factor model. Fit statistics for the final one-factor CFA model is provided in Table 3 below. Models for all three NCS waves meet rules of thumb for fit (RMSEA and SRMR < .08).

Table 3: Social Service Index CFA model fit statistics

	CHISQ	PVALUE	CFI	RMSEA	SRMR	DF
1998	42.116	0.0001	0.970	0.042	0.072	14
2006	28.456	0.012	0.981	0.028	0.052	14
2012	19.086	0.162	0.993	0.018	0.050	14

3.3.1.4 Bridging Index

The Bridging index measures the strength of a congregation's bridging social capital generating capabilities. NCS component variables incorporated into the model are those

that indicate a connecting activity to people, activities, resources, or information outside of the congregation and/or immediate neighborhood (Beyerlein & Hipp, 2005; Nisanci, 2017; Putnam, 2001). Table 4 below shows the 13 component variables that comprise this index.

Table 4: Bridging Index component variables

COMPONENT VARIABLE	FACTOR	DESCRIPTION	TYPE OF VAR
LOBBY	POLITICAL	Group lobbied an elected official in the past 12 months	Binary
POLOPPS	POLITICAL	Political opportunities shared during worship service in past year	Binary
MARCH	POLITICAL	Group met to march or demonstrate in past 12 months	Binary
VOTERREG	POLITICAL	Group met to register people to vote	Binary
SPCAND	POLITICAL	Someone running for office spoke during worship in past 12 month	Binary
POLITICS	POLITICAL	Group met to discuss politics in past 12 months	Binary
VOTRGUID	POLITICAL	Voter guides distributed to people in congregation	Binary
SPGOV	POLITICAL	Elected government official as visiting speaker in past 12 months	Binary
OTHTRAD	SOCIAL	Class met to discuss other religions	Binary
HAVESCHL	SOCIAL	Does congregation have a school?	Binary
COLLAB	SOCIAL	Collaborated with other orgs for at least one social service program	Binary
OUTFN	SOCIAL	Social services supported by outside funding sources	Binary
SPSOCSRV	SOCIAL	Representative of social service organization spoke during worship in past 12 months	Binary

A two-factor model differentiates between politically oriented bridging activities and those that are social/non-politically oriented. This distinction corresponds roughly to the earlier mentioned distinction between linking social capital and standard bridging social capital, respectively (Szreter, 2002; Woolcock, 1998). The POLITICAL factor focuses on connections with those in positions of relative power such as politicians, whereas the SOCIAL factor provides connections outside of the religious activities of the church, but

typically within similar positions of power such as nonprofits or neighborhood parents with school-age children. Fit statistics for the two-factor CFA model are provided in Table 5 below. The high SRMR values and lower CFI values indicate a poorer model fit compared to the Social Service Index model, but RMSEA values are still within range of acceptability for general rules of thumb on fit (RMSEA < .08).

Table 5: Bridging Index CFA model fit statistics

	CHISQ	PVALUE	CFI	RMSEA	SRMR	DF
1998	290.609	0	0.917	0.056	0.108	64
2006	470.544	0	0.892	0.069	0.119	64
2012	435.608	0	0.919	0.070	0.121	64

3.3.1.5 Bonding Index

The Bonding index measures the strength of a congregation's bonding social capital generating capabilities. A two-factor model was originally explored, differentiating between activities available for members, and measures of amount of time spent together. In addition to having poor fit, the two-factor model suffered from a lack of consistent variables across all three waves, and the two factors were negatively correlated, indicating a potential model misspecification. I therefore opted for a simpler one-factor model that focused exclusively on the amount of time members spent participating in church activities, consistent with research finding that participating in activities together provides a reasonable proxy for strength of bonding social capital (Brisson & Usher, 2005). My approach is also consistent with Nisanci (2017) who developed a bonding social capital index for individuals based on the amount of church-

related volunteer participation (service attendance, prayer/Bible Study, assisting/leading worship). See Table 6 for the three NCS component variables in the Bonding Index.

Table 6: Bonding Index component variables

COMPONENT VARIABLE	DESCRIPTION	TYPE OF VAR
ATTMOR	Percentage of adults who attend more than one service/week (not converted to percentile since the variable is already normalized as a percentage).	Numeric
LENGTH	Length of main service in minutes	Numeric
SOCLTIME	Number of minutes spent socializing before and after main service	Numeric

Because of the small number of component variables, and because all three are numeric, rather than develop a CFA model, I chose to take the simple average of these variables to generate the Bonding Index. This straightforward approach equally weights the three component variables and provides a good indication of the amount of time congregants spend together in church-related activities.

3.3.1.6 Church cluster analysis

A cluster analysis of church characteristics was performed to identify a typology derived solely from church activity and demographics. These clusters are used in the statistical matching analysis to supplement and illuminate the primary regression analysis. In addition to using the NCS variables from Table 1 above, two neighborhood variables were incorporated into the cluster analysis: diversity and relative median income of the census tract in which the church is located. Including these neighborhood variables in

the clustering analysis recognizes that where a church is located is an important attribute of the church. Exploratory hierarchical clustering with standard Euclidean distance measurements and Ward clustering (Ward, 1963) revealed four high level clusters upon visual inspection. K-means clustering with k set to 4 was then used to generate four clusters, and the clusters were checked for statistically significant clustering (Liu, Hayes, Nobel, & Marron, 2008). Clusters were identified for the 2089 churches in my NCS sub-sample based on variable values at the time of the NCS survey (2006 or 2012). I also identified clusters for the churches using 1990 predicted values for the NCS variables (see below for prediction methodology). Both clustering analyses revealed the same four high-level clusters that I have labeled and described in Table 7 below. Descriptive statistics and more discussion are provided in the next chapter.

Table 7: Church cluster descriptions

CLUSTER NAME	DEMOGRAPHICS	INDICES	GEOGRAPHY
BLACK	Low percentage whites, low diversity, lower income attendees	High Bonding index, low Social Service and Bridging indices	Dispersed attendees; lower income neighborhoods
DIVERSE	High church diversity; moderate college percentage and incomes	Moderate Bonding, Bridging and Social Service indices	High diversity, moderate income neighborhoods
WHITE AFFLUENT	High percentage white, moderate diversity; highly educated, high income attendees;	High Social Service and Bridging indices, low Bonding index	Low diversity, affluent neighborhoods
WHITE MIDDLE	High percentage whites, low diversity; low to moderate education, low to middle income attendees	Low Social Service and Bridging indices, moderate Bonding index;	Low diversity, moderate income neighborhoods

3.3.1.7 Church/Neighborhood Diversity and Segregation

As mentioned above, I follow Reardon & Firebaugh's (2002) recommendation with Theil entropy-based measures of segregation and diversity for both churches and neighborhoods. An Entropy Score ("E") is a measure of an organizational unit's diversity:

$$E = \sum_{r=1}^{r} (\Pi_r) \ln[1/\Pi_r]$$

Equation 1: Theil's Entropy Score (E), a measure of diversity

where Π_r indicates the proportion of a specific racial or ethnic group to the whole (equation from Iceland, 2004). E has a minimum at zero, indicating only one group, and it is maximized when all groups have equal proportions. My study uses four racial/ethnic categories for both churches and neighborhoods: White, Black, Latino (Hispanic), and Asian. With four groups, the maximum possible entropy score is ln(4) or 1.39. I calculate E for each church in my study and include it as an explanatory variable, labeled "Diversity" in Table 1. I also calculate E for each census tract containing a study church as a measure of the diversity of the neighborhood in which the church is located.

Theil's Entropy Index ("H") measures segregation of the overall area (all churches in an area or all census tracts in an area) and is defined as follows:

$$H = \sum_{i=1}^{n} \left[\frac{t_i(E - E_i)}{ET} \right]$$

Equation 2: Theil's Entropy Index (H), a measure of segregation

where t_i refers to the population in individual unit i, T is the population of the overall region, E is the overall diversity of the region, E_i is the diversity of individual unit i, and n

is the number of individual units within the region (equation from Iceland, 2004). Theil's H is categorized by Massey & Denton (1988) as an evenness conceptualization of segregation, in other words, it measures how evenly distributed the racial/ethnic groups are within the individual units of a region. An H value of zero indicates maximum integration (minimal segregation) with all units perfectly reflecting the diversity of the overall region. Maximum segregation is indicated with an H value of one, in which case each individual unit only has one racial/ethnic group. Further analysis of both E (diversity) and H (segregation) for churches and neighborhoods is provided in the following chapters.

3.3.1.8 Prediction of 1990 values for church variables

Because this study's dependent variables are neighborhood change from 1990 to 2010, my conceptual model (see Figure 1) demands explanatory variables at the beginning of the time period, i.e. 1990. Therefore, a methodology to predict what the church characteristics would have been in 1990, given the data values at the time of the NCS survey (1998, 2006, or 2012), was developed. I make three assumptions in my prediction methodology:

1) My method relies on trends in the NCS data from 1998 to 2012 and extrapolates 1990 values with the assumption that the change in the weighted mean of a variable from 1998 to 2006 (calculated from the NCS data) is the same as the change in that variable from 1990 (predicted) to 1998 (from NCS data). Figure 3 below shows trend lines of the weighted mean of key NCS variables from 1998 to 2006 to 2012

(corresponding to the three NCS waves). For WHITEPCT, DIVERSITY, BAPCT, and LONGDRIVEPCT, the trends show a relatively consistent slope, such that using the same slope from 1990 to 1998 and from 1998 to 2006 is consistent with the overall trend of the variable. RICHPCT and POORPCT are unique because these variables had their thresholds changed with the 2012 NCS survey resulting in a discontinuity in 2006 in the overall trendline for these two variables. The Social Service Index appears to also have a discontinuity at 2006, but the scale of changes is so small that this variable effectively has a flat trend line. The two Bridging index variables and the Bonding Index have different trajectories from 1998-2006 and 2006-2012. In this case, I match the trajectory from 1990-1998 to be consistent with the 1998-2006 trajectory under the assumption that the conditions from 1990 to 1998 match the conditions from 1998 to 2006 much more closely than the conditions from 2006 to 2012.

2) I assume that the density plot showing the distribution of values for a variable in 1998 (calculated from the NCS data) is the same as the density plot in 1990 (predicted). In other words, the general shape of the variable for a nationally representative sample of churches is the same for cross-sectional surveys taken at different times. This assumption can be verified through the density plots for key NCS variables shown in Figure 4 below. In all cases except one, the density plots show consistency through the three NCS waves from 1998 to 2012. The Social Service Index (SSI) plot reveals that 1998 has a different shape from 2006/2012.

However, since my prediction methodology utilizes the shape from 1998 because it is the closest temporally to 1990 and therefore most likely to match the actual SSI shape in 1990, the difference with the 2006 and 2012 density plots is less of a concern. A key strength of my prediction methodology is that the set of predicted values for variables in 1990 matches the overall trends and distribution of values from the three NCS waves, showing good overall consistency.

3) I assume that a church's relative value for a particular variable, with reference to all other churches at the time of the NCS survey, is constant over time. For example, if a church is at the 95th percentile of WHITEPCT or Social Service Index in 2006, it would be at the 95th percentile in 1998 and 1990 for that variable. This method assumes that churches don't change dramatically in their core characteristics, consistent with Ammerman's (1997, p. 63) observation that "…it is safe to say that inertia is the most common pattern found in congregations – in changing communities or otherwise." Supporting research has shown that church's tend to keep doing what they are doing, and not doing what they are not doing, even with large external shocks such as President Bush's Faith-Based and Community Initiatives (Mark Chaves & Wineburg, 2010).

Ideally my prediction methodology would account for differences in church variable averages and trends by neighborhood change type. However, because NCS is a nationally representative sample which is not stratified by neighborhood change type, averages and trends must be aggregated across all neighborhood types. The result is

that the predicted values for church variables will be primarily influenced by trends found in neighborhoods with a change type of “Stable" (recalling that the majority of neighborhoods have this change type). To the extent that church variable averages and trends vary by neighborhood change type (an unknown given the current data), this is a source of potential error in my prediction methodology. To determine the potential impact of this and other sources of error in my prediction methodology, I performed a sensitivity analysis to determine robustness of my findings with respect to the 1990 predictions. My study findings still hold when the predicted values are randomly jittered plus or minus 5% to 20%, indicating good robustness against the 1990 predicted values. See section 5.3 for details.

A generic example will serve to illustrate the prediction methodology: Suppose church A is at the 56th percentile of Social Service index (SSI) in 2012 (with respect to all churches in the 2012 NCS survey). Since I assume that church A would still be at the 56th percentile in 1998 (assumption 3), I can predict church A's 1998 value by looking at the SSI value at the 56^{th} percentile from the 1998 NCS data. To get to 1990, I assume that the overall changes from 1990 to 1998, are the same as from 1998 to 2006 (assumption 1), so I can extrapolate to get church A's predicted value in 1990.

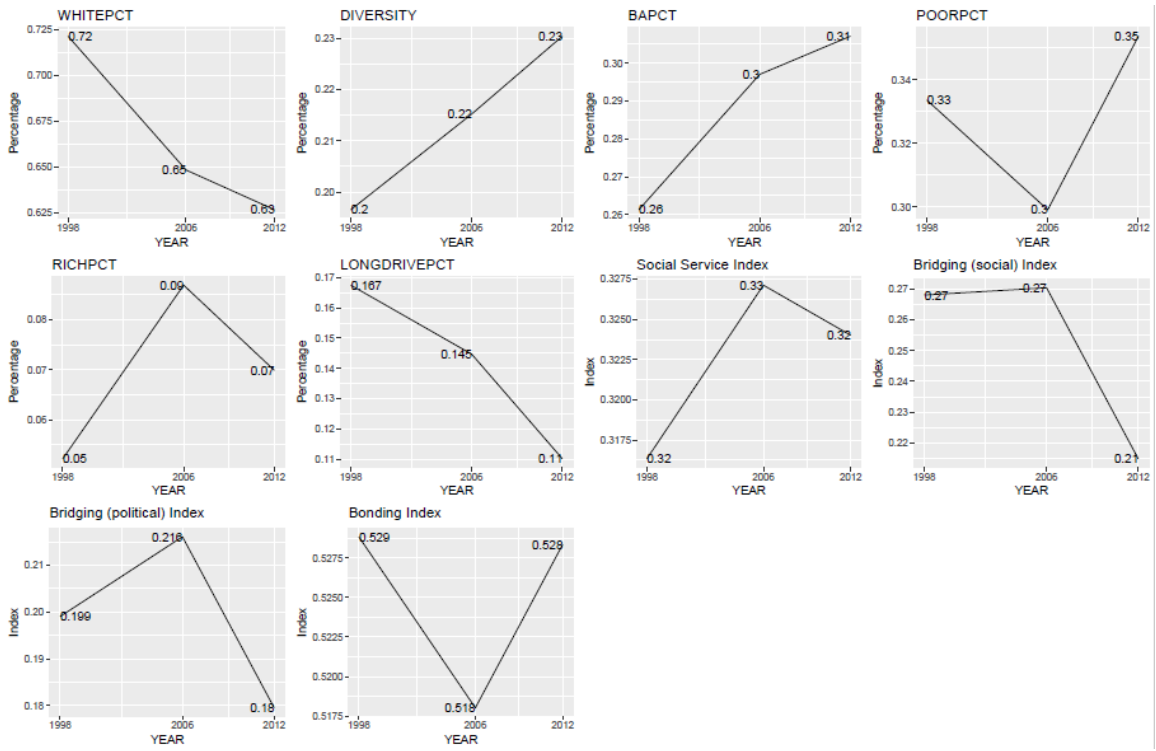

Figure 3: NCS variables weighted mean trend lines across three NCS waves (1998, 2006, 2012)

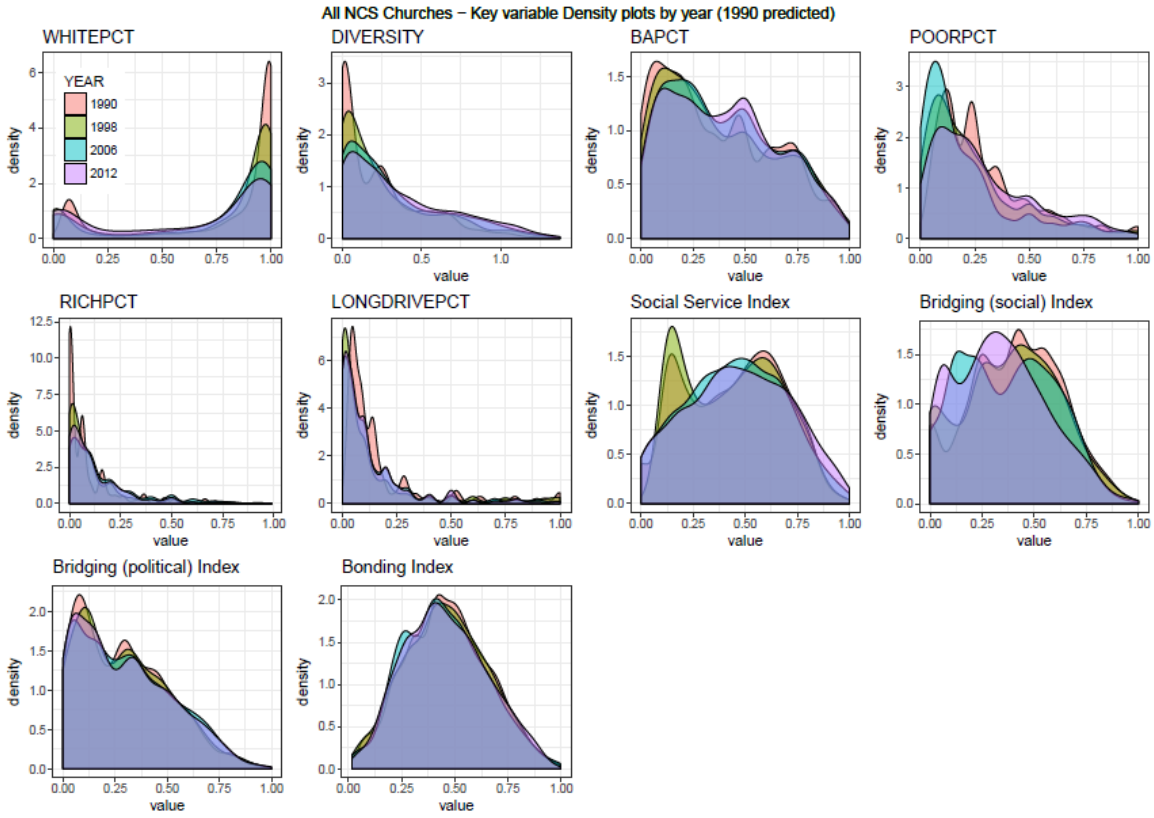

Figure 4: NCS variables density plots across three NCS waves (1998, 2006, 2012) plus 1990 predicted.

3.3.2 Association of Religion Data Archives

The Association of Religion Data Archives (ARDA) provides information on the number of Christian churches and adherents by denomination/religious tradition, for each county in the USA for 1990, 2000, and 2010 (Bacon, Finke, & Jones, 2018). ARDA categorizations of religious tradition correspond to the religious tradition variable found in the NCS data with only a slight change in terminology (ARDA uses “Mainline” whereas NCS uses “White Liberal”.) I use the 1990 ARDA data by converting from county-level to CBSA-level aggregation and incorporating it into my primary regression analysis as CBSA-level controls (see Table 11 below).

Ideally my study would incorporate census tract-level measures of religiosity with controls for the number of churches (in addition to the NCS study churches) in a particular census tract as of 1990. However, this data is simply not available. There are relatively robust church marketing databases that contain upwards of 300,000 current churches with addresses, but, since historic versions of these databases are not maintained, it is impossible to reconstruct the church landscape at a census tract-level as of 1990.

3.4 Missing Value Imputation

Multiple imputation (MI) has emerged as the "method of choice for complex incomplete data problems" (Groothuis-oudshoorn & Buuren, 2011). MI uses known, observed data to estimate the missing values, avoiding the potential introduction of bias from simplistic methods such as complete case analysis. Simply deleting cases with missing data has particularly strong requirements for the total randomness of missingness, something that may be somewhat relaxed with MI (Azur, Stuart, Frangakis, & Leaf, 2011). A key decision in MI methods is which set of observables to include in the imputation process for each variable with missing data. I implemented MI in three elements of my study: component variables for NCS Indices, other NCS variables, and LTDB data.

3.4.1 MI for Component Variables for NCS Indices

I imputed the missing values of component variables for each of the three NCS indices (see 3.3.1.2 above) separately, using the complete set of component variables for each

index as the set of observables. I also used the entire NCS data set (all three waves), not limiting the imputation data to the NCS sub-sample, to maximize the number of cases with which to impute missing data. For the Social Service Index, PRGCS (percent of budget spent on social services) has the highest missingness percentage at 17%, with all other component variables at less than 3% missingness. For the Bridging Index, COLLAB (collaborated with an outside organization) has a 6% missingness rate, with all other components at less than 1.5% missingness. In the Bonding Index, ATTMORE (attended more than one service/week) has a 13% missingness rate, with all other components at less than 3% missingness. Missing values in the NCS data are due to the survey respondent either "not knowing", "refusing to answer", or clerical errors in capturing responses.

3.4.2 MI for Other NCS Variables

POORPCT, RICHPCT and BAPCT have 15%, 13%, and 11% missingness, respectively. WHITEPCT and LONGDRIVEPCT have 2.7% missingness, with all other NCS variables at lower levels of missingness. As described above, I used the entire NCS data set for imputation purposes. The set of observables used to predict missing NCS values are derived from a richer set of NCS variables than included in Table 1 above to minimize chances for introduction of bias. See Table 8 below for details.

Table 8: Observables used in multiple imputation for NCS variables

NCS VARIABLE	DESCRIPTION	TYPE OF VAR
LIBCON	Politically liberal or conservative	Categorical
THEOLOGY	Theologically liberal or conservative	Categorical

NUMTOTAL	Number of adult attendees	Numerical
LT35PCT	Percentage of attendees under 35 years old	Numerical
GT60PCT	Percentage of attendees over 65 years old	Numerical
WHITEPCT, BAPCT, POORPCT, RICHPCT, LONGDRIVEPCT, RELIGIOUS TRADITION	same as in Table 1	
BLACKPCT	Percentage black attendees	Numerical
LATINPCT	Percentage Hispanic/Latino attendees	Numerical
ASIANPCT	Percentage Asian attendees	Numerical
IMMPCT	Percentage of attendees who are immigrants	Numerical

3.4.3 MI for Missing LTDB Data

The LTDB has very little missing data, less than 2% missingness for the variables used in this study. An exception is with respect to 1970 and 1980 census tract median household income and population values. As described above, LTDB performs census boundary translation work by mapping historic 1970 and 1980 tracts to their 2010 equivalent. There are cases however, where a 2010 census tract was simply not populated in 1970 or 1980, in which case there will be no data available. This results in a "missingness" of 21% for 1970 HH median income and population variables, and 12% for 1980 values. Rather than simply drop all of these tracts, I employed MI to impute what these 1970 and 1980 values would be based on a rich set of observables (96 variables in total) from 1970 to 2010 for each census tract. See the LTDB code book ("Census geography: Bridging data for census tracts across time," n.d.) for definitions of these and all other LTDB variables.

Table 9: Set of LTDB variables used for LTDB missing value imputation

LTDB VARIABLE NAMES
A18UND00 A18UND09 A18UND14 AG25UP00 AG25UP09 AG25UP14 AG25UP90 AH18UND90 ASIAN00 ASIAN09 ASIAN10 ASIAN14 ASIAN90 COL_FEMALE09 COL_FEMALE14 COL_MALE09 COL_MALE14 COL00 COL90 DMULTI12 DMULTI90 DPOV00 DPOV09 DPOV14 DPOV90 FB00 FB09 FB14 FB90 H30OLD90 HINC00 HINC09 HINC12 HINC14 HINC70 HINC80 HINC90 HISP00 HISP09 HISP10 HISP14 HISP90 HS90 HU90SP MHMVAL00 MHMVAL09 MHMVAL12 MHMVAL14 MHMVAL90 MRENT00 MRENT09 MRENT12 MRENT14 MRENT90 MULTI12 MULTI90 NHBLK00 NHBLK09 NHBLK10 NHBLK14 NHBLK90 NHWHT00 NHWHT09 NHWHT10 NHWHT14 NHWHT90 NPOV00 NPOV09 NPOV14 NPOV90 OHU00 OHU09 OHU10 OHU14 OHU90 OWN00 OWN09 OWN10 OWN14 OWN90 PCOL12 PFB12 PHS12 POP00 POP00SF3 POP09 POP10 POP14 POP70 POP80 POP90 POP90SF3 POWN12 PPOV12 PUNEMP12 UNEMP90

3.5 Hierarchical Linear Modeling

With a large-scale, nationally representative sample of churches and census tract-level information, regression analysis is an obvious method of choice to answer this study's primary research question, namely, "how do churches impact neighborhood change?" However, the analysis method must account for the fact that neighborhood change is impacted by factors at both local and extra-local levels and the method should also recognize the natural groupings of churches and neighborhoods within CBSAs. Because research has shown that the likelihood of various types of neighborhood change varies dramatically between metropolitan areas (E. C. Delmelle, 2015; Wei & Knox, 2014), and because the role of religion and local churches vary across CBSAs due to a variety of sociocultural factors (Bauer, 2012; Chalfant & Heller, 1991; Lieske, 1993, 2010; Stump, 1986), using standard OLS (ordinary least squares) regression which ignores this CBSA-level clustering would lead to underestimated standard errors. Therefore, this study

employed hierarchical linear modeling (HLM) (Raudenbush & Bryk, 2002; Snijders & Bosker, 2012), a multilevel regression analysis technique that accounts for clustering of data and accommodates multiple sources of variation, which in this study include census tracts (level 1) and CBSAs (level 2).

Several steps were taken to prepare the data for HLM analysis, including: 1) rescaling the NCS weighting variable (WTA3CNG) to account for the CBSA-level grouping structure, as outlined by Aaparouhov (2006); 2) grand-mean centering all predictors (tract-level, church-level, and CBSA-level variables) to aid in interpreting results, especially interaction terms; 3) standardizing model inputs by dividing by twice the standard deviation for each numeric variable, as recommended by Gelman (2007) to aid in comparison of coefficients, particularly between numeric and binary inputs.

3.5.1 Independent Variables

Two types of level-1 independent variables were included in the HLM analysis: NCS church variables (see Table 1 above) and census tract characteristics (see Table 10 below). Following Landis (2016), to make comparisons across CBSAs easier and to aid in interpretation of results, I converted census tract variables to be relative to the CBSA's mean for that variable. For example, a census tract with a relative percent white of .70, is 30% lower than the percent white across the entire CBSA, whereas a tract with a value of 1.5 is 50% higher than the CBSA as a whole. CBSA characteristics were included as level-2 variables in the HLM analysis (see Table 11 below). In addition, four level-1 interaction terms were included (see Table 12 below). The first two interaction terms

were added to help explore study Hypotheses 1 and 2 which predicted increased gentrification with increased differences between a church's and its neighborhood's percentage whites (H1) and percentage college graduates (H2). The third interaction term was added to explore Hypothesis 6 regarding geographic dispersion of members, and the fourth interaction term was added to illuminate unexpected findings regarding church social service offerings in the Gentrify model. No additional interaction terms were incorporated to keep the models as parsimonious as possible.

Table 10: Level-1 census tract independent variables (source: LTDB)

CENSUS TRACT VARIABLE	DESCRIPTION
REL_MED_INCOME_1990	Relative median HH income in 1990.
REL_POVRATE_1990	Relative poverty rate in 1990
REL_PCT_WHITE_1990	Relative percentage non-Hispanic white in 1990.
REL_PCT_BLACK_1990	Relative percentage Black in 1990.
REL_PCT_HISPANIC_1990	Relative percentage Hispanic in 1990.
REL_PCT_FOREIGN_1990	Relative percentage foreign born in 1990.
REL_PCT_COLLEGE_1990	Relative percentage college graduates in 1990
REL_PCT_UNDER18_1990	Relative percentage population under 18 in 1990
REL_SHARE_MULTI_UNITS_1990	Relative percentage(share) of multi-family housing units in 1990
REL_MED_HOME_VAL_1990	Relative median home value in 1990
REL_MED_RENT_1990	Relative median rent in 1990
REL_PCT_HOUSES_OLDER_1960	Relative percentage of houses older than 1960 in 1990
REL_MED_INCOME_CHANGE_1970_1990	Relative HH median income change from 1970 to 1990
SURROUNDING_PCT_GENTRIFY_1990	Percentage of 1990 population in surrounding census tracts that Gentrified from 1990 to 2010
SURROUNDING_PCT_UPGRADE_1990	Percentage of 1990 population in surrounding census tracts that Upgraded from 1990 to 2010
SURROUNDING_PCT_DECLINE_1990	Percentage of 1990 population in surrounding census tracts that Declined from 1990 to 2010

Table 11: Level-2 CBSA-level independent variables (Source: LTDB and ARDA)

CBSA VARIABLE	DESCRIPTION
AVG_MED_HOMEVAL_1990	Population weighted average of CBSA's census tracts' median home values, as a percentile with reference to all CBSAs, in 1990
AVG_MED_HOMEVAL_CHANGE_1990_2010	Growth rate in population weighted average of CBSA's census tracts' median home values from 1990 to 2010
POP_1990	CBSA population in 1990
POPGROWTH_1990_2010	CBSA population growth rate from 1990 to 2010
POVRATE_1990	CBSA poverty rate in 1990
AVG_MED_INCOME_1990	Population weighted average of CBSA's census tracts' median HH income, as a percentile with reference to all CBSAs, in 1990
AVG_MED_INCOME_CHANGE_1990_2010	Growth rate in population weighted average of CBSA's census tracts' median HH income from 1990 to 2010
PCT_HOUSES_OLDER_1960	CBSA's percentage of houses older than 1960 in 1990
PCT_COLLEGE_1990	CBSA's percentage of college graduates in 1990
PCT_FOREIGN_1990	CBSA's percentage of foreign born in 1990
PCT_WHITE_1990	CBSA's percentage non-Hispanic white in 1990
PCT_OWNER_OCCUPIED_1990	CBSA's pct. of owner occupied housing units in 1990
PCT_UNDER18_1990	CBSA's percentage of population under 18 in 1990
PCT_GENTRIFY_1990	CBSA's percentage of 1990 population in census tracts that Gentrified from 1990 to 2010
PCT_UPGRADE_1990	CBSA's percentage of 1990 population in census tracts that Upgraded from 1990 to 2010
PCT_DECLINE_1990	CBSA's percentage of 1990 population in census tracts that Declined from 1990 to 2010
CHURCH_ADHRATE_1990	Total number of church adherents divided by total population in 1990
EVANGELICAL_CONGPER1000_1990	Number of Evangelical congregations per 1000 people
MAINLINE_CONGPER1000_1990	Number of Mainline congregations per 1000 people
CATHOLIC_CONGPER1000_1990	Number of Catholic congregations per 1000 people
BLACK_CONGPER1000_1990	Number of Black congregations per 1000 people

Table 12: Level-1 interaction terms

INTERACTION TERM	DESCRIPTION
CHURCH_WHITEPCT_1990 X REL_PCT_WHITE_1990	Interaction of a church's percentage of non-Hispanic white with the census tract's relative percentage of whites
CHURCH_COLLEGEPCT_1990 X REL_PCT_COLLEGE_1990	Interaction of a church's percentage of college graduates with the census tract's relative percentage of graduates
CHURCH_LONGDRIVEPCT_1990 X CHURCH_WHITEPCT_1990	Interaction of a church's percentage of long distance commuters with percentage of non-Hispanic whites
SOCIAL_SERVICE_INDEX X REL_PCT_WHITE_1990	Interaction of a church's social service index with the census tract's relative percentage of non-Hispanic whites

3.5.2 Dependent Variables

I developed three types of analysis within the HLM framework: 1) Four logistic regression models to test for one of four types of Landis-style neighborhood change – Gentrify, Upgrade, Decline, Stable, over the 20-year study period; 2) regression on the change in a census tract's relative median income from 1990 to 2010, used to detect neighborhood changes that may not be large enough to trigger Landis-style neighborhood change; and 3) regression on the change in a census tract's percentage whites from 1990 to 2010, used to explore racial aspects of neighborhood change that are not included in Landis' 3-D method. See Table 13 for a brief description of these dependent variables.

Table 13: Dependent variables in HLM analysis

DEPENDENT VARIABLE/MODEL #	DESCRIPTION
GENTRIFY (MODEL 1)	Did the census tract Gentrify from 1990 to 2010? (Y/N)
UPGRADE (MODEL 2)	Did the census tract Upgrade from 1990 to 2010? (Y/N)
DECLINE (MODEL 3)	Did the census tract Decline from 1990 to 2010? (Y/N)

STABLE (MODEL 4)	Did the census tract not experience any of the three change types above from 1990 to 2010? (Y/N)
REL_MED_INCOME_CHANGE_1990_2010 (MODEL 5)	Change in census tract's relative median HH income from 1990 to 2010 (numeric)
CHANGE_PCT_WHITE_1990_2010 (MODEL 6)	Change in percentage of non-Hispanic whites in census tract from 1990 to 2010 (numeric)

3.5.3 Fixed Effects vs. Random Effects

As mentioned above, an advantage of HLM is that it recognizes the natural groupings of data, enabling the average response levels (intercepts) and magnitude of effects (coefficients) on explanatory variables to vary by groups. A key modeling decision is whether to allow intercepts, coefficients, or both, to vary by CBSA. Since my goal is to provide generalizable findings that are in effect for all CBSAs, I allow intercepts to vary ("random intercepts"), but not coefficients ("fixed coefficients").

Preliminary exploration revealed that the response intercept varied significantly across CBSAs in model 5, indicating that average changes in relative median income vary by CBSA. Along with high reported Intra-class Correlation Coefficients in all models (see below), this confirms the appropriateness of modeling with random intercepts in all six models.

Regarding fixed vs. random regression coefficients, random coefficients in my study would imply that the effect of church variables varies between CBSAs. However, with the principle of parsimony in mind and to render the study findings more interpretable and useful for practitioners, this study uses fixed coefficients. Regarding parsimony, the study already accounts for the variability of CBSAs with random

intercepts as well as a variety of level-2 CBSA variables as controls (Table 11). In addition, the incorporation of level-1 interaction terms (Table 12) allows for some key coefficients to vary with neighborhood percentage white which is directly related to the study's primary research questions. An area for future research could be to extend this study with the use of random coefficients to more fully determine how characteristics of CBSAs may impact the role of churches in neighborhood change.

3.5.4 Analysis of Subsets of Data

My study performed regression analysis on all churches in the subset of NCS study churches (see section 3.3.1 above). However, to gauge differential church impacts based on neighborhood types, some regression models were also run on data slices such as Metro areas only (filtering out smaller Micropolitan CBSAs), low-income neighborhoods (<= .4 median income decile), and very low-income neighborhoods (<= .3 median income decile).

3.5.5 Model Coefficients and Statistics

The coefficients reported for each logistic model (models 1 through 4 in Table 13 above) are centered and standardized log-odds ratios. That is, taking the exponent (e^b) of coefficient b for predictor x indicates the increase in the odds of the outcome with a one standard deviation change in the predictor x. More practically, a positive coefficient is interpreted as increasing the odds of a true outcome with the dependent variable, while a negative value indicates a decrease in the odds. The coefficients for the linear

models (models 5 and 6) indicate the amount of change in the dependent variable associated with a one standard deviation change in the predictor.

The Intra-class Correlation Coefficient (ICC) indicates the amount of dependent variable variance explained in the model by CBSA clustering, with a zero indicating no clustering effect and one indicating CBSA membership accounts for all variability. R^2 is a familiar statistic for reporting the amount of variance in the dependent variable that is explained by the model. There are a variety of approaches to calculating R^2 or "pseudo-R^2" for multilevel models, with Nakagawa & Schielzeth (2016) providing a robust approach that was utilized in this study.

3.6 Statistical Matching

I incorporated statistical matching to supplement the HLM analysis described above for two primary reasons: 1) "methodological triangulation" (Denzin, 2017) to provide additional support for my study's findings, and 2) to address the research question of the role of churches in neighborhood change in terms of causation. Matching techniques are used in observational studies such as mine to identify treatment and control pairs for causal inference (Steiner & Cook, 2013). Each census tract that receives a treatment is statistically matched across a set of covariates with a control census tract that does not receive the treatment, and an outcome is observed in both the treatment and control tracts. Ideally each treated census tract will be matched with an identical untreated census tract, based on the set of covariates used in the matching algorithm. Finding exact matches typically fails, however, because of finite samples and large

covariate sets (Jasjeet S. Sekhon, 2011), therefore statistical methods have been developed to measure the degree of match or "balance" between control and treatment groups.

I considered two census tract outcomes: change in relative median household income from 1990 to 2010 (the dependent variable in Model 5 from Table 13 above), and the 2010 census tract poverty rate. The mean difference between the treatment and control group's outcome is the "average causal effect" of the treatment, assuming some key requirements, collectively known as "strong ignorability", are met. The estimate of interest in this study is termed the Average Treatment Effect on the Treated (ATT) and is reported in the results section below for each treatment/outcome.

3.6.1 Validity of "Treatment" and "Control" Groups

As further expounded on in section 3.7 below, each treatment and control tract will likely have other churches either located in them, or in close enough proximity to potentially impact the outcome variable. My treatment churches (see immediately below) have criteria for characteristics and longevity of neighborhood presence that I am assuming will not be met by churches in the matched control tract. To the extent that this is not true, the ATT will be less likely to be significant, providing a natural protection against this concern.

3.6.2 Treatments

The treatments used to construct my treatment groups were derived from subsets of NCS churches in my study. Recall that these churches have existed in the census tract

from 1990 to 2010, therefore the "treatment" is extended over a 20-year period. Although many of the churches are likely to have been in place prior to 1990, any influence of these churches on the census tract during the pretest period is filtered out by the matching process described above that is based on covariates measured at the start of the test period, i.e. 1990. The treatments used in the analysis are described in Table 14 below, along with the number of census tracts in each treatment group.

Table 14: Treatment types used in statistical matching analysis.

#	TREATMENT DESCRIPTION (CHURCHES PRESENT IN TRACT 1990-2010)	# TREATED TRACTS
1	NCS study churches	1806
2	Churches that had a higher percentage of whites than the census tract in 1990	1179
3	Churches in which %white >.8 & relative %white in census tract < .2	91
4	Churches in the "White Middle" cluster	712
5	Churches in the "White Affluent" cluster	592
6	Churches in the "Black" cluster	320
7	Churches in the "Diverse" cluster	345
8	Churches in the "White Middle" cluster in low-income census tract*	352
9	Churches in the "White Affluent" cluster in low-income census tract*	282
10	Churches in the "Black" cluster in low-income census tract*	157
11	Churches in the "Diverse" cluster in low-income census tract*	163

*LOW-INCOME CENSUS TRACT DEFINED AS INCOME DECILE <= .4

3.6.3 Covariate Selection and Balancing

A key requirement of strong ignorability is "valid measurement of all constructs that are simultaneously correlated with both treatment and potential outcomes" (Steiner & Cook, 2013, p. 247). In other words, inputs into the treatment selection process (e.g., choices made to locate a church in a particular census tract, or choices made on

particular activities/offerings for a church) must be included in the list of matching covariates if those inputs also impact the outcome of interest. My covariates were chosen from the tract-level control variables in Table 10 above, with the assumption that these demographic and economic factors impact not only the outcomes of interest in the census tract, but also choices made with respect to the treatment churches (see below). Choosing too many covariates, however, could result in a dearth of potential matches. For this reason, I excluded the three "surrounding proportion" variables from Table 10 and focus on covariates that are direct characteristics of the census tract. Of the covariates used, REL_MED_INCOME_CHANGE_1970_1990 deserves special mention because as a pretest measure of an outcome of interest (relative change in HH median income), it "very likely removes a considerable part or even almost all the selection bias" (Steiner & Cook, 2013, p. 248).

While these covariates are robust predictors of neighborhood change (as seen in my HLM analysis results below), there is a question of unobserved contributors to the treatment (church location). Based on the review of determinants of church locations above (see 2.3.1), following are key elements represented in the covariates: 1) neighborhood demographics, 2) neighborhood socioeconomic characteristics, and 3) church density. The first and second are well covered by the tract-level controls described above. For the third, I utilized the county-level religious adherence and congregational density variables from ARDA (Bacon et al., 2018). To further minimize

differences between control and treatment groups, I forced exact matches on the CBSA and County Status (outlying or urban). This implicitly adds all variables from Table 11 as matching covariates and guarantees that matched pairs are in the same CBSA and County. Finally, recognizing that there may be spillover effects (the treatment of a church in a census tract may also impact neighboring census tracts), I restrict matches such that matched pairs may not be adjacent to each other.

3.6.4 Balance between Control and Treatment Groups

Another key requirement of strong ignorability is that control and treatment groups must overlap in the multivariate space defined by the covariates, via a process termed "balancing". This overlap or balance can be visualized as overlapping histograms for the values that each group takes on for a particular covariate. If there is no overlap in the histograms, the groups are said to be out of balance (or poorly matched) along that covariate. Achieving a maximum balance score requires a search for the optimal weights to give to each covariate. Because there are no generally accepted methods to determine covariate weights in balancing, the choice of algorithms to perform the matching and balancing is critical to achieving unbiased estimates of the average causal effect.

I utilized a genetic algorithm, GenMatch, that provides significant improvements over previously available procedures by maximizing covariate balance through the use of an evolutionary algorithm, reducing bias and mean square error of the estimated causal effect (Jasjeet S. Sekhon, 2011). GenMatch maximizes the fit between control and

treatment through parametric t-tests on the difference in means of each covariate, along with a non-parametric Kolmogorov-Smirnov (KS) test. Results of the matching are included in Appendix B. Each treatment unit was matched with one and only one control unit (1:1 matching) to minimize bias, and matching was done with replacement (allowing the same control unit to be assigned to multiple treatment units) to minimize heterogeneity of the matched data set (Steiner & Cook, 2013, p. 242).

3.7 Note on Impact of Multiple Churches on Census Tract Outcomes

As described above, my study used two primary analysis techniques: HLM regression and statistical matching. In both cases a single church derived from the NCS dataset provides the explanatory independent variables. Also, this single church is theorized to have an association (in the case of HLM regression) or causal impact (in the case of statistical matching) on the census tract outcomes in which it is located. But what of the other churches that may be in the census tract or in the areas surrounding the census tract? Certainly, these churches will have some impact on the outcomes of interest in the census tract under study. The effect of these other churches will be present in my study in the error term, or unexplained variance, in the modeling. Choosing as small a geographical area as possible, the census tract, for the outcomes of interest will help mitigate this "noise", as will controlling for overall church densities in the CBSA. However, if there is too much of this "noise", then the effects associated with the study churches will not be statistically significant, providing a natural protection against this concern.

4 Results: Descriptive Statistics

This chapter examines the church and census tract data sources introduced above in more detail, providing standard descriptive statistics and bi-variate associations for key variables that are used in the HLM and Statistical Matching analysis. Statistical differences between NCS study churches and the general NCS data, as well as differences between tracts with NCS study churches and general tracts, are presented. The chapter concludes with results from analyses of changing patterns of church location and entropy-based church and neighborhood diversity and segregation.

4.1 NCS Data

Table 15 below provides summary statistics for key variables (see Table 1 for descriptions) for NCS study churches, with 1990 predicted values, as well as values from the 2006 or 2012 survey, depending on which NCS wave the church is part of. See Figure 3 and Figure 4 above for trend lines of weighted means and density plots by NCS year for these NCS variables. Overall trends indicate growing DIVERSITY (along with less WHITEPCT) and increasing education levels (COLLEGEPCT) for the average church from 1998 to 2012. However, the density plots show DIVERSITY (WHITEPCT) heavily right (left) skewed, indicating that most churches are relatively homogeneous and heavily white. More on this in the Diversity & Segregation section below.

The mean of the Social Service Index increases over time for the average congregation, with a relatively normal distribution, while the mean Bridging (Social) Index goes down over time and is slightly right skewed. The Bridging (Political) Index is

right skewed, indicating most congregations do not engage in this type of activity, with the trend line relatively flat. The Bonding Index is approximately normally distributed and relatively flat over time for the average congregation. LONGDRIVEPCT is heavily right skewed (consistent with the high threshold of greater than 30-minute commute for this variable), with the weighted mean dropping over time, indicating the average congregation is getting more compact in terms of geographical dispersion of attendees. RICHPCT and POORPCT are both right skewed and in general increasing, possibly pointing to increasing economic diversity in churches. However, given the change in definition for both variables with the 2012 NCS survey, and the discussion in section 3.3.1.1 on NCS data limitations for non-observables, extreme caution is required in making claims about changes in the economic makeup of churches.

Finding 1: From 1990 to 2012, churches on average are becoming more diverse, offering more social services, generating slightly less Bridging social capital and flat with Bonding social capital generation. Churches also appear to be getting more geographically compact, and more economically diverse.

Table 15: Summary statistics for NCS study churches (N = 2089). Weighted by NCS survey weights.

NCS Variable	2006/2012 values				Predicted 1990 values			
	Mean	Std	Min	Max	Mean	Std	Min	Max
SOCIAL SERVICE Index	0.341	0.226	0	1	0.313	0.226	0	0.996
BRIDGING (SOCIAL) Index	0.268	0.210	0	1	0.306	0.214	0.001	1
BRIDGING (POLITICAL) Index	0.220	0.205	0	1	0.205	0.190	0	0.981
BONDING Index	0.505	0.190	0.017	0.988	0.526	0.187	0.037	0.996
WHITEPCT	0.676	0.411	0	1	0.747	0.377	0.061	1
COLLEGEPCT	0.308	0.249	0	1	0.271	0.255	0	0.972
POORPCT	0.306	0.277	0	1	0.365	0.272	0.041	1
RICHPCT	0.083	0.141	0	0.950	0.052	0.118	0	0.955

LONGDRIVEPCT	0.119	0.184	0	1	0.177	0.226	0.038	1
DIVERSITY	0.214	0.274	0	1.376	0.180	0.221	0	1.256

Bi-variate correlation analysis of key NCS variables (Table 16) shows moderate positive correlation between the Social Service Index and the Bridging (Social) Index, with weaker but still positive correlation with Bridging (Political) Index. There is a very strong positive correlation between the two factors of the Bridging Index (Social and Political), indicating churches that pursue one type of Bridging activity also tend to pursue the other type and that churches engaged in social service delivery also tend to engage in Bridging social capital generation. The Bonding Index is weakly correlated to most church variables, with its strongest correlation of -.319 to WHITEPCT indicating whiter churches have less emphasis on Bonding activities (measured as amount of time spent together). Figure 5 corroborates this with Black and Diverse cluster churches both having higher Bonding Index values than White Middle or White Affluent churches. COLLEGEPCT and RICHPCT have positive (albeit weak) correlations with all the indices, except for a very weak negative correlation with the Bonding Index. The opposite is seen with POORPCT, pointing to higher Social Services and Bridging activities in more affluent churches. This same pattern is seen in Figure 5 showing the White Affluent cluster with higher index values across the board, except for the Bonding Index.

Finding 2: Churches that offer social service programs also tend to engage in Bridging social capital generation, but not necessarily Bonding social capital generation. More affluent white churches tend to have the most activity in all of these areas, except for Bonding social capital generation.

Table 16: Weighted correlation matrix – NCS study churches (values from 2006/2012 survey)

	SOCIAL SERVICE Index	BRIDGING Index - SOCIAL	BRIDGING Index - POLITICAL	BONDING Index	WHITE PCT	COLLEGE PCT	POOR PCT	RICH PCT	DIVERSITY	LONGDRIVE PCT
SOCIAL SERVICE Index	1	0.573	0.382	-0.014	0.137	0.367	-0.170	0.265	0.240	0.038
BRIDGING Index – SOCIAL		1	0.837	-0.060	-0.022	0.306	-0.113	0.250	0.143	0.094
BRIDGING Index - POLITICAL			1	0.010	-0.173	0.216	-0.016	0.161	0.136	0.113
BONDING Index				1	-0.319	-0.137	0.079	-0.095	0.026	0.121
WHITEPCT					1	0.298	-0.319	0.144	-0.078	-0.181
COLLEGEPCT						1	-0.392	0.460	0.148	0.036
POORPCT							1	-0.321	-0.035	0.100
RICHPCT								1	0.135	0.070
DIVERSITY									1	0.044
LONGDRIVEPCT										1

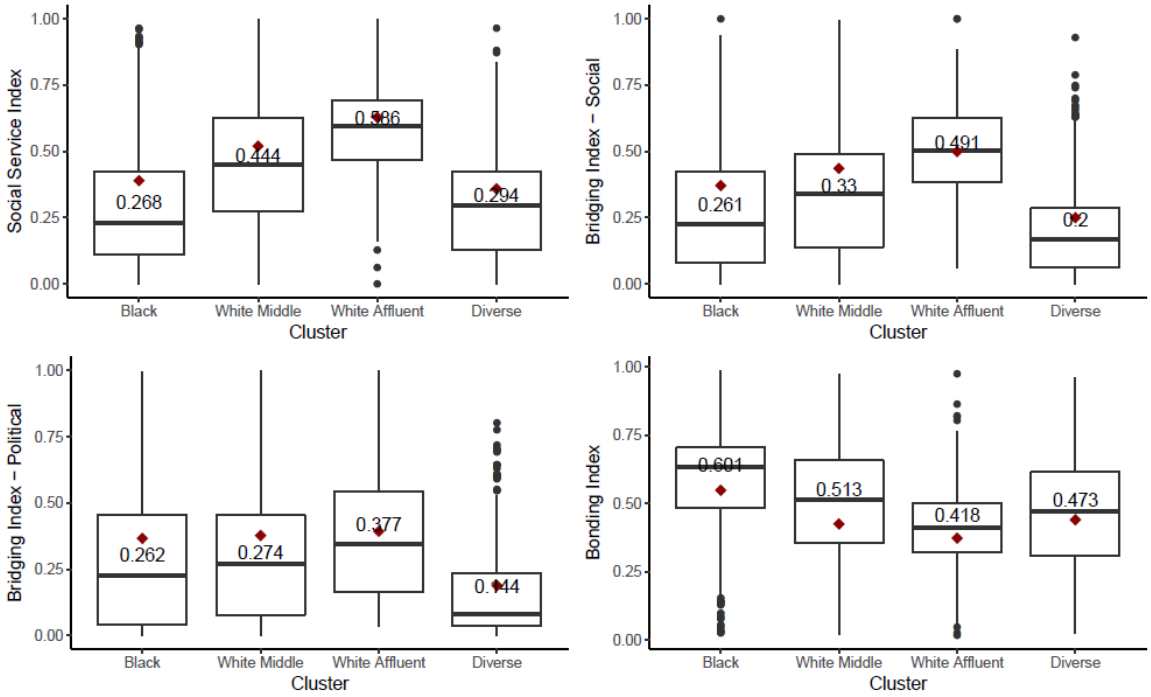

Figure 5: Weighted boxplot by 2006/2012 Cluster-type - NCS Study church indices

T-tests comparing NCS study churches with all NCS churches reveal small but statistically significant differences for all but WHITEPCT, DIVERSITY, and Neighborhood

Diversity and Relative median income (see Table 17). NCS study churches on average have higher Social Service and Bridging Index values, lower Bonding Index, and more affluent and educated attendees. The study churches also appear to be less geographically dispersed, on average, compared to overall NCS churches. Aside from LONGDRIVEPCT, the differences are small and do not raise concern of substantial bias in the subset of churches chosen for my study. The 2.2 percentage point difference in LONGDRIVEPCT is likely due to my NCS study churches being limited to those within CBSAs, whereas the general NCS database includes churches outside of CBSAs. Included in Table 17 are entries for the diversity and relative median household income of the census tract in which the church is located. No statistical difference is seen between NCS study churches and all NCS churches for these neighborhood characteristics, alleviating any concerns of geographic bias from my study subset.

Table 17: T-tests NCS study churches vs. all NCS churches (values from 2006/2012 survey)

	Study Churches	All NCS Churches	T-stat	pvalue
SOCIAL SERVICE Index	0.341	0.323	2.974	0.003
BRIDGING Index - SOCIAL	0.268	0.252	2.732	0.006
BRIDGING Index - POLITICAL	0.220	0.199	3.627	0.0003
BONDING Index	0.505	0.525	-3.854	0.0001
WHITEPCT	0.676	0.664	1.089	0.276
COLLEGEPCT	0.308	0.289	2.545	0.011
POORPCT	0.306	0.327	-2.804	0.005
RICHPCT	0.083	0.071	3.509	0.0005
DIVERSITY	0.214	0.214	-0.010	0.992
LONGDRIVEPCT	0.119	0.141	-3.990	0.0001
Neighborhood Diversity	0.510	0.522	-1.311	0.190
Neighborhood Rel_Median_Income	0.449	0.447	0.242	0.809

4.1.1 Church Clusters

Four church clusters based on church activities and demographics were identified in NCS study churches: Black, Diverse, White Affluent, and White Middle. These same four clusters were identified based on church characteristics in 2006/2012 (time of the survey for the NCS study churches), as well as in 1990 using predicted values. In summary, Black churches have very low percentages of whites with dispersed attendees; Diverse churches have high racial diversity scores and are located in diverse neighborhoods; White Affluent churches are predominantly white, have a high percentage of rich attendees and are located in low diversity, affluent neighborhoods; and White Middle churches are white, low to middle income, and located in low diversity, moderate income neighborhoods (see Table 7 above for complete descriptions). Table 18 and Table 19 provide the weighted means of key variables for each cluster. Also, see Figure 5 above for a boxplot of the four indices by 2006/2012 cluster along with a discussion of how Bonding and Bridging indices differ by clusters.

Social Services are most prevalent in White Affluent churches, followed by Diverse churches. However, because White Affluent churches tend to be located in higher income neighborhoods, many of these services are likely targeting neighborhoods other than the one in which the church is located. In terms of racial diversity, both Black and White Middle churches are very homogenous, with Black churches located in more diverse neighborhoods compared to White Middle churches.

Black churches are the most geographically dispersed, with a notable minority of members driving more than 30 minutes to attend.

Finding 3: Affluent white churches offer the most social services, but these are likely targeting neighborhoods other than the church neighborhood. Diverse churches offer more social services than either White Middle or Black churches.

Finding 4: Black churches are significantly more geographically dispersed than either White Middle or White Affluent churches.

Table 18: Weighted mean of key variables by Church Clusters – NCS Study churches 2006/2012 values

	White Middle	White Affluent	Black	Diverse
SOCIAL SERVICE Index	0.294	0.586	0.268	0.444
BRIDGING Index – SOCIAL	0.200	0.491	0.261	0.330
BRIDGING Index – POLITICAL	0.144	0.377	0.262	0.274
BONDING Index	0.473	0.418	0.601	0.513
WHITEPCT	0.970	0.936	0.030	0.639
COLLEGEPCT	0.272	0.688	0.176	0.353
POORPCT	0.283	0.097	0.448	0.301
RICHPCT	0.056	0.246	0.045	0.111
DIVERSITY	0.118	0.24	0.136	0.785
LONGDRIVEPCT	0.090	0.102	0.170	0.145
Neighborhood Diversity	0.405	0.454	0.602	0.810
Neighborhood Rel Median Income	0.492	0.607	0.315	0.407
count(weighted)	796	202	432	185

Table 19: Weighted mean of key variables by Church Clusters – NCS Study churches 1990 predicted values

	White Middle	White Affluent	Black	Diverse
SOCIAL SERVICE Index	0.267	0.538	0.233	0.402
BRIDGING Index - SOCIAL	0.241	0.501	0.285	0.409
BRIDGING Index - POLITICAL	0.135	0.325	0.239	0.314
BONDING Index	0.497	0.461	0.627	0.537
WHITEPCT	0.985	0.974	0.111	0.679

COLLEGEPCT	0.219	0.660	0.118	0.304
POORPCT	0.346	0.174	0.519	0.393
RICHPCT	0.030	0.164	0.021	0.068
DIVERSITY	0.059	0.100	0.326	0.628
LONGDRIVEPCT	0.147	0.16	0.236	0.222
Neighborhood Diversity	0.216	0.226	0.439	0.523
Neighborhood Rel Median Income	0.463	0.644	0.286	0.343
count(weighted)	837	249	387	142

A Cluster Index (C.I.) with significance test (Huang, Liu, Yuan, & Marron, 2015; Liu et al., 2008) was calculated to ensure that the identified clusters are statistically significant. Since this procedure requires testing two clusters at a time, clustering was first tested between the "mega-clusters" of White Affluent/White Middle and Diverse/Black. C.I values of .793 (2006/2012 clusters) and .780 (1990 clusters) with p-values of zero indicate statistically significant clustering. C.I values were then calculated to test for significant clustering between White Affluent and White Middle clusters, generating CI values of .812 (2006/2012) and .801 (1990) with p-values of zero. Testing between Diverse and Black clusters generated CI values of .721 (2006/2012) and .809 (1990) with p-values of zero. In all cases, statistically significant clustering was found.

The equivalence of clustering between 2006/2012 and 1990 (using predicted values) can be seen by examining changes in cluster membership for NCS study churches in Table 20 below. 314 (15%) study churches changed clusters between 1990 and 2006/2012, with the majority of these changes being White Middle or White Affluent churches changing membership to the Diverse cluster. This trend is consistent with the general diversification of churches noted above.

Table 20: Transition of NCS Study churches by cluster from 1990 to 2006/2012 (unweighted counts)

	2006/2012 Cluster			
1990 Cluster	Black	Diverse	White Affluent	White Middle
Black	334	1	0	0
Diverse	70	285	2	1
White Affluent	1	79	495	47
White Middle	0	94	19	661

4.2 ARDA Data

The ARDA dataset provides CBSA-level measures of church density (see Table 11 for descriptions). Table 21 below shows summary statistics for the average NCS study church for key ARDA variables in 1990. The average church in our NCS sample is in a CBSA with a church adherence rate (total church adherents divided by total population) of .580 and 1.238 congregations per 1000 people. Note that a small number of CBSAs that contain an NCS study church have adherence rates greater than 1, indicating a relatively large number of people who commute into the CBSA to attend church.

Weighted t-tests were calculated to compare ARDA church densities between CBSAs with NCS study churches and all CBSAs in the US. While church adherence rates are statistically the same between the two groups of CBSAs, the number of congregations per 1000 people is higher in CBSAs in the study than general CBSAs. This is true for all religious traditions except Catholic churches where there is no statistical difference. These differences are likely explained by the fact that the NCS study churches are limited to those within CBSAs, whereas the general NCS database includes churches outside of CBSAs.

Table 21: Summary statistics and t-tests for CBSA-level 1990 ARDA variables, weighted by NCS weights.

	CBSAs with NCS Study Churches				All CBSAs		
	Mean	Std	Min	Max	Mean	T-Stat	pvalue
CHURCH_ADHRATE	0.580	0.138	0	1.310	0.575	1.618	0.106
CONGPER1000	1.238	0.647	0	3.510	0.969	19.006	0
EVANGELICAL_CONGPER1000	0.617	0.472	0	2.570	0.449	16.131	0
MAINLINE_CONGPER1000	0.466	0.307	0	1.760	0.363	14.960	0
CATHOLIC_CONGPER1000	0.079	0.063	0	0.440	0.078	0.728	0.467
BLACK_CONGPER1000	0.014	0.032	0	0.180	0.007	8.487	0

4.3 Census Tract Data

The primary geographical unit of analysis for this study is the census tract. As explained above, tract boundaries have been normalized to 2010, enabling consistent analysis over the 20-year study period. Table 22 shows the percentage of tracts by US census region that underwent each of the Landis-style neighborhood change types from 1990 - 2010. A Pearson's Chi-squared test ($\chi^2 = 830.35$, df = 9, p =0) indicates statistically significant differences in the neighborhood change patterns by region. It is immediately obvious that the primary change type is Stable, consistent with other research finding neighborhood stability the predominant trajectory for neighborhoods from 1990 to 2010 (Wei & Knox, 2014). Nationwide, 23.1% of tracts experienced change over the study period, with the Northeast being the most stable with only 15% of tracts changing, while the South has seen nearly twice as much change at 27.8%. Overall, Decline is the most prevalent change type for tracts that change, both in terms of percentage of tracts (ranging from 7.3% of Northeast tracts to 13.9% of South tracts) and percentage of population experiencing the change (see Table 23). While gentrification has captured

the interest of both researchers and the popular press, it has impacted roughly half the number of people compared to those experiencing Declining neighborhoods. For example, the South has the largest percentage of people (7% as of 1990) living in census tracts that experienced Gentrification. However, twice as many lived in a Declining census tract. In all four regions, even when the total percentages of those experiencing Upgrading are added to those experiencing Gentrification, the sum is still less than the percentage experiencing Decline.

Finding 5: Twice as many people lived in Declining neighborhoods from 1990-2010 compared to those living in Gentrifying neighborhoods. However, the clear majority (upwards of 80%) lived in neighborhoods that were Stable.

Table 22: Percentage tracts by region experiencing change (1990 – 2010)

	Upgrade	Gentrify	Decline	Stable
West	0.052	0.072	0.122	0.754
Midwest	0.047	0.057	0.104	0.791
Northeast	0.036	0.043	0.073	0.848
South	0.059	0.080	0.139	0.722
Nationwide	0.050	0.066	0.114	0.769

Table 23: Percentage of population in 1990 by region experiencing change (1990 – 2010)

	Upgrade	Gentrify	Decline	Stable
West	0.040	0.060	0.110	0.790
Midwest	0.040	0.050	0.110	0.800
Northeast	0.030	0.030	0.070	0.870
South	0.040	0.070	0.140	0.740

While this study's primary time period of interest is 1990-2010, the analysis was expanded to include two other overlapping 20-year time periods: 1970 – 1990, and

1980 – 2000. Using the same Landis-style definitions of neighborhood change, Table 24 shows the percentages of tracts nationwide by neighborhood change type in these three overlapping 20-year time periods. The largest difference is seen in the Stable category, with many more tracts experiencing change from 1970-1990 (34.9%) compared to 24.6% from 1980-2000 and 23.1% from 1990-2010. This difference comprises a much higher percentage of tracts Gentrifying and Declining in the earliest time period, compared to the later time periods.

Table 24: Percentage of tracts nationwide experiencing change during three overlapping 20-year periods

	Upgrade	Gentrify	Decline	Stable
1970-1990	0.064	0.112	0.172	0.651
1980-2000	0.053	0.070	0.123	0.754
1990-2010	0.050	0.066	0.114	0.769

What about differences between census tracts that contain at least one NCS study church, and census tracts that do not contain an NCS study church? While the NCS is a nationally representative sample of churches, it is important to look at these differences to determine if any bias may be present in the NCS data that may impact the study findings. Table 25 does indicate some statistically significant differences (χ^2 = 11.981, df = 3, p =.007), with 80.1% of the tracts with an NCS study church experiencing Stable neighborhood change compared to 76.8% of general tracts. Whether this difference is an artifact of the NCS sampling methodology, representative of churches tending to choose more stable neighborhoods for a location, or the result of churches being a stabilizing force in the neighborhood, cannot be answered definitively at this

point. With a potential bias towards more stable neighborhoods in the NCS study churches, this study may be underestimating the amount of change associated with churches and therefore result in more conservative findings.

Further examination of Table 25 shows that differences in neighborhood change are nearly balanced between Upgrade/Gentrify (1.9% less of these change types for NCS church tracts) and Decline (1.5% less Decline for NCS church tracts). This approximate equality provides some assurance that the NCS data is not biased towards a certain type of neighborhood change.

Table 26 shows mixed results on statistically significant differences between the tracts with and without an NCS study church in them. Importantly, this study's primary dependent variable, Relative Median Income change (1990-2010), shows no statistical difference, indicating that the NCS dataset is not systematically biased towards tracts with positive (or negative) median income changes. There is similarly no difference in percentage of surrounding population experiencing Gentrification, and tract percentage of whites and college graduates, thus revealing no systematic bias of the data towards potential gentrification drivers. The significant differences seen in Table 26 include slightly negative pre-study period income growth, lower starting median income, lower home value growth, higher population, lower population growth, and less surrounding population Upgrading for tracts with an NCS study church. These differences may point to the tendency of NCS study churches to be located in less dynamic, urban census tracts. However, given no difference in median income growth during the study period

and no difference in gentrification drivers (as mentioned above), these differences don't point to any systematic bias that may impact the study's primary research questions.

Table 25: Percentage tracts experiencing change (1990 – 2010) by presence of NCS Study church in tract

NCS church in tract?	FALSE	TRUE
Upgrade	0.051	0.038
Gentrify	0.066	0.060
Decline	0.115	0.100
Stable	0.768	0.801
	n = 65,357	n=1806

Table 26: T-tests key census tract variables, tracts with NCS study churches vs. tracts w/o

	mean (tract w/o NCS)	mean (tract w/ NCS)	t-stat	P value
Rel Med Income change (1970-1990)	0.0005	-0.018	3.390	0
Rel Med Income change (1990-2010)	0.0001	-0.004	1.040	0.300
Med Income 1990	33,095	31,857	3.440	0
Med Home value growth (1990-2010)	0.935	0.709	1.960	0.050
Pct college graduates 1990	0.207	0.209	-0.580	0.560
Percent non-Hispanic White 1990	0.753	0.743	1.420	0.150
Population 1990	3,424	3,884	-12.950	0
Pop growth rate (1990 - 2010)	1.368	0.385	22.690	0
Surrounding Pct pop Gentrify	0.062	0.057	1.520	0.130
Surrounding Pct pop Upgrade	0.047	0.039	3.630	0
Surrounding Pct pop Decline	0.110	0.105	1.170	0.240
	n = 65,357	n=1806		

4.4 Church and Neighborhood Variable Associations

In the final sections of this chapter, associations between key church and neighborhood variables are explored, starting with simple bi-variate associations, followed by a summary of changing patterns in church locations. The chapter concludes by comparing

and contrasting church segregation and diversity with neighborhood segregation and diversity.

As seen in Table 27 below, most correlations between church and neighborhood variables are very weak (< .2 correlation coefficient). This is expected, as the determinants of neighborhood outcomes are varied and complex. Nonetheless, some interesting associations can be gleaned, many of which will be further explored in the following chapter. For example, church demographic variables such as percentage white, college, poor, and rich are correlated in the expected direction (positive for all but percentage poor) with the relative median income of the church's neighborhood, indicating that the demographic and economic makeup of a neighborhood tends to be reflected in the demographic and economic makeup of churches in that neighborhood, consistent with findings from Form & Dubrow (2008). This can be seen even more clearly when looking at the correlation between the neighborhood's relative poverty rate and the church's percentage poor (.213 coefficient) and percentage white (-.338 coefficient). A neighborhood's demographic makeup is also correlated with the church's demographic makeup, with a .447 coefficient between church and neighborhood percentage white, .427 between church and neighborhood college graduate percentage, and .436 between church and neighborhood diversity scores. While these correlations point to a positive relationship between church and neighborhood demographic makeup, the discussion below on segregation and diversity exposes interesting

differences, as does the analysis when the geographic dispersion of attendees is considered.

> *Finding 6: Whiter, richer, more educated churches tend to be located in neighborhoods that are whiter, richer, more educated. More generally, the demographic and economic makeup of neighborhoods are roughly reflected in the demographic and economic makeup of the churches within it.*

Table 27: Weighted correlation between NCS church study variables (1990 predicted values) with 1990 neighborhood variables

	NCS Study church variables (1990 predicted values)									
Neighborhood variables (1990)	SOCIAL SERVICE Index	BRIDGING SOCIAL Index	BRIDGING POLITICAL Index	BONDING Index	WHITE PCT	COLLEGE PCT	POOR PCT	RICH PCT	DIVERSITY	LONG DRIVE PCT
Rel_Med_income	0.076	-0.077	-0.135	-0.060	0.315	0.288	-0.269	0.308	-0.216	-0.071
Rel_med_income_change 1990_2010	-0.052	-0.016	0.010	-0.051	-0.081	-0.052	0.060	-0.040	-0.028	-0.055
Rel_POVRATE	-0.040	0.130	0.173	0.085	-0.338	-0.187	0.213	-0.180	0.234	0.107
Rel_PCT_White	0.021	-0.143	-0.188	-0.131	0.447	0.232	-0.205	0.170	-0.288	-0.119
Change_pct_white 1990_2010	-0.048	-0.039	-0.019	-0.057	-0.005	-0.031	0.021	-0.050	-0.161	0.044
Neighborhood_Diversity	0.058	0.120	0.158	0.114	-0.392	-0.113	0.185	-0.049	0.436	0.140
Rel_PCT_College	0.187	0.038	-0.041	-0.030	0.271	0.427	-0.258	0.391	-0.108	-0.022
Rel_PCT_Under18	-0.098	-0.056	-0.016	0.059	-0.197	-0.253	0.117	-0.123	0.054	0.026

4.4.1 Church Location Patterns

Where are churches located with respect to the type of change its containing neighborhood is experiencing and how are the patterns changing over time? Figure 6 charts the percentage of all NCS churches at each wave (1998, 2006, and 2012) by type of change the census tract of the church's location underwent from 1990 to 2010. Note that since these charts include all NCS churches and incorporate NCS weights, claims can be made about the "average church" in America at the time of the survey, regardless of founding or closing date. As discussed above, the most prevalent type of neighborhood

change is Stable. This is reflected in the bottom chart of Figure 6 with a relatively stable trend of approximately 76% of churches located in Stable neighborhoods, very close to the 76.9% of tracts experiencing Stability nationwide (reference Table 22 above). Figure 6's top panel shows that in 1998 (at approximately the midpoint of the 1990-2010 time period of neighborhood change), 10.4% of churches were in Gentrifying tracts, considerably higher than the 6.6% of tracts that Gentrified nationwide over this time period. By the end of the period, the percentage of churches in these Gentrifying neighborhoods had declined slightly to 8.4%, still an overrepresentation. This overrepresentation of churches in Gentrifying neighborhoods will be seen even more clearly below when focusing on new churches. In terms of church representation in Declining neighborhoods (11.4% of all tracts nationwide), churches are slightly underrepresented, starting at 9.7% in 1998, but increasing to 10.7% by 2012. Finally, churches are very slightly underrepresented in Upgrading neighborhoods (5% of all tracts nationwide), with 4.5% (1998) down to 4.2% (2012) of churches located in Upgrading neighborhoods.

Finding 7: From 1998 to 2012, on average churches were overrepresented in Gentrifying neighborhoods, and underrepresented in Declining neighborhoods.

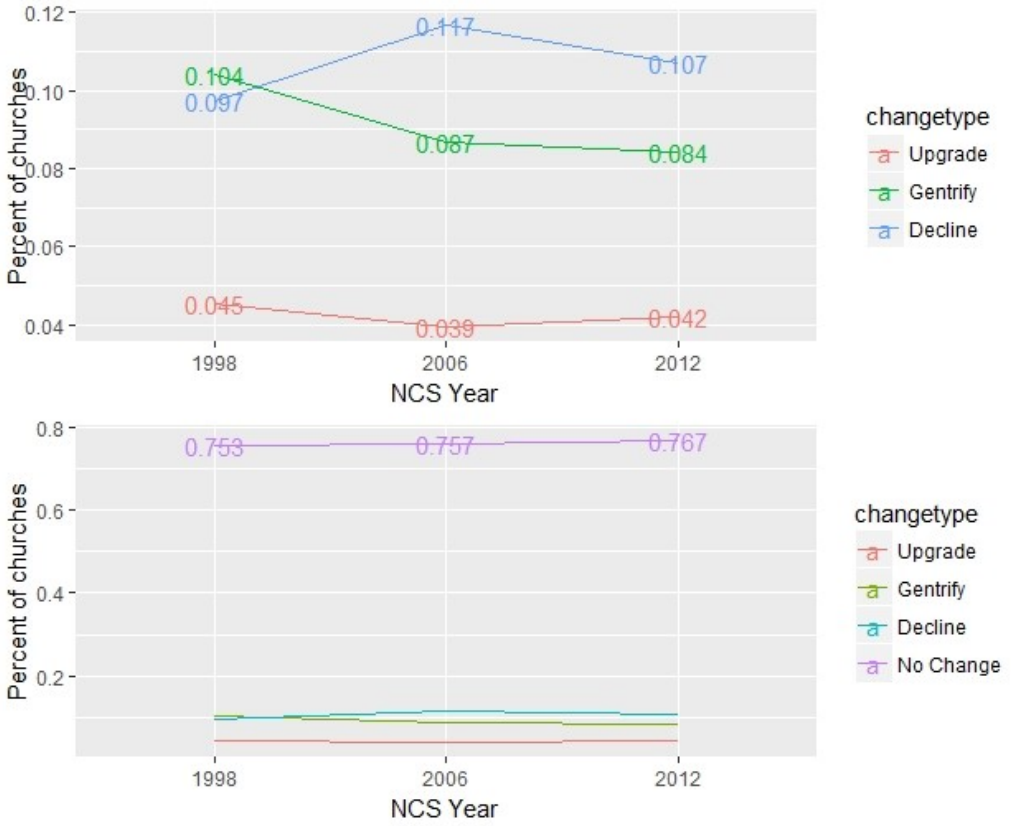

Figure 6: Location of NCS churches by neighborhood change type (1990-2010) by NCS year, weighted by NCS weights

Since the above analysis is on the overall stock of churches in existence at a point in time (the year of the NCS survey), it provides insight on nationally representative location trends of all churches from 1998 to 2012. However, it aggregates numerous factors that contribute to church location, including startups, closures, movements, and churches that were already in the neighborhood at the beginning of the time period. It also ignores differences that may be related to how far along a neighborhood is in its change trajectory – for example, in 1998 neighborhoods were at the midpoint of the 1990-2010 time period, but by the 2012 NCS survey, the period had completed and neighborhoods had finished their change trajectory.

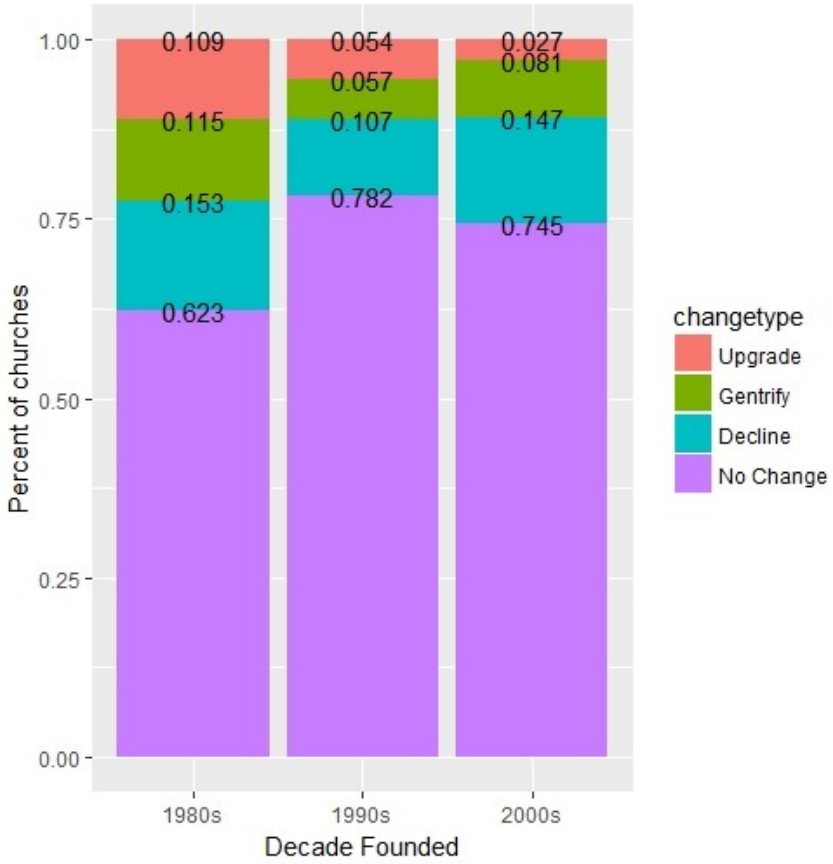

Figure 7: Location of NCS churches by neighborhood change type by decade founded, weighted by NCS weights

Figure 7 addresses these issues by grouping churches according to the decade of their founding, thus focusing the analysis on where *new* churches are being established ("church planting" in the parlance of religious circles). Slicing the NCS data in this way no longer enables claims about the "average congregation" since this subset is no longer a nationally representative sample of all churches (n = 231, 233, and 141 for churches founded in the 1980s, 1990s, and 2000s, respectively). Nevertheless, I can make general observations about trends in church planting with respect to the types of neighborhoods being chosen for these new churches.

To provide a consistent analysis of the relationship between church location and neighborhood change, I adjusted the 20-year time period for each decade analyzed so that the church's founding decade starts at the midpoint of the time period. Thus, for churches founded in the 1980s, the time period to calculate neighborhood change is 1970-1990; for churches founded in the 1990s, the time period is 1980-2000; and for churches founded in the 2000s, the time period is 1990-2010. More practically, this means that the decision to plant the church was likely near the midpoint of the transition period where the signs of neighborhood change were present, but the change was not yet complete. Table 24 above shows these same three overlapping time periods and the corresponding percentage of neighborhood change type for all US tracts during these time periods. Comparison of Figure 7 and Table 24 reveals several interesting trends.

Churches founded in the 2000s decade are overrepresented in Gentrifying neighborhoods, with 8.1% of churches planted in Gentrifying neighborhoods, compared to 6.6% of US tracts experiencing Gentrification from 1990 to 2010. However, churches planted during the 1990s are actually underrepresented in Gentrifying neighborhoods (5.7% of church plants compared to 7% of US tracts that Gentrified from 1980 to 2000). Churches planted in the 1980s in Gentrifying neighborhoods (11.5%) are evenly matched with the overall percentage of Gentrifying neighborhoods from 1970 to 1990 (11.2%). Given the general over representation of the stock of churches in Gentrifying neighborhoods (refer to discussion of Figure 6 above), it appears there may have been

some attempts to correct this over representation with church planting in the 80s and 90s (whether deliberate or not is unknown), but any such attempts were abandoned with church planting in the 2000s that saw an over representation in Gentrifying neighborhoods.

Interestingly, churches founded in the 2000s are even more strongly over represented in Declining neighborhoods (14.7% of church plants versus 11.4% of all US tracts Declining from 1990 to 2010) compared to the over representation in Gentrifying neighborhoods (8.1% of churches plants versus 6.6% of all US tracts Gentrifying from 1990 to 2010). This over representation in Declining neighborhoods is a new phenomenon, given that church plants in the 1980s and 1990s are underrepresented in Declining neighborhoods.

Based on the above observations, I posit that church planters increasingly favored Declining and Gentrifying neighborhoods as we move from the 1980s to the 2000s. Looking at the third neighborhood change type, Upgrading, can provide some explanation of this trend. Recall that an Upgrading neighborhood, using Landis' definition, is similar to a Gentrifying neighborhood with at least a two decile increase in median income, but Gentrifying tracts start in the bottom four income deciles, whereas Upgrading neighborhoods start at the fifth income decile or higher. Church planting patterns have transitioned from an overrepresentation in Upgrading neighborhoods in the 1980s (10.9% church plants versus 6.4% of US tracts Upgrading), to an underrepresentation in the 2000s (2.7% church plants versus 5% of US tracts

Upgrading). This movement of church planting towards lower income Declining and Gentrifying neighborhoods and away from higher income Upgrading neighborhoods is seen in Figure 8 below with a drop in the mean of the relative median income[8] for tracts in which the churches are being started, by decade of founding. Churches founded in the 1980s were established in tracts with a mean relative median income of .485, whereas churches founded in the 2000s see a mean relative median income of .422, a drop of approximately 13%.

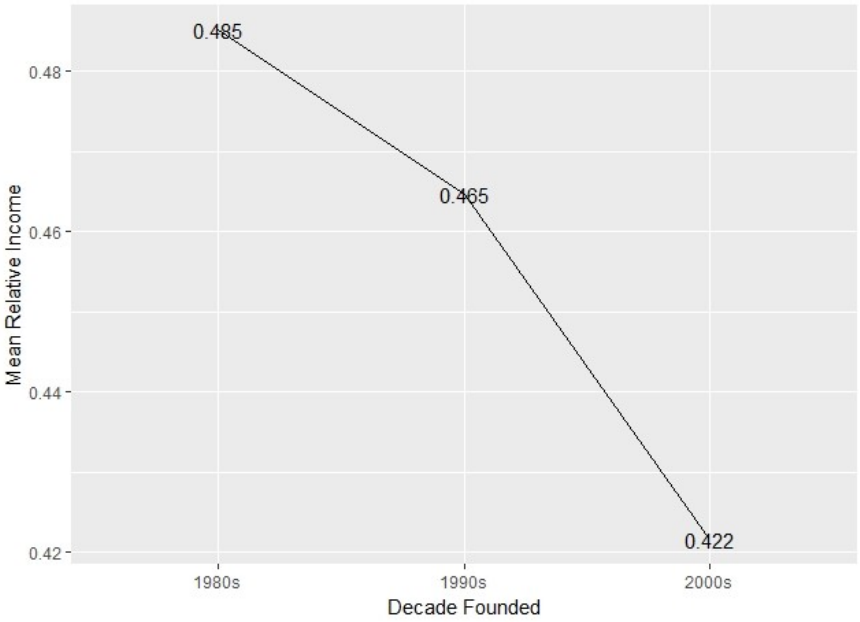

Figure 8: Mean of neighborhood relative income, by decade of church founding, weighted by NCS weights

[8] Recall that relative median income refers to the median household income of the census tract, relative to the average income of the surrounding CBSA.

Finding 8: Churches planted in the 2000s favored lower income neighborhoods that were either Gentrifying or Declining, compared to churches planted in the 1980s that favored higher income Upgrading neighborhoods.

4.4.2 Church and Neighborhood Segregation and Diversity

This chapter concludes with an analysis of church and neighborhood segregation and diversity. Recall from section 3.3.1.7 above that the higher the Theil multigroup entropy index (Equation 2), the higher the segregation, with a maximum of 1 indicating complete segregation of racial groups into individual units. Included in this analysis are two measures of residential segregation. The first, "neighborhoods (all)" looks at overall segregation at the census tract level using all tracts in the nation or region; the second, "neighborhoods (church)" looks only at the subset of tracts in the nation or region that contain an NCS church. Both versions of residential segregation were included to determine if substantial differences in methodology would impact findings. While there are differences, they don't impact the overall findings of this analysis. NCS weights are used to enable claims about the average congregation nationwide. Observations about differences at the regional level are offered, but since the NCS sample is not stratified by region, caution is required in making statistical claims at the regional level. Note that the Theil multigroup entropy index, as a measure of segregation, provides a single number for the "evenness" of a group of units (churches or census tracts in the nation or region in a specific NCS year), and is not a direct comparison of churches to the neighborhoods in which they are located. Such a direct comparison requires the use of Theil's Entropy Score (Equation 1 above) which is a measure of diversity.

Figure 9 reveals that churches are significantly more segregated than the neighborhoods in which they are located. Nationally from 1998 to 2012, church segregation is roughly 1.6 times greater than neighborhood segregation. During this time period, both church segregation and neighborhood segregation have been relatively stable, dropping very slightly from .62 to .6 and .39 to .37, respectively. Regionally, the South has the most segregated churches (.68 dropping to .63) as well as the biggest spread between church and residential segregation (.32 dropping .29), indicating that church segregation is approximately 1.9 times greater than neighborhood segregation in the South. The South has lower rates of residential segregation than either the Midwest or Northeast, but the South has substantially higher rates of church segregation compared to both regions. As quoted earlier, it seems that churches in the South have led the way in "…reluctantly dragging her heels" (Burns, 1949, p. 123) with regards to race relations.

While the West has the least segregated churches (ranging from .54 to .46), it also has the least segregated neighborhoods by a substantial amount compared to other regions (stable at around .29). This creates a large spread between church and residential segregation in the West. In fact, the spread in the West is larger than that seen in Northeast: in 2012, church segregation was 1.8 times higher than residential segregation in the West, compared to 1.4 times higher in the Northeast.

Except for the Midwest, church segregation nationally and regionally has gone down slightly from 1998 to 2012. The Midwest has seen a rise in church segregation,

from the lowest regional value of .52 in 1998, to .6 in 2012. Even more troubling is the fact that residential segregation has declined in the Midwest during this time period, from .42 to .37.

Finding 9: From 1998 to 2012, churches on average were 1.6 times more segregated than neighborhoods, with both church and neighborhood segregation dropping very slightly from 1998 to 2012.

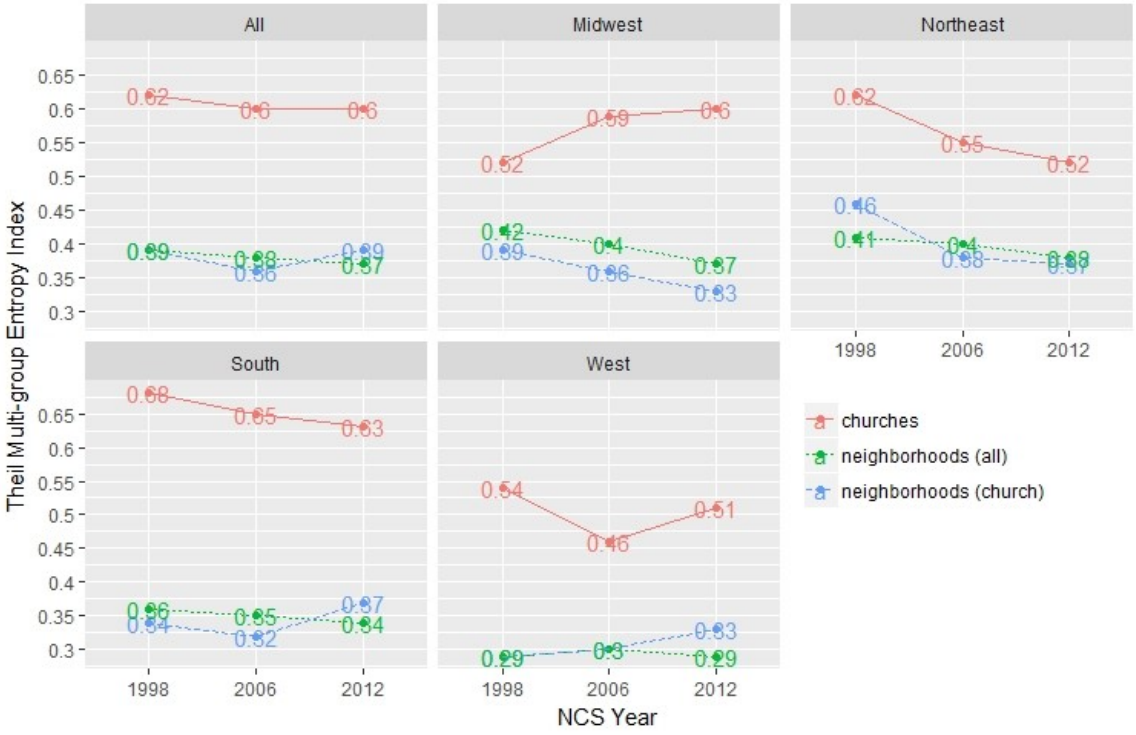

Figure 9: Theil multigroup entropy index (segregation) for NCS churches and neighborhoods

To gain insight into how churches compare specifically to their neighborhood, I pursue two additional analyses: comparing a church's diversity with the diversity of its neighborhood, and comparing the percentage of whites in a church with the percentage

of whites in its neighborhood. These more granular views point to the components of higher church segregation compared to residential segregation.

4.4.2.1 Church versus neighborhood racial diversity

Comparing diversity scores of a church's neighborhood with the church itself, I find that in 1998 church neighborhoods were 8 times more racially diverse than the church, dropping slightly to 6 times more diverse in 2012. These findings are similar to Dougherty & Emerson (2018), but they report a more substantial drop to 4 times more diverse in 2012. Table 28 shows that from 1998 to 2012, 84-87% of churches nationwide are less diverse than the neighborhood in which they are located. As expected, in the South, the numbers are the highest (in the 90-93% range). In the Midwest and Northeast, the numbers are the lowest (in the 76-84% range) and the West in-between at 83-85%. How much less diverse are churches than their neighborhoods, however? Figure 10 charts church diversity against the church's neighborhood diversity, where each dot represents a church in the combined NCS datasets (1998, 2006, and 2012) and dots above the diagonal line are amongst the 84-87% of churches less diverse than their neighborhood.

Table 28: Percentage of NCS churches with lower diversity than neighborhood, weighted by NCS weights

	1998	2006	2012
Nationwide	0.861	0.842	0.869
Midwest	0.787	0.756	0.839
Northeast	0.758	0.800	0.830
South	0.927	0.891	0.903
West	0.845	0.841	0.825

Given the relative stability of the trends from Table 28 above, combining all the NCS churches provides a good picture of how church diversity compares to its neighborhood diversity with as many data points as possible. The density based color scheme in the chart highlights the densest concentration of churches (in yellow) with low church diversity (less than approximately .2) located in low to moderate diversity neighborhoods (.1 to .4). The second densest location of churches extends upward (yellow-green) indicating a substantial number of churches with low diversity (less than .25) located in diverse neighborhoods (.4 and higher).

Finding 10: 87% of churches nationwide are less diverse than the neighborhood in which they are located. This has not changed substantially from 1998 to 2012.

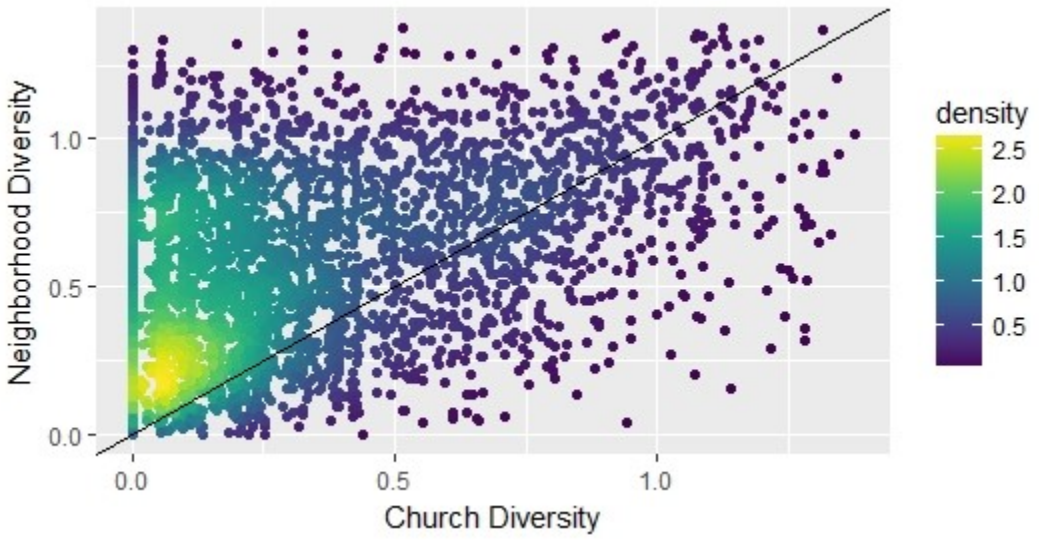

Figure 10: Church diversity vs. church's neighborhood diversity, all three NCS waves

4.4.2.2 Church vs. neighborhood percentage white

Finally, we should ask: what about differences between the percentage of whites in churches compared to the percentage of whites in the neighborhoods in which they are

located? Specifically, I am interested in cases where whites are over represented in churches by looking for instances where the percentage of whites in a church is greater than 80%, yet the percentage of whites in the neighborhood is less than 80%. Table 29 indicates that approximately 20% of churches nationwide are overrepresented with whites in this way, dropping slightly from 23% in 1998. The South is unsurprisingly higher than the nationwide average, but so is the West.

Finding 11: In 2012, 20% of churches nationwide had 80% or more whites but were located in neighborhoods that were less than 80% white, a slight decline from 23.3% in 1998.

Table 29: Percentage of NCS churches with > 80% whites located in neighborhoods with < 80% whites, by NCS year and region, weighted by NCS weights

	1998	2006	2012
Nationwide	0.233	0.218	0.200
Midwest	0.070	0.096	0.167
Northeast	0.163	0.165	0.100
South	0.316	0.258	0.228
West	0.253	0.294	0.237

Figure 11 provides a graphical view with "hotspots" in yellow and green showing churches with very high percentages of whites (> 80%) located in neighborhoods that are moderately white in the 75-80% range. These cases, while meeting the definition of over representation here, are nonetheless fairly evenly matched racially with their neighborhoods. There are cases of white churches in neighborhoods with much lower representation of whites, but this is seen predominately in the South and to a lesser degree in the West. The South also has a substantial showing of churches with very low

percentages of whites, located in neighborhoods of varying degrees of white representation, all the way up to and including near 100% white.

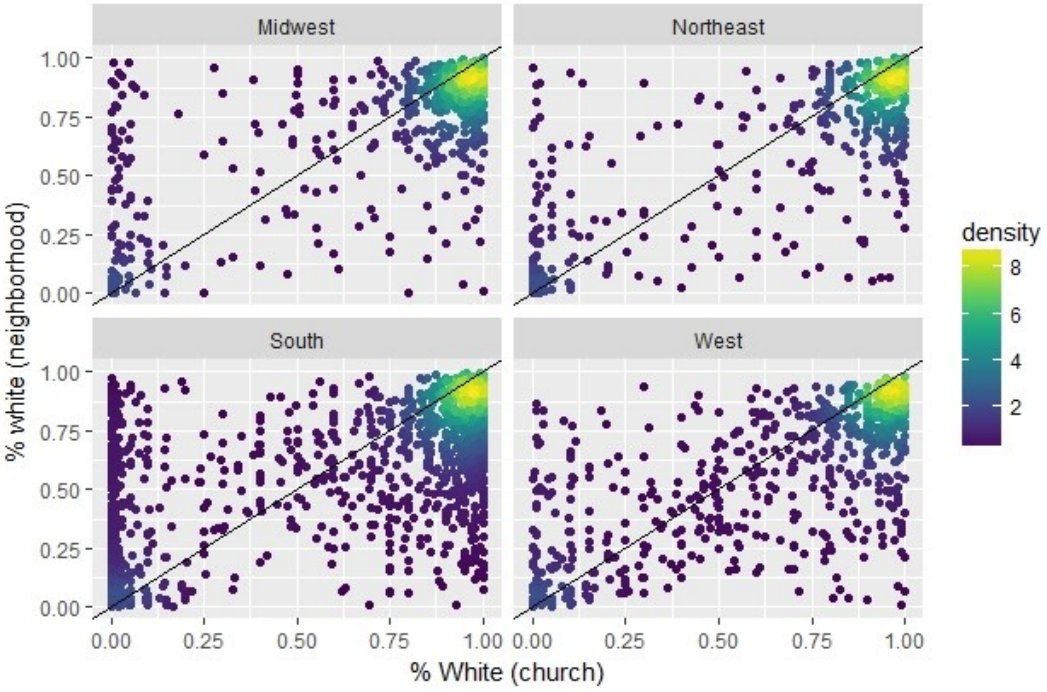

Figure 11: % white in church vs. % white in church's neighborhood, all three NCS waves, weighted by NCS weights

4.5 Chapter Summary and Discussion

In addition to providing a wide range of descriptive statistics, the primary objective of this chapter was to address the first research question, namely "How have patterns of new church formation changed overtime with respect to neighborhood change?" Looking at the national stock of churches from 1998 to 2012, the percentage of churches in Gentrifying neighborhoods dropped slightly from 10.4% to 8.4%. However, even with the drop, churches were still overrepresented in Gentrifying neighborhoods in 2012, and slightly underrepresented in Declining neighborhoods.

Church planting practices have changed rather dramatically from the 1980s to the 2000s, eschewing higher-income Upgrading neighborhoods for lower income neighborhoods. While there appears to have been an effort to start more churches in Declining neighborhoods in the 2000s, there was also a renewed effort to start churches in lower income Gentrifying neighborhoods, thereby reinforcing the overrepresentation of churches in Gentrifying neighborhoods. We thus see a "back to the city" movement for churches that mirrors the well-known movement with the same name used to describe overall neighborhood gentrification processes (Hyra, 2015; Smith, 1979). It appears that new church locations have shifted from predominantly up-and-coming higher income neighborhoods in the 1980s, to "grittier" and perhaps "cooler" lower-income neighborhoods in the 2000s, some of which were already gentrifying, others which were still in the throes of decline.

As mentioned above, the data on church planting is incomplete and not based on a nationally representative sample of church plants. These general findings point to the need for more research, and possibly more awareness of how church planting decisions can either counter or reinforce general urban trends that most researchers agree have resulted in displacement of marginalized populations and exasperated economic inequality. For example, will the church planting trends uncovered in this chapter erase the drop in the percentage of churches that are over represented with whites (Table 29) as new churches continue to start in lower income neighborhoods? Will these churches speed up gentrification or slow down or even reverse decline in

these neighborhoods? Will white churches in predominantly non-white neighborhoods contribute to displacement of residents? The specific impacts of churches within these and other types of neighborhoods is explored in the following chapter.

While there may be some reason to celebrate the increasing racial diversity of churches (this study; Dougherty & Emerson, 2018), my research findings temper this enthusiasm with the observation that church segregation remains stubbornly high, with just a small drop from 1998 to 2012. Thus, while mean and even median diversity is increasing, the profile remains heavily skewed with very little church diversity being the norm. Nationally, churches on average are 1.6 times more segregated than our neighborhoods. Even in the West where church and neighborhood segregation is the lowest in the nation, church segregation is 1.8 times higher than residential segregation. This discrepancy between church and neighborhood racial composition is even more stark when considering racial diversity: 87% of churches nationwide are less diverse than the neighborhood in which they are located, a figure that has not changed substantially from 1998 to 2012.

5 Analysis Results and Discussion

This chapter presents core study findings from the HLM and Statistical Matching analysis. The chapter will answer the second research question, namely "How do churches impact neighborhood change?" and report on the study hypotheses along with additional insight from the analyses. Findings for each model will be discussed independently. After the statistical matching analysis results are shared, the chapter concludes with a synthesis of findings for each church predictor.

5.1 Note on Causality and Endogeneity

Readers should note that the NCS local church predictors used in the HLM models and statistical matching are set at the beginning of the test period (1990) and that the dependent variables (neighborhood change) are measured in 2010. While the predictors certainly change in value over the study period, perhaps in response to neighborhood changes that may be occurring, this study only uses 1990 predictors to avoid endogeneity concerns. The HLM models also include a pretest period version of the key dependent variable - relative median income change (1970-1990) - as a control to address church self-selection bias. That is, by controlling for how the neighborhood changed in the previous time period, the model accounts for preferences churches may have for locating into or remaining in certain types of neighborhoods. The result is that the NCS local church predictors can be considered exogenous to the model with the direction of the relationship from church variables to neighborhood change.

5.2 HLM Analysis

As summarized in Table 13 above, this study includes six multilevel models: four logistic models (models 1 through 4) with binary outcomes indicating if a census tract experienced Gentrification, Upgrading, Decline, or Stability, respectively, from 1990-2010; a linear model (model 5) with change in tract-level relative median household income from 1990-2010 as the outcome; and a linear model (model 6) with change in tract-level percentage of non-Hispanic whites from 1990-2010 as the outcome. All models are run on the NCS study data set as well as a subset focused on Metro areas only. Models 4 through 6 also include a subset limited to low-income neighborhoods (income decile ≤ .4), with models 5 and 6 further distinguishing very low-income neighborhoods (income decile ≤ .3). Although I report the value of coefficients for all regressions (see Appendix A), my primary concern is to determine which 1990 church variables are statistically significant predictors of the outcome, focusing on the direction of the relationship rather than the value of the coefficient. This recognizes the myriad inter-related factors contributing to neighborhood change so that (hypothetical) statements such as "Churches that have higher percentages of whites compared to their neighborhood who pursue XYZ activity may be contributing to gentrification" are warranted by this study, but statements such as "For every 1% increase in the difference in percent white between a church and its neighborhood, churches that spend X% of their budget on XYZ increase the likelihood of gentrification by Y%" are not only of

limited practical usefulness, but beyond the precision and intended usage of the NCS data (see discussion in section 3.3.1.1 on limitations of key informant interviews). A summary of the HLM analyses (metropolitan-only analysis not included) with directionality and statistical significance of results is displayed in Table 30 below.

Model fit R^2 values specifically formulated for multilevel models (Nakagawa & Schielzeth, 2016) were calculated for the full models and the full models minus the local NCS church variables, enabling calculation of percentage of variance explained by the local NCS church variables. Except for the Upgrade model (model 2) which reveals very poor prediction value of local church variables with a negative impact on model fit, local church variables account for 2.3% to 6.1% of the variance in the logistic models. Model 5 shows increasing church variable explanatory power from 1% to 3% as the analysis moves from all neighborhoods to very low-income neighborhoods. Model 6, predicting change in percentage non-Hispanic whites, has 1.2% to 1.7% explanatory power for local church variables. In nearly all cases, the local church variables have greater explanatory power in low or very low-income neighborhoods, indicating the important impact of churches in lower income neighborhoods.

The ICC indicates the amount of variance explained by CBSA grouping. The Gentrify model has a high degree of clustering (over .64) indicating that over half of the variance is explained simply by the CBSA membership of the census tract. The other logistic models also have relatively high degrees of clustering around CBSAs, ranging from .37 to .67 range. While models 5 and 6 have lower ICC values, even these indicate

clustering accounting for a quarter to a third of the variance in model 5, and .12 to .26 in model 6. These values consistently reinforce the appropriateness of using multilevel modeling for the analysis.

Table 30: HLM Model summaries

	Model 1 Gentrify? 1a	Model 1 Gentrify? 1b	Model 2 Upgrade?	Model 3 Decline?	Model 4 Stable?		Model 5 Relative Median Income Change (1990-2010)			Model 6 White Influx (1990-2010)		
	All	All	All	All	All	Low-income	All	Low-income	Very low	All	Low-income	Very low
Local-level church variables (source: NCS)												
SOCIAL SERVICE Index	(-)	(-)							-		(+)	
BRIDGING-SOCIAL Index		(+)^{M}		+^{M}		-	-		(-)	-	-	-
BRIDGING-POLITICAL Index				(-)		+	+	(+)	(+)	(+)	+	+
BONDING Index					-			(+)	+	+	+	+
POORPCT	-	-		+	+^{M}		-	-	-	(-)		
RICHPCT			(-)	-	+		+	+	+			
WHITEPCT	na				-		-	-	(-)^{M}			+
COLLEGEPCT	na						-					
DIVERSITY	na				(-)	(-)				-	-	-
LONGDRIVEPCT	(-)^{M}				+	+		-	(-)	-	-	-
interaction terms												
WHITEPCT * Rel_PCT_White	na	-	(+)	-	+	(+)	(-)	-		+		
COLLEGEPCT * Rel_PCT_College	na				(-)	-				-	-	(-)
LONGDRIVEPCT * WHITEPCT	na	(+)	-^{M}							-	(-)	(-)
SOCIAL SERVICE * Rel_PCT_White	na	+	na	na	na	na	na	na	na	na	na	na
CBSA-level church variables (source: ARDA)												
Church ADHRATE			(+)									
EVANGELICAL CONG1000					-	(-)			+		+	+
MAINLINE CONG1000								(+)	(+)			
CATHOLIC CONG1000									+			
BLACK CONG1000	-	-			(+)	(+)		-	-	-	-	-
Model Fit												
R^2	0.89	0.93	0.81	0.82	0.62	0.83	0.44	0.50	0.50	0.48	0.53	0.60
ICC	0.63	0.69	0.36	0.40	0.40	0.67	0.24	0.34	0.31	0.10	0.17	0.27
Variance explained by local-church	2.1%	5.2%	-2.6%	2.5%	3.8%	6.7%	1.0%	2.0%	3.0%	1.4%	1.5%	1.2%

Note: direction of impact indicated for $p \leq .5$, enclosed in parentheses for marginal significance ($p \leq .10$). "M" super-script indicates significance only in the metropolitan-only version of the model.

5.2.1 Model 1: Gentrify

Two versions of the logistic Gentrification model, with a binary outcome indicating if Gentrification occurred in the census tract from 1990 to 2010, are included in this study. Model 1a, with an R^2 of .89 (see Table 34), incorporates difference variables DIFF_WHITE and DIFF_COLLEGE indicating the difference in percentage of whites and college graduates, respectively, between the local NCS church and the census tract in which it is contained. This model provides a direct test of hypotheses 1 and 2 which posit that larger differences will be associated with increased Gentrification. Because of collinearity concerns, this model of necessity drops the components of the difference (direct measures of percentage white and college graduates in the church and in the neighborhood) as well as the neighborhood diversity measure. No interaction terms are included in this first Gentrification model.

The second Gentrification model, Model 1b with an R^2 of .93 (see Table 35), drops the two difference variables and instead includes a series of interaction terms. While there is value in maintaining both versions of the Gentrification model, ultimately more insight and explanatory power are gleaned from the interaction terms than the simple differences. Model 1b's church variables explain 5.2% of the outcome's variance, compared to 2.1% in model 1a.

5.2.1.1 WHITEPCT

DIFF_WHITE is not a significant predictor in model 1a, however the WHITEPCT * Rel_PCT_White interaction term in model 1b is significant (log-odds = -2.83, p = .001, Table 35). Although WHITEPCT (percentage white in the local church) is non-significant in model 1b (log-odds = -.06, p = .951, Table 35), there are areas of significance when the interaction with the neighborhood's percent white is incorporated. Figure 12 is an interaction plot that shows how the impact of a variable on the model outcome (its regression coefficient) varies with another variable, with the grey bands indicating the 95% confidence interval. In this specific case, Figure 12 shows how WHITEPCT interacts with Rel_PCT_White (the relative percent white of the church's census tract).

In Figure 12, the church WHITEPCT coefficient starts at approximately 4 in the extreme left of the graph where neighborhoods have very low percentage of whites, indicating a positive association of church WHITEPCT with Gentrification. However, as the neighborhood percent white increases, the church WHITEPCT coefficient goes down until it reaches a value of approximately -4, indicating the opposite effect of church WHITEPCT on Gentrification in very white neighborhoods. The confidence bands on both ends of the graph do not encompass zero, indicating statistically significant effects. The interpretation is that the impact of a church's WHITEPCT on Gentrification varies significantly with the percent white in the neighborhood such that in very non-white neighborhoods, a church's WHITEPCT is positively and significantly associated with

Gentrification but the effect diminishes (and becomes non-significant) as a neighborhood becomes more white.

> *Finding 12: In predominantly non-white neighborhoods, churches with higher percentages of whites will be associated with increased rates of Gentrification. (Support for Hypothesis 1).*

As neighborhoods reach a maximum saturation of whites (the extreme right of the graph), the impact of a church's WHITEPCT again becomes significant, but with the opposite (negative) association.

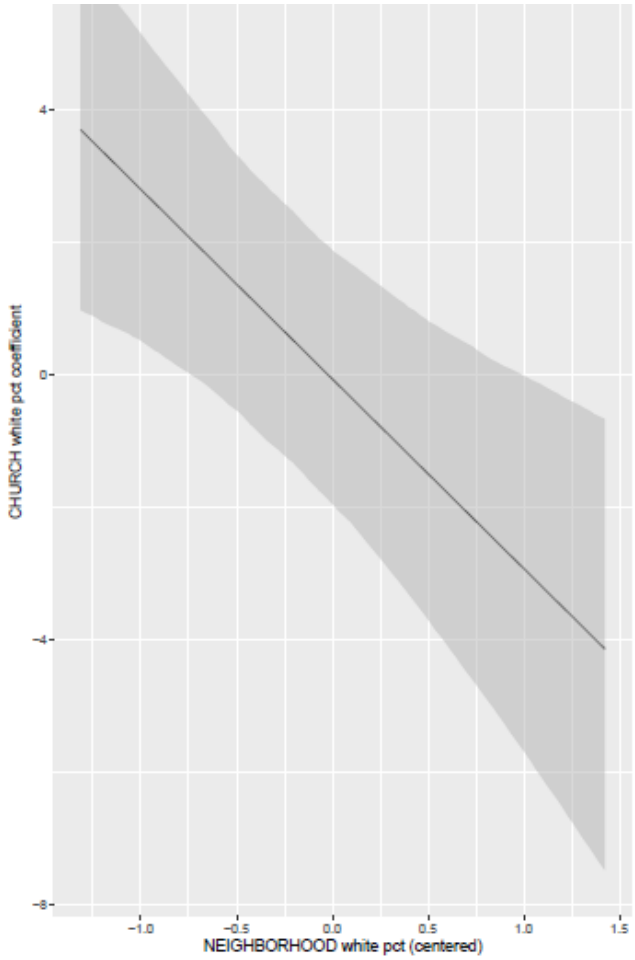

Figure 12: Church and Neighborhood %white interaction – Model 1b – Gentrify

5.2.1.2 COLLEGEPCT

Neither DIFF_COLLEGE in model 1a nor COLLEGEPCT and COLLEGEPCT *

Rel_PCT_College in model 1b are significant.

> *Finding 13: No significant association between a church's percentage of college graduates and Gentrification. (No support for Hypothesis 2).*

5.2.1.3 SOCIAL SERVICE Index

In both models 1a and 1b, the church SOCIAL_SERVICE_Index has a negative, marginally significant association with Gentrification. This holds for All neighborhoods (log-odds = -.93, p = .090, model 1b) as well as the Metro subset (log-odds = -1.16, p = .084, model 1b). This finding was not anticipated in the study hypotheses and warranted further exploration. Figure 13 displays the statistically significant interaction (log-odds = 4.63, p < .001) between the SOCIAL_SERVICE_Index and the census tract's relative percentage white, revealing differential impacts of a church's social services based on the socioeconomic status of the neighborhood. For non-white (likely lower income) neighborhoods, a church's SOCIAL_SERVICE_Index is negatively associated with Gentrification (with a coefficient value of approximately -7), highlighting a potential anti-displacement effect, something that will be further explored below. In whiter, likely higher income neighborhoods, the SOCIAL_SERVICE_Index is positively associated (coefficient value of approximately 6) with Gentrification. In both cases the confidence bands do not encompass zero, indicating substantial ranges where the effects are statistically significant.

> *Finding 14: Social service offerings of churches in predominantly non-white, lower income neighborhoods are associated with reduced rates of Gentrification. Social services in whiter neighborhoods, however, are associated with increased rates of Gentrification.*

Regarding the positive association with Gentrification in whiter neighborhoods, recall from the cluster analysis above that White Affluent churches had the highest levels of social service provision and were predominantly located in higher income neighborhoods. One interpretation is that because these churches are providing these services outside of their church's neighborhood, they are not directly impacting their neighborhood. Therefore, the anti-displacement effect mentioned above is not taking place in these whiter neighborhoods, and the forces driving gentrification are uninhibited. Alternatively, because many of these White Affluent churches may be centrally located due to their long history in the city, their services can draw participants from a wide variety of neighborhoods (only some of which live in the church's neighborhood). These churches are therefore providing broad impact across the city but very little in the neighborhood in which the church is located.

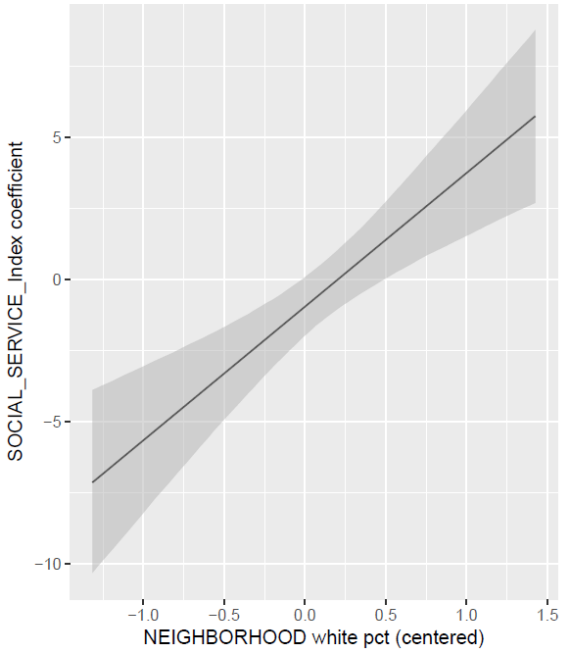

Figure 13: Church SOCIAL_SERVICE_Index and Neighborhood %white interaction – Model 1b – Gentrify

5.2.1.4 BRIDGING INDEX

Hypothesis 3 posits that a church's bridging social capital generation will be positively associated with gentrification. Recall that this study distinguishes between socially oriented bridging activities and politically oriented activities (see 3.3.1.4). In model 1b, when run on the Metro subset, BRIDGING_INDEX_SOCIAL has a positive, marginally significant association with Gentrification (log-odds = 2.09, p = .054). No significant association is found in either model with BRIDGING_INDEX_POLITICAL. This provides partial support for hypothesis 3.

> *Finding 15: Socially oriented bridging activities have a positive, marginally significant association with Gentrification in metro areas. No significant*

association of politically oriented bridging activities with Gentrification was found. (Partial support for Hypothesis 3).

5.2.1.5 POORPCT

In both models 1a and 1b, in all neighborhoods and in metro neighborhoods, church POORPCT is significantly and negatively associated with Gentrification. For the all neighborhood versions of model 1b, log-odds = -2.49, and log-odds = -3.06 in metro neighborhoods, with $p < .001$ for both. This finding is a corollary to hypotheses 1 and 2 which expected to find a positive effect between a church's whiter, more educated congregants and Gentrification. This finding indicates the mirror image, with an anti-gentrification association with the percentage of poor in a church, with an even stronger effect in metro neighborhoods.

Finding 16: The percentage of poor in a church is negatively associated with Gentrification. (Corollary support for Hypotheses 1 and 2).

5.2.1.6 LONGDRIVEPCT

In model 1a, metro areas only, LONGDRIVEPCT has a negative, marginally significant associated with Gentrification (log-odds = -.96, $p = .063$). Model 1b incorporates an interaction term, LONGDRIVEPCT * WHITEPCT to explore how the impact of a church's geographic dispersion may vary with a church's demographics. The interaction is marginally significant in the all neighborhood version of model 1b (log-odds = 2.90, $p = .052$), and significant in the metropolitan-only version of the model (log-odds = 3.65, p =

.036). Figure 14 displays the interaction plot for the metropolitan model, showing a statistically significant negative association between LONGDRIVEPCT and Gentrification for churches with lower rates of whites (where the grey bands do not encompass zero in the left-hand portion of the figure). For churches with median or higher percentages of whites, the effect is still negative, but not statistically significant. Hypothesis 6 posits that more geographically dispersed churches will be associated with less neighborhood change, something that is tested directly in model 4 below. The anti-gentrification association found here does provide partial support for hypothesis 6, and will be fully explicated below.

> *Finding 17: More geographically dispersed metropolitan churches comprised of lower than median percentages of whites are associated with less Gentrification. (Partial support for H6.)*

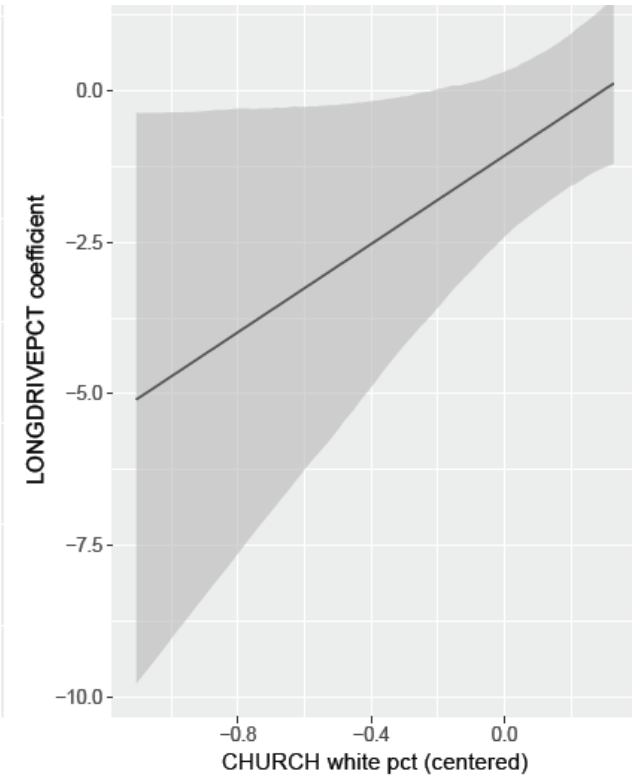

Figure 14: Church LONGDRIVEPCT and WHITEPCT interaction – Model 1b (Metro areas) - Gentrify

5.2.2 Model 2: Upgrade

Model 2, which tests if the census tract Upgraded from 1990 to 2010, has an R^2 of .81 for the all neighborhood version, and .87 for the metropolitan-only version (see Table 36). As mentioned above, although the explanatory power of the church variables in this model is negative, some statistically significant associations exist.

5.2.2.1 RICHPCT

Church RICHPCT has a marginally significant negative association with neighborhood Upgrading (log-odds = -1.38, p = .074), likely explained by the location of more affluent churches in higher income neighborhoods that have already Upgraded. This

interpretation is supported by the cluster analysis which indicates that churches in the White Affluent church cluster are in higher income neighborhoods (relative median income of .644, see Table 19).

> *Finding 18: More affluent churches, more likely to be in higher income neighborhoods, are associated with less neighborhood Upgrading.*

5.2.2.2 WHITEPCT

Although church WHITEPCT does not have a direct statistically significant association with Upgrading, the percentage of whites in the neighborhood, Rel_PCT_White, does (log-odds = 4.79, p = .001), and the interaction term WHITEPCT * Rel_PCT_White (log-odds = 2.59, p = .091) is marginally significant. The interaction term is fully significant in the metro model (log-odds = 8.32, p = .031). Figure 15 shows that the association of a neighborhood's percentage white with Upgrading is always positive, but it starts as a non-significant association in the presence of churches that are predominantly non-white. As churches become more white, the positive association between neighborhood percentage white and Upgrading increases and becomes significant.

> *Finding 19: A neighborhood's percentage white is positively associated with neighborhood Upgrading and the effect gets stronger in the presence of whiter churches.*

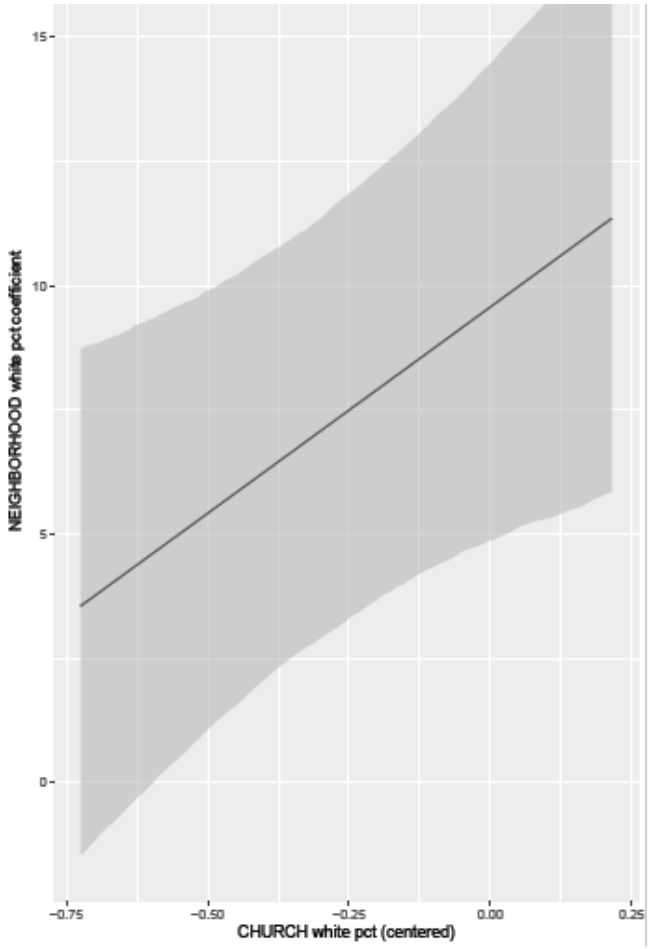

Figure 15: Church and neighborhood %white interaction – Model 2 – Upgrade

Further explication of the impact of WHITEPCT on neighborhood Upgrading is available by noting a significant interaction between WHITEPCT and LONGDRIVE in metro areas (log-odds = -8.83, p = .020). As shown in Figure 16, a negative association of church WHITEPCT with neighborhood Upgrading becomes significant as the LONGDRIVEPCT gets large. This provides further support for hypothesis 6 which expects less neighborhood change with more geographically dispersed congregations.

Finding 20: As congregations become more geographically dispersed, the effect of church WHITEPCT becomes a significant, dampening effect on neighborhood Upgrading. (Partial support for Hypothesis 6).

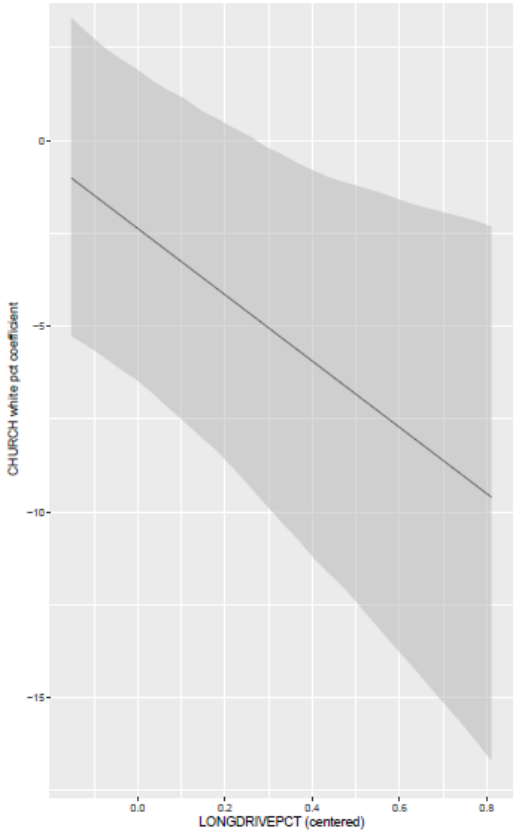

Figure 16: WHITEPCT and LONGDRIVEPCT interaction – Model 2 (Metro) – Upgrade

5.2.3 Model 3: Decline

Model 3, which tests if a census tract Declines from 1990 to 2010, has an R^2 value of .82 for the all neighborhood version, and .83 for the metropolitan-only version (see Table 37). The local church variables account for 2.5% of the variance in the outcome.

5.2.3.1 BRIDGING INDEX

BRIDGING_INDEX_SOCIAL is positively associated with neighborhood Decline in the metropolitan-only model (log-odds = 2.69, p = .042). This is a surprising finding given that BRIDGING_INDEX_SOCIAL is also positively associated with Gentrification in metro areas (Finding 15). BRIDGING_INDEX_POLITICAL has a marginally significant opposite effect in the all-neighborhood (log-odds = -.93, p=.065) and a significant effect in the metropolitan-only model (log-odds = -2.54, p=.048), indicating a stabilizing effect on neighborhood Decline. The opposite effects of socially- versus politically-oriented bridging activities will also be seen in models 4, 5, and 6 below, pointing to the importance of carefully distinguishing between bridging and linking social capital generation in churches.

> *Finding 21: Politically oriented bridging social capital generation is associated with less Decline in neighborhoods, but socially oriented bridging social capital is associated with more Decline.*

5.2.3.2 BONDING INDEX

My study finds no support for Hypothesis 4 which states that "church bonding activities will be associated with neighborhood decline".

> *Finding 22: Bonding social capital generation in churches is not associated with neighborhood Decline. (No support for Hypothesis 4).*

5.2.3.3 POORPCT and RICHPCT

Church POORPCT is significantly associated with more neighborhood Decline in all neighborhoods (log-odds = .74, p = .006) and marginally in the metropolitan-only model (log-odds = 1.22, p = .089). Church RICHPCT has the opposite association in both the all neighborhood model (log-odds = -1.04, p=.008) and the metropolitan-only model (log-odds = -3.60, p=.007). In both cases the effect is stronger in metro areas.

> *Finding 23: A higher percentage of poor in a church is associated with more neighborhood Decline. A higher percentage of rich is associated with less neighborhood Decline, with both effects stronger in metro areas.*

5.2.3.4 WHITEPCT

Church WHITEPCT is marginally significantly associated with neighborhood Decline in the metropolitan-only model (log-odds = 2.10, p=.078), and the interaction of WHITEPCT * Rel_PCT_White is significant in the overall model (log-odds = -1.97, p=.010) and the metropolitan-only model (log-odds = -3.68, p=.029). The left-hand panel of Figure 17 highlights that the WHITEPCT association with Decline is positive and statistically significant in non-white neighborhoods (those less than approximately the mean for relative neighborhood percentage white). At first glance this may be a non-intuitive finding, but could be evidence of white churches clinging to neighborhoods that have experienced white flight and are continuing to suffer the effects of disinvestment.

Finding 24: Churches with higher percentages of whites are associated with more neighborhood Decline in non-white neighborhoods.

The right-hand panel provides a more expected relationship, showing that the neighborhood percentage white effect is negatively associated with Decline, becoming significant as the neighborhood church percentage white increases. It appears that whiter neighborhood churches strengthen the negative effect that neighborhood whites have on the likelihood of Decline in a neighborhood.

Finding 25: Churches with higher percentages of whites strengthen the negative effect of neighborhood percentage white on neighborhood Decline, helping to stem Decline.

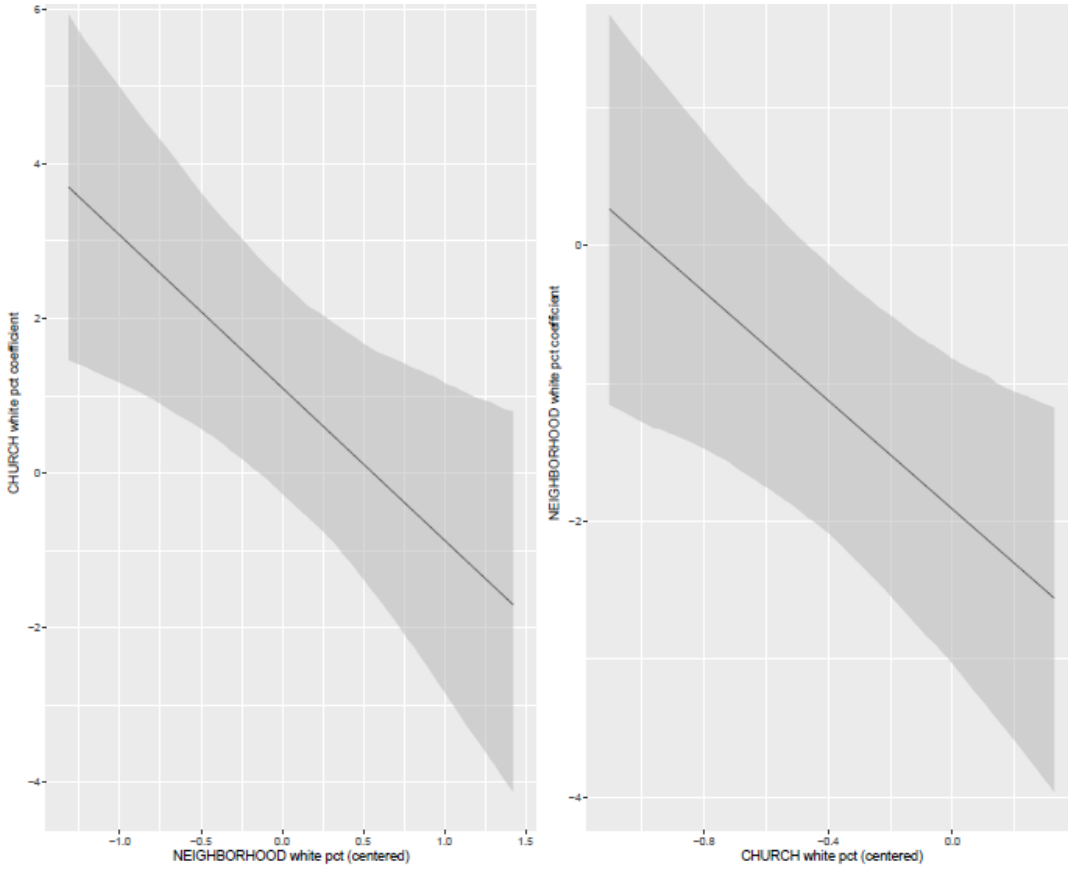

Figure 17: Church and neighborhood %white interaction – Model 3 – Decline

5.2.4 Model 4: Stable

Model 4, which tests whether a census tract experiences Stability from 1990 to 2010, has an R^2 value of .62 for the all neighborhood version, and .63 for the metropolitan-only version (see Table 37). This model was also run on low-income neighborhoods with an R^2 of .83. The local church variables account for 3.8% of the variance in the outcome in the all-neighborhood model, and 6.7% in the low-income neighborhood version.

5.2.4.1 BRIDGING INDEX

The BRIDGING_INDEX_SOCIAL is negatively associated with Stability (i.e., positively associated with neighborhood change) in the low-income model (log-odds = -3.43, p = .020). This is consistent with the positive associations found with Gentrification and Decline in metro areas in models 1b and 3, respectively. The opposite (positive association with Stability) is found with BRIDGING_INDEX_POLITICAL in the low-income model (log-odds = 3.84, p=.014). This is consistent with decreased neighborhood Decline found in model 3. Neither variable is significantly associated in the all neighborhood or metropolitan-only models. The opposing effects of the socially- and politically-oriented bridging activities was also seen in Model 3 (Decline) and will be seen again in models 5 and 6.

> *Finding 26: Socially oriented bridging social capital generation is associated with more neighborhood change (more Gentrification and Decline in metro areas). Politically oriented bridging social capital activities are associated with less neighborhood change (less Decline).*

5.2.4.2 Bonding INDEX

BONDING_INDEX is negatively associated with Stability (i.e., positively associated with neighborhood change) in the all-neighborhood model (log-odds = -.50, p=.016). This is at odds with hypothesis 4 which expects more Decline as well as more Stability with more bonding activities. Further analysis of hypothesis 4 will be deferred to later in the report.

Finding 27: Bonding social capital generation is associated with more neighborhood change.

5.2.4.3 POORPCT and RICHPCT

Church POORPCT is positively associated with Stability in the metropolitan-only model (log-odds=.92, p=.048). The interpretation is unclear, however, as POORPCT is also associated with decreased Gentrification (Finding 16) as well as positively associated with neighborhood Decline (Finding 23). RICHPCT is positively associated with Stability in both the all-neighborhood model (log-odds = .53, p=.022) and the metropolitan-only model (log-odds = 1.8, p=.02). This is consistent with Finding 23 from model 3 of a negative association with neighborhood Decline, and the marginal negative association with neighborhood Upgrading from model 2.

Finding 28: Higher percentages of rich in a church are associated with more Stable neighborhoods.

5.2.4.4 WHITEPCT

Church WHITEPCT has a negative association with Stability (i.e., a positive association with change) in the all-neighborhood model (log-odds = -.93, p=.038). The interaction of WHITEPCT and neighborhood percentage white is significant (log-odds = 1.32, p=.002). Figure 18 indicates a negative association of WHITEPCT with a Stable neighborhood but only in non-white neighborhoods. In other words, a church's WHITEPCT is positively associated with neighborhood change in non-white neighborhoods, consistent with

Finding 12 (association with increased Gentrification in non-white neighborhoods) as well as Finding 24 (association with increased Decline in non-white neighborhoods). The full import of these combined findings will be addressed after the discussion of models 5 and 6.

Finding 29: A church's percentage white is associated with more neighborhood change (both Gentrification and Decline), but only in predominantly non-white neighborhoods.

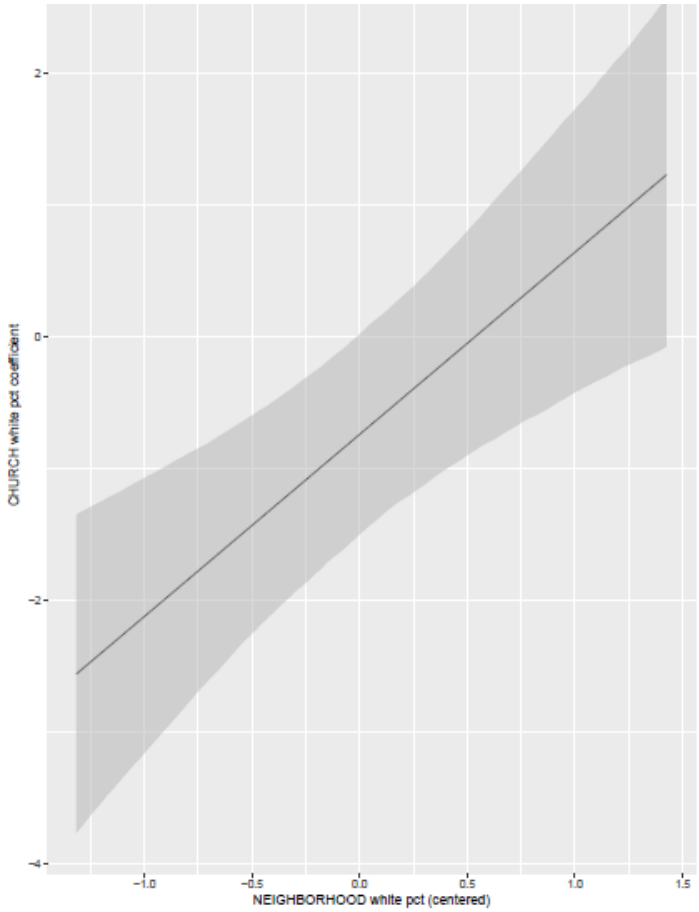

Figure 18: Church and neighborhood %white interaction – Model 4 – Stable

5.2.4.5 Diversity

Church Diversity is marginally negatively associated with Stability (i.e., positively associated with change) in all neighborhoods (log-odds = -.43, p=.099) and low-income neighborhoods (log-odds = -1.05, p=.052). However, since the previous models do not explain the type of neighborhood change associated with Diversity, this result is a tentative finding at this point.

> *Finding 30: (Tentative) Church Diversity is associated with more neighborhood change in all neighborhoods, including low-income.*

5.2.4.6 LONGDRIVEPCT

Church LONGDRIVEPCT is positively significantly associated with Stability in the all-neighborhood model (log-odds = .43, p=.038), marginally in the metro model (log-odds=.93, p=.066), and significantly in the low-income model (log-odds = 2.44, p=.001). The magnitude of the effect is greatest in low-income neighborhoods. This finding is consistent with hypothesis 6.

> *Finding 31: More geographically dispersed congregations are associated with less neighborhood change. The effect is strongest in low-income neighborhoods. (Partial support for Hypothesis 6.)*

5.2.4.7 COLLEGEPCT

While church COLLEGEPCT has no association with Stability, the neighborhood's college graduate percentage (Rel_PCT_College) has a marginal negative association with

Stability (i.e., a positive association with neighborhood change) in the metro model (log-odds = -.61, p=.082) and in the low-income model (log-odds = -.98, p=.090). The interaction of church and neighborhood college graduate percentages is also marginally significant in the all neighborhood model (log-odds = -.66, p=.096) and significant in the low-income model (log-odds = -3.89, p=.011). Figure 19 displays the interaction effect in low-income neighborhoods, showing a brief positive significant relationship between church percentage college graduates and Stability (the extreme left of the graph). However, the primary effect is a negative relationship as the neighborhood college graduate percentage increases. Thus, a church's percentage of college graduates tends to be negatively associated with neighborhood Stability (positively associated with change), but only in neighborhoods that have a larger than median amount of college grads. The effect gets stronger as the neighborhood education level continues to increase.

> *Finding 32: A church's college graduate percentage is associated with less neighborhood change, but only in very poorly educated neighborhoods. The primary effect is that a church's college graduate percentage is associated with more neighborhood change, particularly in low-income neighborhoods as the neighborhood education level increases.*

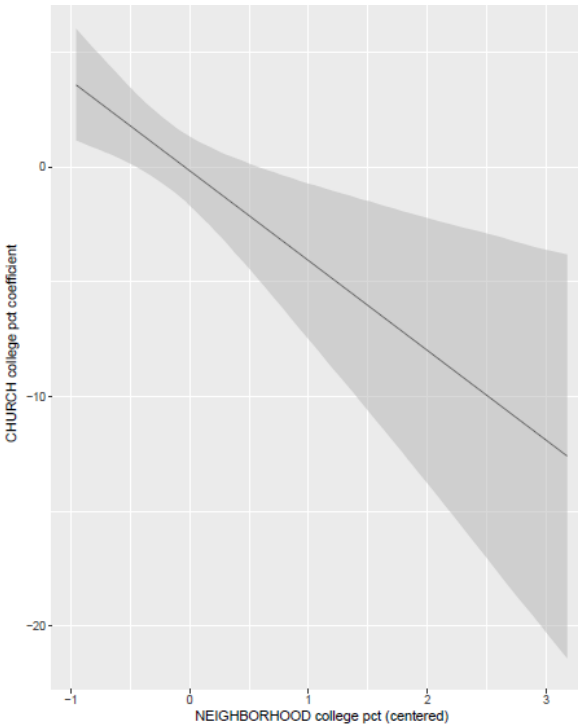

Figure 19: Church and neighborhood %college interaction – Model 4 (low-income) – Stable

5.2.5 Model 5: Relative Median Income Change

Recall that "relative median income" is a census tract's median household income divided by the average median income in the CBSA, so measuring changes in this value will detect neighborhoods that move up or down economically compared to other census tracts in its CBSA. Model 5 uses change in relative median income ("income change" for brevity) as the outcome and is therefore able to detect associations that may not be large enough to trigger Landis-style neighborhood change (the outcomes of models 1 through 4). Note that associations with "negative income change" (really negative *relative* income change) do not imply smaller absolute incomes over time, but rather indicate the neighborhood is falling behind other neighborhoods in the CBSA.

Two versions of the model are presented, the all neighborhood version (Table 39) has an R^2 value of .44 and the metropolitan-only version (Table 40) has an R^2 value of .449. In both versions, low-income and very low-income neighborhood subsets explore differences based on economic status of the neighborhoods with R^2 values that increase up to .498 (full model) and .503 (metropolitan-only model) for very low-income neighborhoods.

5.2.5.1 SOCIAL SERVICE Index

In very low-income neighborhoods, SOCIAL SERVICE Index has a statistically significant negative association with income change (β=-.03, p=.017) in the full model and metro model (β=-.03, p=.009). In other words, church social services are associated with negative relative income change in very low-income neighborhoods. This is consistent with the posited anti-displacement explanation for the negative relationship of social services with Gentrification (Finding 14), something that will become clearer when model 6 (white influx) is examined.

> *Finding 33: Church social service activities are associated with negative relative income change in very low-income neighborhoods, consistent with an anti-displacement effect resulting in reduced Gentrification (Finding 14).*

No support is found for Hypothesis 5 which states that "churches with higher social-service indexes will be associated with less neighborhood decline."

Finding 34: No support for Hypothesis 5 ("churches with higher social-service indexes will be associated with less neighborhood decline.")

5.2.5.2 BRIDGING INDEX

BRIDGING_INDEX_SOCIAL has a negative association with income change in the full model (β=-.03, p=.028) and metro model (β=-.03, p=.014), as well as a marginal association in very low-income neighborhoods in the full model (β=-.03, p=.080). This is consistent with the positive association with Decline found in the metropolitan-only model 3 (Finding 21), but not consistent with the finding of positive marginal association with Gentrification in metropolitan-only model 1b.

Finding 35: Socially oriented church bridging activities are associated with negative relative income change.

BRIDGING_INDEX_POLITICAL has the opposite impact, with a positive association with income change in the full model (β=.03, p=.032) and metropolitan-only model (β=-.03, p=.022). This same effect is seen in low and very low income neighborhood versions of the full model as well, with marginal significance. This finding is consistent with the negative association with neighborhood Decline found in model 3 (Finding 21).

Finding 36: Politically oriented church bridging activities are associated with positive relative income change, including less neighborhood Decline (Finding 21).

5.2.5.3 BONDING INDEX

Church BONDING INDEX is positively marginally associated with income change in low and very low-income neighborhoods in the full model and in the metro model. The association is significant in the full model in very low income neighborhoods (β=.03, p=.012). Note however, that the positive association with income change is not enough to trigger Gentrification in model 1. Church bonding activities appear to have a positive economic impact in low and very low-income neighborhoods.

> *Finding 37: Church bonding activities are associated with positive relative income change in low and very low income neighborhoods.*

5.2.5.4 POORPCT and RICHPCT

Church POORPCT has a significant negative association with income change across all versions of model 5 (full model, all neighborhood version β=-.02, p=.007). This is consistent with the negative association with Gentrification and positive association with Decline in models 1 and 3, respectively. As expected RICHPCT has the opposite association in all models (full model, all neighborhood version β=.03, p<.001). This is consistent with the negative association with Decline in model 3.

> *Finding 38: Churches with higher percentage of poor are associated with negative relative income change in the church neighborhood. The opposite effect is seen with percentage of rich.*

5.2.5.5 WHITEPCT

Church WHITEPCT has a significant negative association with income change in the all-neighborhood and low-income version of both the full model and metro models (full model, low-income version β=-.06, p=.001). There is also a marginally significant association in very low-income neighborhoods in the metro model (β=-.03, p=.094). The interaction of WHITEPCT and neighborhood percentage white is significant in low-income neighborhoods (full model, β = -.06, p<.001), with Figure 20 showing the negative association of WHITEPCT with income change becoming significant only in neighborhoods that are approximately at the mean or higher of percentage white in their neighborhood. In non-white neighborhoods, the association of WHITEPCT with income change is the opposite, positive, although non-significant. This positive association coincides with Finding 12 of increased Gentrification in non-white neighborhoods.

> *Finding 39: Church WHITEPCT is positively (but not significantly) associated with relative income change in non-white neighborhoods, consistent with increased Gentrification (Finding 12). More generally, it is negatively associated with income change. In low-income neighborhoods, the negative association only becomes significant in relatively white neighborhoods.*

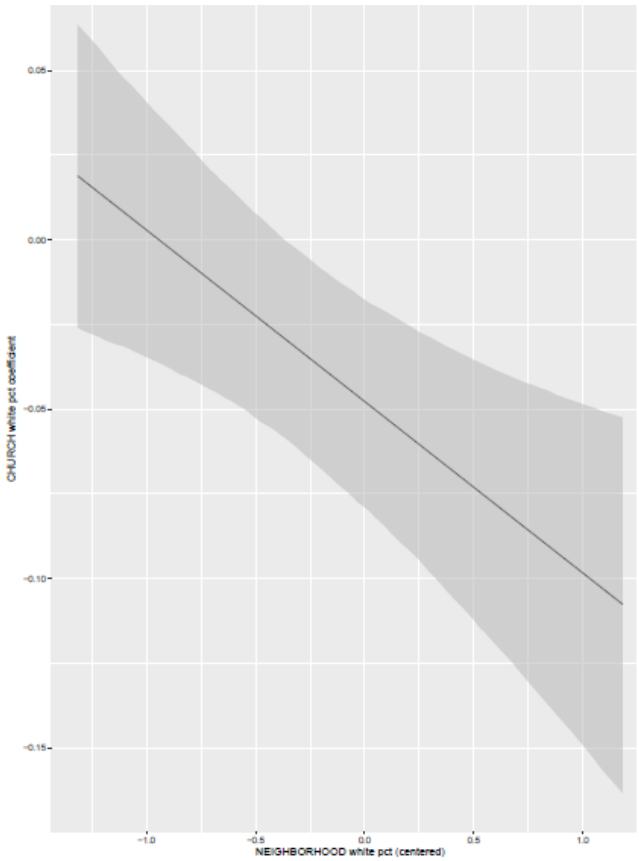

Figure 20: Church and neighborhood %white interaction in low-income neighborhoods – Model 5 – Income change

5.2.5.6 COLLEGEPCT

Church COLLEGEPCT is negatively associated with income change in both the full model (β=-.02, p=.013) and metro model (β=-.02, p=.040).

Finding 40: Church college graduate percentage is negatively associated with neighborhood relative income change.

5.2.5.7 LONGDRIVEPCT

Church LONGDRIVEPCT is negatively associated with income change in low and very low-income neighborhoods in both the full and metropolitan-only models. In the full model, the effect is significant in low-income neighborhoods (β=-.03, p=.002) and marginally significant in very-low (β=-.02, p=.073). In the metro model, the association is fully significant in both low-income (β=-.03, p=.002) and very low-income neighborhoods (β=-.02, p=.040).

> *Finding 41: More geographically dispersed congregations are associated with negative relative income change in low and very low-income neighborhoods.*

5.2.6 Model 6: Change in Neighborhood Percent White (1990-2010)

Model 6 uses the simple difference in neighborhood percent white between 2010 and 1990 ("white influx") to illuminate potential displacement effects of neighborhood change that are not captured by the Landis method and the previous models. Note that positive and negative associations with white influx indicate the marginal contribution of specific variables. Whether a specific neighborhood experiences an actual "influx" of whites (i.e., an increase in the absolute percentage of whites) is not ascertainable from this model. The full model (Table 41) has R^2 values that range from .48 (all neighborhoods) to .60 (very low-income neighborhoods). The metro model (Table 42) has R^2 values that range from .49 (all neighborhoods) to .607 (very low-income

neighborhoods). Discussion on most of the findings below will be differed to later in the chapter.

5.2.6.1 SOCIAL SERVICE Index

In the full model, SOCIAL SERVICE Index has a marginally significant positive association with white influx (β=.01, p=.097) in low-income neighborhoods.

> *Finding 42: Church social service activities are associated with positive white influx in low-income neighborhoods.*

5.2.6.2 BRIDGING Index

BRIDGING_INDEX_SOCIAL has a negative association with white influx in the full model (β=-.02, p=.010) and metro model (β=-.03, p=.003) in all neighborhoods. The effect is twice as strong in low and very low income neighborhoods.

> *Finding 43: Socially oriented church bridging activities are associated with negative white influx, especially in low and very low income neighborhoods.*

BRIDGING_INDEX_POLITICAL has the opposite association with white influx in the full model (β=.02, p=.057) and metro model (β=.02, p=.037) in all neighborhoods. The effect is twice as strong in low and very low income neighborhoods.

> *Finding 44: Politically oriented church bridging activities are associated with positive white influx, especially in low and very low income neighborhoods.*

5.2.6.3 BONDING Index

BONDING_INDEX has a positive association with white influx in both models in all neighborhoods except the all-neighborhood metro model. As with the Bridging indices, the effects are twice as strong in low and very low income neighborhoods. In low-income neighborhoods, the full model (β=.02, p=.009) and metro model (β=.02, p=.021) are fully significant.

> *Finding 45: Church bonding activities are associated with positive white influx, especially in low and very low income neighborhoods.*

5.2.6.4 POORPCT

Church POORPCT has a marginally significant negative association with white influx in the all-neighborhood full model (β=-.01, p=.086), and a fully significant association in the metropolitan-only model (β=-.01, p=.023).

> *Finding 46: Church POORPCT is associated with negative white influx.*

5.2.6.5 WHITEPCT

Church WHITEPCT has a marginally significant positive association with white influx in very low income neighborhoods in the full model (β=.03, p=.097). Rel_PCT_White, the relative neighborhood percentage white, has a significant negative association with white influx in both models in all neighborhoods with β values ranging from -.10 to -.14. The stronger effect of neighborhood white percentage compared to church white

percentage is not surprising, and the negative relationship of neighborhood percentage white with white influx indicates that as a neighborhood get more white compared to the rest of the CBSA, the size of increases diminishes as the neighborhood approaches 100% white. The interaction of WHITEPCT * Rel_PCT_White is significant in both models (Figure 21). The left-hand panel reveals a positive significant association of church WHITEPCT in neighborhoods that are relatively white, but a negative association in neighborhoods with very few whites. The direct effect mentioned above indicates the positive association with white influx to be predominantly true in very low income neighborhoods. The right-hand panel illuminates that church WHITEPCT works to moderate the negative association of neighborhood white percentage with white influx (indicated by the positive slope of the line). In other words, a church with more white people can speed up white influx, especially in neighborhoods that are already starting to tip towards more whites (Schelling, 1971).

> *Finding 47: Church WHITEPCT is positively associated with white influx, especially in very low income neighborhoods, and in neighborhoods with relatively high levels of whites in them already.*

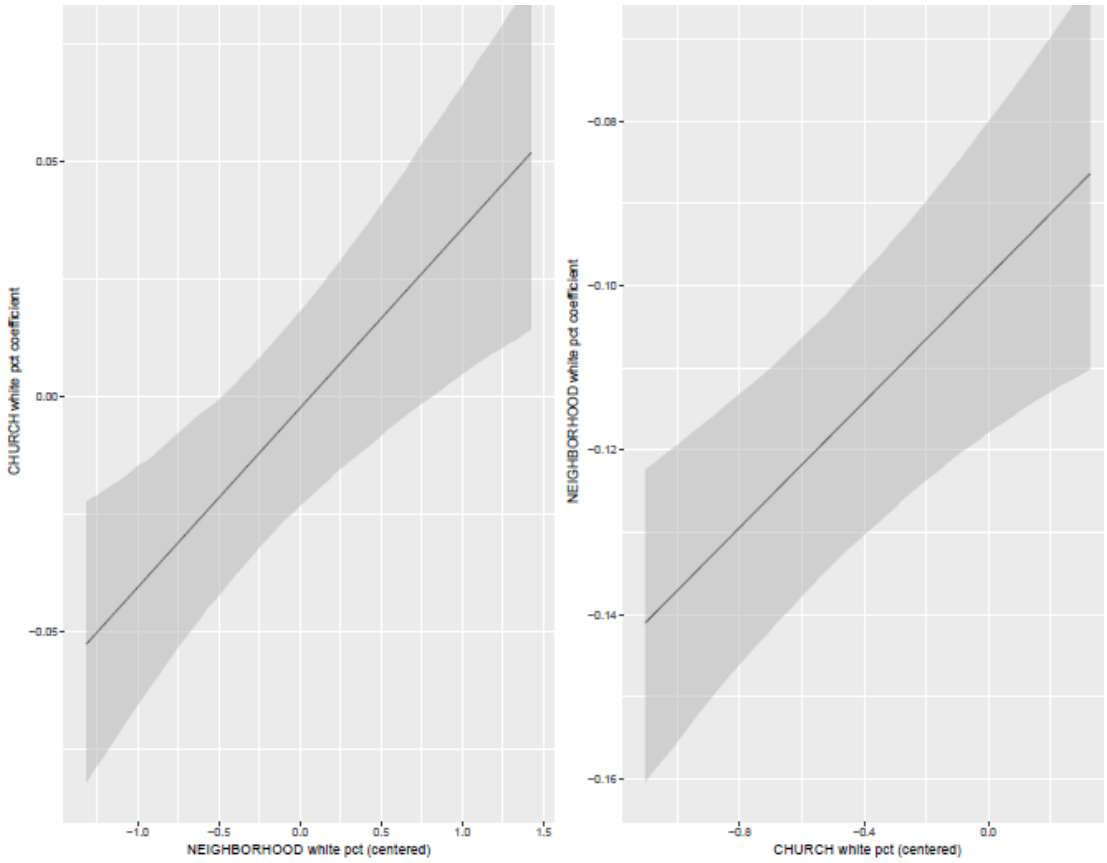

Figure 21: Church and neighborhood %white interaction – Model 6 – White influx

5.2.6.6 DIVERSITY

Church DIVERSITY is significantly negatively associated with white influx in both models across the board with β values ranging from -.02 to -.03.

Finding 48: Church DIVERSITY is negatively associated with white influx.

5.2.6.7 LONGDRIVEPCT

Church LONGDRIVEPCT is significantly negatively associated with white influx in the full model in all neighborhoods (β=-.01, p=.030). In low and very low-income

neighborhoods, the association is twice as strong and still fully significant in the full model, and marginally significant in the metro model. The significant interaction of LONGDRIVEPCT and WHITEPCT (β=-.02, p=.017) indicates that the negative association is stronger for churches that have higher percentages of whites (Figure 22). In fact, the effect is opposite (but non-significant) for non-white churches.

Finding 49: More geographically dispersed churches have a negative association with white influx, but the effect is only true for churches that have median or higher percentage of whites, and the effect is in the opposite direction (but non-significant) for non-white churches.

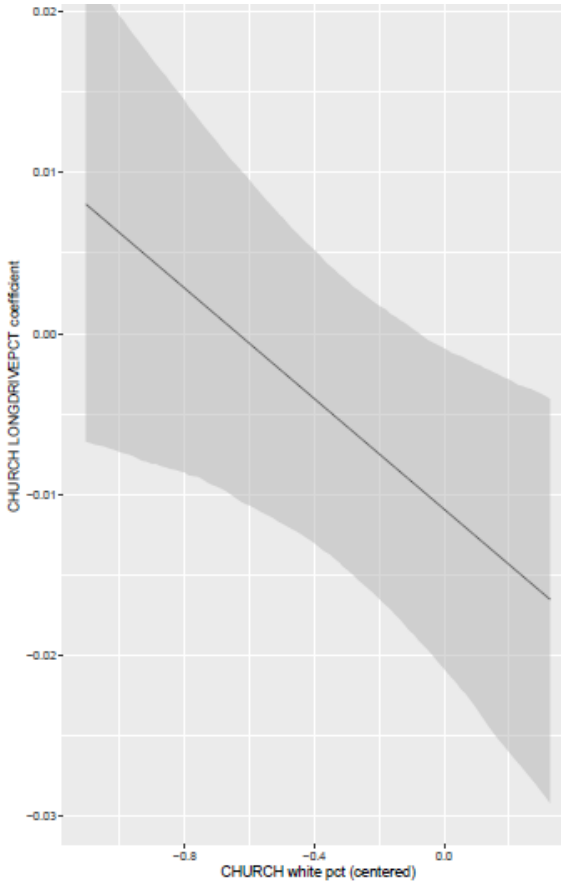

Figure 22: Church white% and LONGDRIVEPCT interaction – Model 6 – White influx

5.2.6.8 COLLEGEPCT

Church COLLEGEPCT does not have a statistically significant relationship to white influx, but the neighborhood's percentage of college graduates has a positive significant relationship to white influx in all models (full model, β=.06, p<.001). The interaction of the two is significant (full model, β=-.02, p=.016). The left-hand panel of Figure 23 shows that except for a very small area where the neighborhood college percentage is very low, a church's COLLEGEPCT is negatively associated with white influx. The right-hand panel shows that church COLLEGEPCT dampens the positive effect of neighborhood college percentage on white influx.

> *Finding 50: A church's college graduate percentage is negatively associated with white influx, and serves as a dampening effect on the positive draw of college educated residents for whites to move into a neighborhood.*

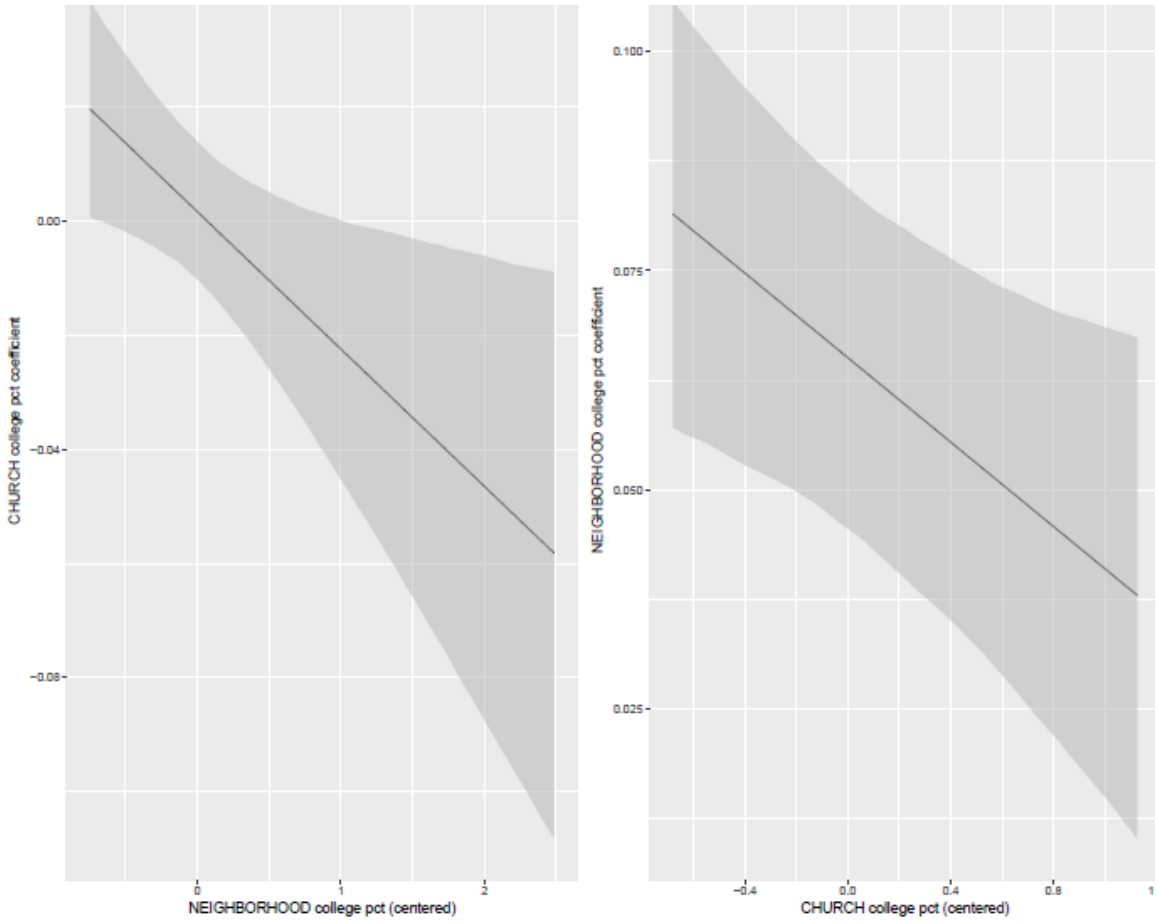

Figure 23: Church and neighborhood college% interaction – Model 6 – White influx

5.2.7 CBSA-level Church Variables

Recall that each HLM model includes CBSA-level controls derived from the ARDA dataset. As with the local church variables (derived from the NCS dataset), the ARDA variables are fixed to 1990 values at the beginning of the study period. However, unlike the NCS data, the ARDA 1990 is based on survey results, not predictions. Note that because the ARDA variables are used as controls in my study and not as explanatory variables, the findings in this section should be considered tentative. A more complete

study of the effects of these CBSA and county-level church characteristics would likely require a three-level HLM scheme with region at the highest level, followed by CBSA and census-tract. This remains an area for future research.

5.2.7.1 ADHRATE

This study found minimal neighborhood effects for higher rates of church adherence in the CBSA. A marginally significant positive association with increased neighborhood Upgrading (model 2) was found in the full model (log-odds = 1.32, p=.071) and metropolitan-only model (log-odds = 7.37, p=.060). This is generally consistent with (Gruber, 2005) who found higher levels of church participation in 1990 led to higher incomes and education levels.

5.2.7.2 Evangelical CONGPER 1000

In model 4, the CBSA density of Evangelical churches was found to be significantly negatively related to neighborhood Stability – i.e., positively related to more neighborhood change (log-odds = -.93, p=.026), but not enough to trigger any of the three Landis-style neighborhood change types (Gentrification, Upgrading, Decline). In very low-income neighborhoods, a higher density of Evangelical churches in the CBSA is associated with increased positive income change (Model 5, β=.06, p=.028). This is generally consistent with (Rupasingha & Chilton, 2009) who found a positive but non-significant relationships between county-level Evangelical church adherence rates and

county-level per capita income growth between 1990 and 2000. CBSA-level Evangelical church density was also found to be positively associated with white influx (Model 6, β=.05, p=.029) in very low-income neighborhoods. These two findings comprise the building blocks of increased gentrification, therefore the potential impact of Evangelical churches to increase gentrification must be taken seriously (see also the discussion above on the positive effect of percentage of whites in churches driving gentrification). This is particularly urgent considering the discussion on church planting practices indicating a "back to the city" movement, and the fact that the majority of church growth is coming from non-denominational, Protestant Evangelical churches.

> *Finding 51: (Tentative) A higher level of Evangelical church density in a CBSA is associated with positive income changes and increased white influx in very low-income neighborhoods. These findings comprise the building blocks of gentrification.*

5.2.7.3 Mainline CONGPER 1000

CBSA Mainline church density was found to be marginally positively related to relative income change (Model 5) in low (β=.04, p=.082) and very low income (β=.04, p=.067) neighborhoods. This is contrary to Rupasingha & Chilton (2009) who found a negative relationship between county-level Mainline Protestant adherence rates and county-level per capita income growth. It is also not consistent with Hoyman et al. (2016) who found a negative relationship between county-level densities of bridging congregations

(of which Mainline Protestants are normally considered) and per capita income. These two county-level studies do not differentiate between neighborhood types, however, pointing to the need for more research such as mine to distinguish church effects by neighborhood type.

5.2.7.4 Catholic CONGPER 1000

CBSA-level Catholic church density has a significant positive (β=.05, p=.045) association with relative income change (Model 5) in very low income neighborhoods. This is generally consistent with (Rupasingha & Chilton, 2009) who found a positive significant relationships between county-level Catholic church adherence rates and county-level per capita income growth.

> *Finding 52: (Tentative) A higher level of Catholic church density in a CBSA is associated with positive income changes in very low income neighborhoods.*

5.2.7.5 Black CONGPER 1000

CBSA-level Black church density is a stabilizing force at the neighborhood level, significantly associated with lower levels of neighborhood Gentrification (model 1b full model, log-odds = -1.70, p=.030) and less neighborhood change in low-income neighborhoods (model 4, log-odds = 22.30, p=.056). Black church density is also associated with less income change in metro-areas neighborhoods (model 5 metropolitan-only full model, β=-.03, p=.044) as well as less white influx (model 6 full

model, β=-.03, p<.001), pointing to an anti-displacement effect. Perhaps more than any other church type, Black church impacts at the CBSA-level are important considerations as Black cluster churches have the highest degree of geographic dispersion of attendees (estimated 23.6% LONGDRIVEPCT in 1990, see Table 19), pointing to broader geographic impacts from Black churches.

> *Finding 53: (Tentative) A higher level of Black church density in a CBSA is associated less Gentrification in low-income neighborhoods, and less income change and white influx in metro-area neighborhoods.*

5.3 Sensitivity Analysis for 1990 Predicted Values

Given that my study relies on predicted 1990 values for local church variables (see section 3.3.1.8 for prediction methodology), I performed a sensitivity analysis to determine the robustness of my findings with respect to the predicted values. I utilized a Monte Carlo-type analysis to run Model 5 100 times, randomly jittering the predicted 1990 values for all NCS local church variables (Table 1) for each iteration from -5% to +5% and then recalculating the significance of each predictor. The mean of the 100 p-values for each predictor is calculated to determine how the jittering affects the statistical significance of the predictors in model 5. I performed this analysis for 5%, 10%, 20%, and 25% jitter percentages. Model 5 was chosen for this analysis because it had a high number of significant predictors and its dependent variable, change in relative median income, is more sensitive to neighborhood change than the logistic

models (models 1 – 4) which require a much higher threshold to register a change in the dependent variable.

Table 31 displays the results of the analysis, with the original p-value from model 5, and the mean p-value for each jitter percentage Monte Carlo run. Most predictors are robust even with 20% jittering of the 1990 predicted values. In the all-neighborhood version of model 5, the two BRIDGING indices are still marginally significant with 20% jitter, and POORPCT, RICHPCT, and COLLEGEPCT are still significant even after 25% jitter. WHITEPCT is marginally significant with 10% jitter. In the very low-income version of the model, the Social Service index is still significant with 25% jitter, while LONGDRIVEPCT and BONDING Index maintain marginal significant with 25% jitter. The BRIDGING Social and Political Indices are less robust than in the all neighborhood model, maintaining marginal significance at 5% and 10% jittering.

The sensitivity analysis indicates that the primary study findings are reasonably robust against the 1990 predicted values for the NCS variables and would hold even with predictions that vary by up to 20-25%.

Table 31: Sensitivity analysis against 1990 predicted values

		1990 predictors jitter percentage			
Model 5 significant predictors	original p-val	5%	10%	20%	25%
All neighborhoods model		*mean p-val from 100 iterations*			
BRIDGING_INDEX_SOCIAL	.058	0.034	0.047	0.093	0.163
BRIDGING_INDEX_POLITICAL	.054	0.037	0.050	0.085	0.154
POORPCT	.004	0.008	0.010	0.019	0.026
RICHPCT	<.001	0	0	0	0

WHITEPCT	.037	0.047	0.068	0.157	0.182
COLLEGEPCT	.005	0.014	0.018	0.026	0.039
Very low-income neighborhoods model					
SOCIAL_SERVICE_Index	.031	0.018	0.023	0.023	0.030
BRIDGING_INDEX_SOCIAL	.063	0.092	0.102	0.185	0.261
BRIDGING_INDEX_POLITICAL	.042	0.059	0.069	0.122	0.192
BONDING_INDEX	.012	0.015	0.019	0.042	0.086
POORPCT	<.001	0.001	0.001	0.002	0.005
RICHPCT	.003	0.003	0.003	0.004	0.005
LONGDRIVEPCT	.066	0.072	0.072	0.072	0.066

5.4 Statistical Matching

As described in section 3.6, this study's statistical matching comprises a total of 11 church "treatments" (see Table 14 for more details) on census tracts with two outputs of interest: change in relative median income from 1990 to 2010 and poverty rate in 2010. The Average Treatment Effect on the Treated (ATT) for each treatment/outcome pair is provided in Table 32.

Table 32: Average Treatment Effect on the Treated (ATT).

	Relative median income change (1990-2010)	Poverty rate (2010)
Treatment 1 (NCS Study Churches)	-0.001	0.005*
Treatment 2 (%white in church > neighborhood)	0.007	0.003
Treatment 3 (church %white > .8, rel. neigh. < .2)	0.025·	0.01
Treatment 4 ("White Middle" cluster)	-0.002	0.013***
Treatment 5 ("White Affluent" cluster)	0.001	-0.001
Treatment 6 ("Black" cluster)	0.006	-0.005
Treatment 7 ("Diverse" cluster)	-0.009	0.004
Treatment 8 ("White Middle" cluster, low-income)	0.021*	0.012·
Treatment 9 ("White Affluent" cluster, low-income)	0.024*	-0.003
Treatment 10 ("Black" cluster, low-income)	0.001	0.001

Treatment 11 (“Diverse” cluster, low-income)	0.067**	0.009

*** p≤.001, **p≤.01, *p≤.05, · p≤.10

Treatment 1 is the most generic, looking at differential outcomes on census tracts based on the presence of an NCS study church (treatment) or not (control). 2010 Poverty rates were found to be .5% higher in treatment groups with p≤.05. However, the usefulness of this ATT is questionable given the highly generic nature of the treatment. The only other treatments with a significant ATT on poverty rates are treatments 4 and 8 which both pertain to the presence of churches in the “White Middle” cluster (see Table 7 for full cluster descriptions) in any neighborhood or in low-income neighborhoods, respectively. These treatments have an ATT of 1.3% (p≤.001) and 1.2%(p≤.10) respectively. Treatment 8, however, also has a positive marginally significant ATT of .021 (p≤.05) on income change. In other words, White Middle cluster churches are contributing to increases in the relative income of low-income neighborhoods, while also contributing to increases in poverty rates.

> *Finding 54: White Middle cluster churches have a causal effect of increasing poverty rates in 2010 by approximately 1.3 percentage points (in all neighborhoods) and 1.2 percentage points (in low-income neighborhoods), as well as increasing relative income change from 1990 to 2010 by 2.1 percentage points in low-income neighborhoods.*

A slightly higher significant ATT on income change (2.4%) is found in treatment 9 (White Affluent cluster churches in low-income neighborhoods), but without the increase in

poverty associated with White Middle churches. Treatment 3 has a similar ATT on income change (.025, p≤.10). Treatments 3, 8, and 9 are all likely pointing to the same effect, i.e., predominantly white churches in low-income neighborhoods driving increases in relative income change which could be pointing to a contribution to gentrification.

> *Finding 55: White Middle and White Affluent cluster churches have a causal effect of increasing relative income change from 1990 to 2010 by 2.1-2.4 percentage points in low-income neighborhoods. Churches with over 80% white in heavily non-white neighborhoods have a similar effect (2.5 percentage points) on relative income change.*

The largest ATT on income change is seen in treatment 11 (Diverse cluster churches in low-income neighborhoods) with an ATT of .067 (p≤.01).

> *Finding 56: Diverse cluster churches have a causal effect of increasing relative income change from 1990 to 2010 by 6.7 percentage points in low-income neighborhoods.*

Balance statistics indicating the quality of the matching between control and treatment groups for treatments 3, 4, 8, 9, and 11 are provided in Appendix B.

5.5 Summary and Discussion of Key Church Variables

Below I synthesize the findings from the HLM Models and Statistical Matching for each of the primary local church variables.

5.5.1 Social Service Index

This study found no support for Hypothesis 5 which states that "churches with higher levels of social services will be associated with less neighborhood decline". Instead I found evidence for an anti-displacement effect: the social service offerings of churches in non-white, lower income neighborhoods are associated with reduced rates of Gentrification (model 1) and less income change in very low-income neighborhoods (model 5). At first glance, a negative impact on income change from church social services may be disconcerting. However, without the intervention of church social services in low-income neighborhoods, these neighborhoods are more susceptible to gentrification which by definition means positive neighborhood income changes primarily through the displacement of lower-income residents.

As laid out in the literature review, churches rarely engage in long term services to lift people out of poverty (such as job training, for example). The material benefit of "short term" social services should not be minimized, however, as making a rent payment because other material necessities are provided via church social services is certainly a valuable outcome. Numrich (2015) expands the view of church social service provision beyond the material into a social exchange which he contends is much more important than the actual good or service delivered. In this view, church social services may provide an entry for lower-income neighborhood residents into the social capital being generated from the church, which in turn can aid in fighting against displacement.

Another possible explanation for the anti-gentrification impact of church social services is that churches with higher levels of social services may attune their mid- and higher-income church attendees to the challenges of low-income residents to stay in the neighborhood (or attract such attendees), leading to less displacement-inducing actions on their part (such as buying up depressed properties) and taking on more aggressive advocating positions for anti-displacement initiatives. While more research is required to identify the specific mechanisms, church social services appear to be enabling low-income residents stay in their neighborhoods, thereby slowing gentrification. Additional research is also required to determine if there are interactive effects between a church's social services and the geographic dispersion of its attendees. For example, are social services offered by neighborhood churches more effective in meeting neighborhood needs compared to commuter churches?

5.5.2 Bridging Index

This study found dramatically differing impacts between socially oriented and politically oriented bridging social capital generation. Recall that the former is associated with connecting churches with those of relatively equal power such as local nonprofits or parents with school-age children, whereas the latter is focused on linking to unequal sources of power such as those found in the political system. Partial support for Hypothesis 3 which states that "higher bridging social capital generation in a church will be associated with increased neighborhood upgrading and gentrification" was found in

that socially oriented bridging activities (but not politically oriented bridging) are marginally associated with increases in Gentrification in metro areas (model 1). However, social bridging was also found to be associated with increases in neighborhood Decline (model 3) along with negative effects on income change (model 5). The negative income effects are likely related to reductions in the amount of white influx associated with church social bridging activities (model 6). These findings are consistent with model 4 showing that socially oriented bridging activities create more neighborhood change in low-income neighborhoods. Taking all model findings together, socially oriented bridging activities tend to further drive Decline and Gentrification in low-income neighborhoods, but more research is required to understand the conditions driving the association with neighborhood Decline versus Gentrification.

Politically oriented bridging, or linking, has the opposite effect of socially oriented bridging: linking activities are associated with reductions in neighborhood Decline (model 3) and more Stable low-income neighborhoods (model 4). And while this type of linking activity was not found to be associated with Gentrification, it does have a positive effect on income change (model 5) and is associated with higher levels of white influx (model 6). This could point to the beginnings of gentrification as neighborhood decline is stemmed, incomes rise, and the white population increases.

Churches must exercise caution as they generate bridging social capital, as both political and social forms appear to hold promise as well as danger. On the balance,

politically oriented bridging appears to have a more positive overall impact on neighborhood change compared to socially oriented bridging. Unfortunately, churches have lower political compared to social Bridging index values (.205 vs. .306 predicted in 1990, respectively, see Table 15 above), and Bridging (political) is heavily skewed (see Figure 4 above) with most churches engaging in very low levels of this type of activity.

5.5.3 Bonding Index

This study found no support for Hypothesis 4 which states that "higher bonding social capital generation in a church will be associated with increased neighborhood Stability and Decline". I found no association between church bonding and neighborhood Decline (model 3), but a positive association with more change (model 4), contrary to Hypothesis 4. Church bonding activities are also associated with higher levels of income change in low and very low-income neighborhoods (model 5), as well as higher rates of white influx (model 6). While not enough to trigger an association with Gentrification, churches with higher Bonding Index values may be leaving the door open to gentrification in some neighborhoods and not doing enough to stem decline in other neighborhoods.

These mixed results point to a complex relationship between bonding and bridging social capital within a church context. While the literature supports the conventional wisdom that churches heavy in bonding social capital will be less neighborhood- and outward-oriented than those strong in bridging social capital, other

research finds that involvement in church-oriented activities can help develop civic skills (Djupe & Gilbert, 2006; Schwadel, 2002) and drive increased social justice involvement (Houston & Todd, 2013), both of which are decidedly outward-oriented activities. My findings are in line with this later research, indicating a positive association between Bonding social capital generation and more neighborhood change, higher levels of income change, and higher rates of white influx (similar to my findings for politically oriented Bridging social capital generation in the previous section). This study found a more complex picture, compared to conventional wisdom, pointing to bonding social capital functioning in churches as a mediator of civic engagement, producing outcomes like those seen with politically oriented bridging social capital generation.

5.5.4 POORPCT

This study found that churches with higher percentages of poor are associated with less Gentrification (model 1), more neighborhood Decline (model 3), less positive income change (model 5), and less white influx (model 6). Together, the effect may be similar to the anti-displacement effect of the Social Service Index above, not only for the attenders, but potentially for other poor in the neighborhood as well. One potential explanation for this anti-displacement effect is that these lower-income attendees are able to connect more directly into the social capital and social services provided by the church. The economic diversity in the church may also help attune mid- and higher-income church attendees to the challenges of low-income residents to stay in the

neighborhood (or attract such attendees), leading to less displacement-inducing actions on their part (such as buying up depressed properties) and taking on more aggressive advocating positions for anti-displacement initiatives. However, more research is required to determine the specific mechanisms that connect higher rates of poor church attendees with less gentrification.

5.5.5 RICHPCT

Higher percentages of rich in a church are associated with more stable neighborhoods (model 4) with less instances of Decline (model 3) and higher neighborhood income change as well (model 5). Interestingly, RICHPCT is not associated with higher rates of Gentrification, something explained by looking at the White Affluent cluster: churches in this cluster not only have the highest percentages of rich (see Table 19), but they are also located in higher income neighborhoods which by Landis' definition, cannot Gentrify.

5.5.6 WHITEPCT

The impact of a church's demographic makeup on a neighborhood is complex and often operates indirectly by amplifying or attenuating neighborhood socioeconomic forces. The discussion above on church and neighborhood segregation and diversity is particularly relevant here, highlighting mismatches between a church and its neighborhood's demographics. (Recall that 87% of churches are less diverse than the

neighborhood in which they are located, church segregation is roughly 1.6 times greater than neighborhood segregation, and approximately 20-25% of churches are 80% or greater white but located in neighborhoods with less than 80% whites.)

This study found that a higher percentage of whites in churches located in predominantly non-white neighborhoods is associated with more neighborhood change of all types including Gentrification, Upgrading, and Decline. I find support for Hypothesis 1 that states "churches in which the percentage of white attenders is higher than the surrounding community will be associated with increased neighborhood gentrification", but only in non-white neighborhoods, here defined as less than the CBSA median percentage of whites. Building on the concept of churches as voluntary associations of individuals seeking "their people" (homophily), my premise is that the white church serves as a signal to potential gentrifiers that the neighborhood is turning the "right" direction and safe to move into. Dias & Beaumonth (2010, p. 277) provide such an example with a well-meaning Mennonite congregation in West Philadelphia that began to worry about "aiding and abetting gentrification" because of their "visible resemblance to the encroachers" and concern that they "had paved the way for new white residents". Bielo (2011) goes so far as to label white, middle-class Evangelicals planting churches in low-income urban neighborhoods as "gentrifiers". From a theoretical perspective, because the white church may function as a cultural amenity (Ley, 1994) leading to cultural displacement (Hyra, 2015), it is squarely implicated in the

gentrification process. This explanation is bolstered by this study's finding that church WHITEPCT is positively associated with white influx, especially in very low income neighborhoods, and in neighborhoods that have a white percentage higher than the CBSA's mean. In addition, church WHITEPCT is positively (but not significantly) associated with increased income change in non-white neighborhoods.

In regards to the positive association between church whiteness and neighborhood Decline, the picture becomes more complex when considering that in non-white neighborhoods, church whiteness is associated with both increased Gentrification (discussed above) and Decline (Finding 24). In contrast to the mechanism of the church as a cultural amenity in the case of Gentrification, some white churches may be cultural "artifacts", clinging to declining neighborhoods that have already experienced white flight, unable to effectively fight against neighborhood decline. In many cases, the attendees have also taken part in white flight and are commuting back in to their old neighborhood church, further limiting their ability to influence the neighborhood (see discussion below on LONGDRIVEPCT for the "commuter" effect). In other cases, however, an opposite indirect effect is seen (Finding 25) as churches with higher percentages of whites help to stem Decline by strengthening the negative effect of neighborhood percentage white on neighborhood Decline. Here, the effect is indirect, pointing to a neighborhood context in which the neighborhood may already be coming

out of Decline, with increases in white residential percentages coinciding with the increased presence of a white church.

The effect of church WHITEPCT on neighborhood Upgrading is similarly indirect: as expected, a neighborhood's percentage white is positively associated with neighborhood Upgrading, but the effect is stronger in the presence of churches with higher percentages of whites. In both Upgrading and Decline, the whiteness of a neighborhood may be effecting change, but whiter churches seem to strengthen this effect.

The finding that church WHITEPCT is negatively associated with income change is at first glance inconsistent with the findings above indicating a positive association with Gentrification and Upgrading. However, recall from the discussion on church planting the "back to the city" movement of churches with locational decisions trending toward lower income communities (see Figure 8 above). In some cases, the placement of a white church in a lower-income neighborhood may aid and abet gentrification. The Statistical Matching analysis supports this view by finding that churches in both the White Middle and White Affluent church clusters have a causal effect of increasing a neighborhood's relative income change from 1990 to 2010 by 2-2.5 percentage points, but only in low-income neighborhoods. To put the magnitude of this effect into perspective, consider that Landis-style Gentrification requires a 20-percentage point increase in relative median income (2 deciles). Thus, these churches on average are

responsible for about 10% of the relative income growth required to trigger neighborhood Gentrification.

In some cases, however, the placement of a white church in a lower-income neighborhood may see that neighborhood continue its decline. In a troubling finding, White Middle cluster churches were found to have a causal effect of increasing poverty rates by approximately 1.4 percentage points in low-income neighborhoods (as well as increasing relative incomes as discussed above), pointing to a potential for increasing income inequality. Obviously more research is required to untangle the intersecting effects, particularly the relationship of churches (and more specifically the demographic composition of churches) with neighborhood inequality.

5.5.7 COLLEGEPCT

No support was found for Hypothesis 2 that states "churches in which the college graduation rate of attenders is higher than the surrounding community will be associated with increased neighborhood gentrification". However, the study did find significant effects from the interaction between church and neighborhood college graduate percentages. The primary effect is that a church's COLLEGEPCT is associated with more neighborhood change (model 4), particularly in low-income neighborhoods that already have a relatively high percentage of college educated residents, here defined as greater than the mean of the CBSA. While the specific type of neighborhood change is not specified in this model, the effect of more neighborhood change in low-

income neighborhoods resulting from higher percentages of residents who are college graduates is not surprising and fits into the general narrative of highly educated gentrifiers disrupting neighborhoods. Like the strengthening effect of white churches on Gentrification discussed above, churches with higher percentages of college graduates can strengthen the disruptive effect of college graduate residents on the census tract.

Again, the type of neighborhood change is not discernable in model 4. However, insight is available from model 6 where it was found that a church's college graduate percentage is negatively associated with white influx, serving as a dampening effect on the positive draw of college educated residents for whites to move into a neighborhood. Model 5 corroborates this ameliorating effect on white influx with a finding that church COLLEGEPCT is negatively associated with neighborhood income change (less positive income change). Thus, although a higher percentage of college graduate in a church cannot stem neighborhood change, it may help transform it to be slightly less "disruptive" (less white influx, for example). This salutary effect is hinted at in model 4 that found a small area of significant church and neighborhood college interaction in low-income, poorly educated neighborhoods. In these neighborhoods, a church's college graduate percentage is associated with less neighborhood change. However, as discussed above, this stabilizing effect disappears in highly educated neighborhoods.

5.5.8 DIVERSITY

This study found several positive effects from more diverse churches. Church DIVERSITY is associated with less neighborhood Stability (but not more Gentrification) in low-income neighborhoods, a finding corroborated and illuminated by the statistical matching analysis: churches in the Diverse cluster have a causal effect of increasing relative income change from 1990 to 2010 by 6.7 percentage points in low-income neighborhoods, substantially more than the 2-2.5 points from the White church clusters and the zero-effect seen with the Black church cluster. Church DIVERSITY is also associated with less white influx (model 6), potentially helping to stem race-based displacement in all types of neighborhoods, including low and very low-income neighborhoods. A potential explanation for the anti-displacement effect is that Diverse churches provide relatively high levels of social services (see Table 19) which we have determined previously as having an anti-displacement effect in low-income neighborhoods. Others have noted local congregations to be sources of resistance, functioning as a resource for diverse neighborhoods to avoid racial tipping (Numrich, 2015; Schelling, 1971). While the anti-displacement effect found in my study is reassuring, more research is required to determine if there are conditions under which Diverse churches may in fact be contributing to gentrification, especially considering the large 6.7 percentage point increase in relative median income discussed above. Unfortunately, the Diverse church cluster (see Table 19 above) is the smallest at 9% of

all churches in 1990, compared to 24% Black, 15% White Affluent, and 52% White Middle. The relative size of the Diverse cluster only rose to 11% as of 2006/2012 (see Table 18 above). And while church diversity is increasing (this study; Dougherty & Emerson, 2018), the percentage of churches that are less diverse than their neighborhoods is high and essentially flat from 1998 to 2012 (see Table 28). The challenge, therefore, is to grow the number of Diverse churches without losing their salutary effect.

5.5.9 LONGDRIVEPCT

LONGDRIVEPCT is a blunt instrument as it measures the percentage of church attendees that must drive 30 minutes or more to church. Ideally the NCS data would include more granular measures – measures which were in fact included in the 1998 survey, but subsequently dropped in 2006 and 2012. Nonetheless, LONGDRIVEPCT is a rough proxy for the geographic dispersion of attendees, enabling approximate differentiation of neighborhood/parish-based churches from metro/commuter churches (Ebaugh et al., 2000) but lacking the subtlety to detect Sinha's (2007) three-fold geographic categorization.

This study found support for Hypothesis 6 that states “churches with more geographically dispersed attendees will be associated with increased neighborhood Stability”. Whether this stability is a desirable effect or not depends on the state of the neighborhood and the type of change avoided. For example, this study found that under

certain circumstances, more geographically dispersed congregations are associated with less Gentrification: Models 1a and 1b indicate that more geographically dispersed metro-area churches comprised of lower than median percentages of whites are associated with less Gentrification, with no association found for whiter churches. Potentially these non-white church members may have already been displaced but continue to commute into their old neighborhood which was already well along the gentrification process at the start of the study period (and therefore appears to have a lower rate of Gentrification during our study period). An alternate interpretation is that the white members of these churches are more attuned to the struggles of their non-white co-congregants to stay in their neighborhoods (or the church attracts such attendees). These white members may therefore choose to commute in to church rather than move into the neighborhood and contribute to gentrification. The anti-Gentrification impact of these relatively non-white churches is consistent with the findings in section 5.2.7.5 where the density of Black churches at the CBSA-level is associated with less Gentrification in neighborhoods.

What about predominantly white churches and geographic dispersion? No direct tie to Landis-style neighborhood Gentrification was found in the study, but model 6 indicates that white, geographically dispersed congregations are associated with less neighborhood white influx, especially in low and very low-income neighborhoods. This is particularly important considering the findings from section 5.5.6 that indicate a positive

association between a church's percentage white and white influx into the neighborhood. The implication is that whites who choose to commute in to churches rather than move into the church's non-white neighborhood may help slow down gentrification by reducing the amount of race-based displacement in the neighborhood.

Turning our attention to neighborhoods in Decline (recalling that this is the most prevalent form of neighborhood change after Stability), model 5 shows that geographically-dispersed congregations are associated with less positive income change in low and very low-income neighborhoods. Unfortunately, while these commuter-style churches may not be contributing to Gentrification, neither are they helping Declining neighborhoods become healthy.

6 Conclusion

This study examined the role of local churches in neighborhood change, analyzing the relationship between Christian churches and changes in median incomes from 1990 to 2010 in the census tract in which each church is located. Based on a nationally representative sample of churches from 2006 and 2012, the study uses hierarchical linear modeling and statistical matching techniques to analyze how key church characteristics such as social service involvement, social capital generation, residential patterns of attendees, and demographic composition are related to changes in neighborhoods. Two primary research questions were addressed: 1) How have patterns of church location changed with respect to neighborhood types, and 2) How do churches impact neighborhood change?

6.1 Summary of Findings: Research Question 1

The percentage of churches nationally in Gentrifying neighborhoods dropped slightly from 10.4% to 8.4% from 1998 to 2012. However, even with the drop, churches were still overrepresented in Gentrifying neighborhoods in 2012, and slightly underrepresented in Declining neighborhoods. Church planting practices have changed dramatically from the 1980s to the 2000s, eschewing higher-income Upgrading neighborhoods for lower-income neighborhoods. While there appears to have been an effort to start more churches in Declining neighborhoods in the 2000s, there was also a renewed effort to start churches in lower income Gentrifying neighborhoods, thereby

reinforcing the overrepresentation of churches in Gentrifying neighborhoods. With this "back to the city" movement, new church locations have shifted from predominantly up-and-coming higher income neighborhoods in the 1980s, to "grittier" and perhaps "cooler" lower-income neighborhoods in the 2000s, some of which were already gentrifying, while others remained in the throes of decline.

While there may be some reason to celebrate the increasing racial diversity of churches, my findings temper this enthusiasm with the observation that church segregation remains stubbornly high, with just a small drop from 1998 to 2012. Nationally, churches on average are 1.6 times more segregated than neighborhoods. This gap between church and neighborhood is even more stark when considering the racial diversity of churches and neighborhoods: 87% of churches nationwide are less diverse than the neighborhood in which they are located, a figure that has not changed substantially from 1998 to 2012.

See Appendix C for a complete list of study findings for research question 1, which are described in Findings 5 through 10.

6.2 Summary of Findings: Research Question 2

The title of this study asks, "Can churches change a neighborhood?" My findings indicate that they can along many fronts (see section 5.5 above for a complete discussion of the findings summarized here). The impact of a church's demographic makeup on a neighborhood is complex and often operates indirectly by amplifying or

attenuating neighborhood socioeconomic forces. This study found that a higher percentage of whites in churches located in predominantly non-white neighborhoods is associated with more neighborhood change such as Gentrification and Upgrading, and less neighborhood Decline. White churches are also positively associated with higher levels of white influx into the neighborhood, especially in very low-income neighborhoods and in neighborhoods that have a white percentage higher than its CBSA's mean. These churches also caused about 10% of the neighborhood income growth required to trigger neighborhood Gentrification. My conclusion is that local churches are implicated in the gentrification process, potentially serving as a signal to gentrifiers that the neighborhood is turning in the "right" direction and is safe to move into.

I found that although church social services neither stem neighborhood Decline nor necessarily improve the economic status of neighborhoods, there is evidence for a stabilizing, anti-displacement effect: church social services appear to be enabling low-income residents to stay in their neighborhoods, thereby slowing gentrification. In addition to providing material resources such as food, clothing, and financial assistance to help residents stay in their homes, these services may provide a connection for lower-income residents into the social capital being generated by the church, which in turn can aid in fighting against displacement. Churches that provide higher levels of social services may also attune their middle- and higher-income attendees to the

challenges low-income residents face in their efforts to stay in their neighborhoods, or these churches may attract attendees with this social awareness already in place. Such social awareness may lead to less displacement-inducing actions such as buying up depressed properties, as well as more aggressive advocating positions for anti-displacement initiatives. More research is required to determine the specific mechanisms that connect higher rates of social services with less gentrification.

This study found dramatically differing impacts between socially oriented and politically oriented bridging social capital. Recall that the former is associated with connecting churches with those of relatively equal power such as neighborhood nonprofits and local parents, whereas the latter is focused on linking to unequal sources of power such as those found in the political system. Socially oriented bridging activities are associated with increases in Gentrification in metropolitan areas, but also with more neighborhood Decline and less white influx. Politically oriented bridging, or linking, has the opposite effects and is associated with reductions in neighborhood Decline and more Stable low-income neighborhoods. And while linking was not found to be associated with Gentrification, it does have a positive effect on income change and is also associated with higher levels of white influx. This could point to the beginnings of gentrification as neighborhood decline is stemmed, incomes rise, and the white population increases. Churches must therefore exercise caution as they generate bridging social capital, as both political and social forms appear to hold promise as well

as danger. On the balance, politically oriented bridging appears to have a more positive overall impact on neighborhood change than socially oriented bridging.

Instead of the expected association between church bonding activities and less neighborhood change or more decline, my study found a positive association with more change and no association with Decline. Church bonding activities are associated with greater income change in low- and very low-income neighborhoods as well as higher rates of white influx. While not enough to trigger an association with Gentrification, churches with more bonding activities may be leaving the door open to gentrification in some neighborhoods, and not doing enough to stem decline in others. These results point to a more complex relationship between bonding and bridging social capital than the standard trope of "churches heavy in bonding social capital will be less neighborhood- and outward-oriented than those strong in bridging social capital." Instead, this study points to bonding social capital functioning in churches as a mediator of civic engagement, producing outcomes like those seen with politically oriented bridging social capital generation.

Churches with higher percentages of poor attendees are associated with less Gentrification and less white influx. This effect may be like the anti-displacement effect of church social services discussed above: these lower-income attendees may be able to connect more directly into the social capital and social services provided by the church, enabling them to stay in their residences. The economic diversity in these churches may

also help attune middle- and higher-income church attendees to the challenges low-income residents face to stay in their neighborhoods (or attract such attendees), leading to less displacement-inducing actions on their part, such as buying up depressed properties, and taking on more aggressive advocating positions for anti-displacement initiatives. However, more research is required to determine the specific mechanisms that connect higher rates of poor church attendees with less gentrification.

Churches with higher levels of racial diversity are associated with less white influx, potentially helping to stem race-based displacement in all types of neighborhoods, including low and very low-income neighborhoods. Again, uncovering the specific mechanisms leading to less white influx requires additional research, but the increased racial diversity may function like that of increased economic diversity described above, with less displacement-inducing actions and more aggressive advocating against displacement.

Under certain circumstances, more geographically dispersed congregations are associated with less Gentrification and white influx. For example, this study found that in metropolitan areas, more geographically dispersed churches that are not predominantly white are associated with less Gentrification. Potentially, these non-white church members may have already been displaced but continue to commute into their old neighborhood which had already been gentrified at the beginning of the interval I studied (1990). An alternate interpretation is that the white attendees of

these churches are more attuned to the struggles their non-white fellow congregants face to stay in their neighborhoods (or the church may attract such attendees), resulting in decisions to commute in to church rather than move into the neighborhood and contribute to gentrification. They may also be more motivated to engage in anti-displacement advocating. The anti-Gentrification impact of these relatively non-white churches is consistent with my finding that a higher density of Black churches at the CBSA level is associated with less Gentrification in neighborhoods within that CBSA.

What about predominantly white churches and geographic dispersion? More geographically dispersed white congregations are associated with less neighborhood white influx, especially in low- and very low-income neighborhoods. Thus, whites who choose to commute to churches in these low-income neighborhoods rather than relocate may help slow down gentrification by limiting white influx and reducing displacement pressures. This finding is sure to be troubling to well-intentioned church planters and attendees who have a genuine desire to help these neighborhoods thrive. More on this when implications are discussed below.

Looking at neighborhoods in Decline, I found that geographically-dispersed congregations are associated with less positive income change in low- and very low-income neighborhoods. My study finds that while more geographically dispersed, commuter-style churches may not be contributing to Gentrification, neither are they helping Declining neighborhoods become healthy.

Table 33 below provides a summary of findings for my study's six hypotheses.

For a complete listing of study findings see Appendix C.

Table 33: Summary of hypotheses findings

	Hypothesis	Summary of Findings
H1	Churches in which the percentage of white attenders is higher than the surrounding community will be associated with increased neighborhood gentrification	Support found. A higher church white percentage in non-white neighborhoods is associated with more neighborhood Gentrification. On average white churches in low-income neighborhoods are responsible for about 10% of the relative income growth required to trigger gentrification. See section 5.5.6 for more details.
H2	Churches in which the college graduation rate of attenders is higher than the surrounding community will be associated with increased neighborhood gentrification.	No support found. Instead found that a church's college graduate percentage is negatively associated with white influx, serving as a dampening effect on the positive draw of college educated residents for whites to move into a neighborhood. See section 5.5.7 for more details.
H3	Higher bridging social capital generation in a church will be associated with increased neighborhood upgrading and gentrification.	Partial support found. Socially oriented bridging activities are marginally associated with increases in Gentrification in metro areas. However, they also appear to drive Decline in low-income neighborhoods. Politically oriented bridging, or linking activities, have the opposite effect and are associated with reductions in neighborhood Decline and more Stable low-income neighborhoods. See section 5.5.2 for more details.
H4	Higher bonding social capital generation in a church will be associated with increased neighborhood stability and decline.	No support found. Instead found a positive association with more neighborhood change. Found support for bonding social capital functioning as a mediator of civic engagement. See section 5.5.3 for more details.
H5	Churches with higher social-service indexes will be associated with less neighborhood decline.	No support found. However, found evidence for an anti-displacement, anti-Gentrification effect from church social services. See section 5.5.1 for more details.
H6	Churches with more geographically dispersed attendees will be associated with increased neighborhood stability.	Support found. More geographically dispersed non-white congregations are associated with less Gentrification. More dispersed white congregations are associated with less white influx into neighborhoods. While these commuter-style churches may not be contributing to

	Gentrification, neither are they helping Declining neighborhoods to become healthy. See section 5.5.9 for more details.

6.3 Implications for Church Leaders

This study invites church leaders to consider both how churches relate to individuals and how they interact with social processes in their communities. My hope is that this research will help connect local faith communities with the worlds of community and economic development, leading church leaders and participants to ask hard questions about the role of churches in their communities, realizing that the impacts go far beyond the spiritual and the intentional. This study shows that churches do, in fact, impact their neighborhoods' socioeconomic trajectories, sometimes positively, other times negatively. For example, the anti-gentrification, anti-displacement impact of social services deserves more attention and investigation. While churches and researchers may bemoan slow progress in lifting people out of poverty, perhaps that is not the ultimate benefit of these services. Church social services can be more focused on helping low-income residents keep their homes, strengthening the anti-gentrification impact. Churches should also examine how their programs and activities generate social capital and the implications of that social capital: bridging activities that link congregations to the larger political and economic systems appear to have the most beneficial impacts for surrounding neighborhoods, a definite challenge for church leaders who may be uncomfortable interacting with those systems.

Particularly urgent is the need for church leaders, especially those starting new churches, to realize that their choices can either resist or reinforce general urban trends that have resulted in the displacement of marginalized populations and increasing economic inequality. For example, this study's finding that white churches in predominantly non-white neighborhoods can contribute to gentrification by acting as a beacon or an amenity for gentrifiers is troubling news, but it shines a necessary light on an understudied and little-understood phenomenon. Similarly, the choice to commute or relocate into a neighborhood to attend church needs careful deliberation, given my study's finding that white churches with more dispersed attendees can lessen white influx, especially in low-income neighborhoods. Given the varied impacts highlighted in this study, church leaders should consider doing a "community impact study" prior to making location choices for new churches. Such a study could result in a decision to change locations, or pursue partnering with existing churches and institutions rather than starting a new church. At the very least, this process would sensitize church leaders to the context of the neighborhood and the potential benefits and pitfalls of a new church in the community. Periodic community impact studies can help churches track neighborhood changes and risk factors, informing needed course corrections as the church seeks to contribute to the welfare of the neighborhood and city.

6.4 Implications for Community Development and Economic Development Professionals

This study shows that local churches are important members of the local collective of actors that impact neighborhood health. While it is true that community asset maps often include faith communities, incorporating churches more deeply into community development plans requires more awareness of the unique capabilities that churches bring to communities. In addition to providing volunteers and being a community resource for space, churches are important sources of social capital, both with their potential to strengthen local bonds and encourage civic engagement, and their capacity to bridge and link with people, organizations, and power sources outside of their neighborhoods. As churches grow in awareness of their own role in hastening or slowing neighborhood change, community development and economic development practitioners can develop even deeper partnerships with local churches willing to invest in the welfare of their communities.

6.5 Summary of Theoretical Implications

My study provides empirical support for what I believe to be a new theoretical path linking neighborhoods and churches. Starting with the premise that neighborhood change is a result of both local and extra-local forces, local institutions are posited as having a critical role in determining neighborhood trajectories (Betancur & Smith, 2016; Landis, 2016; Ley & Martin, 1993; Smith, 1979). Churches, important but often

overlooked local institutions, are conceptualized as institutions within an ecological framework (Douglass & Brunner, 1935), as social capital generators (Putnam, 2001), and as voluntary associations along an axis of affinity (Ammerman, 1997; Putnam, 2001). These local churches impact neighborhoods through the mechanisms of social service delivery, economic impacts, social capital generation, and through the influence of attendee demographics and residential patterns. Figure 24 provides a graphical representation of this theoretical linkage.

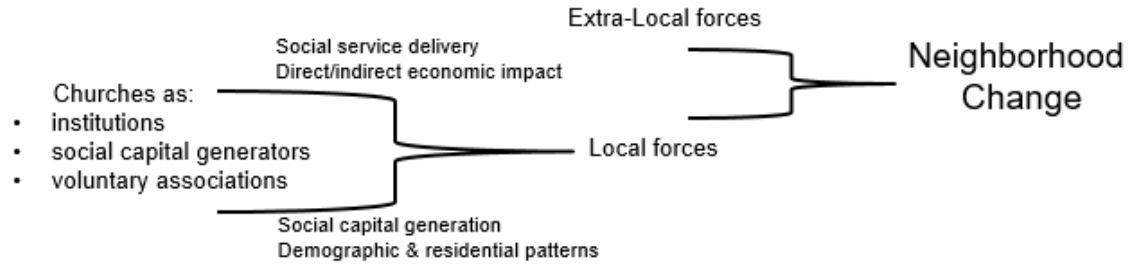

Figure 24: Theoretical linkage between churches and neighborhood change

6.6 Study Limitations

My study's use of Landis' 3-D method to analyze neighborhood change provides important benefits but entails several limitations as well. For example, the use of change in median income as the primary dependent variable misses important cultural, demographic, and political indicators of neighborhood change. I have been somewhat able to address this limitation by incorporating an analysis of white influx to account for

demographic changes. Furthermore, my study does not provide insight directly into the wellbeing of individuals in those neighborhoods. While this represents a potential area of expansion for my study, the challenges of operationalizing neighborhood change flexibly and broadly, as provided by my study, is at odds with the multitude of potential measures (and data sources) of individual wellbeing that are typically found in the neighborhood effects literature. While my study's 20-year timeframe to measure change will filter out anomalous short-term changes, I may also be missing important neighborhood transitions that occur within the 20-year study window. Finally, the use of census tracts to define a neighborhood artificially restricts the analysis of church impacts, which most certainly extend beyond official boundary lines.

This study measures church impacts in a very specific manner. The impact of churches is much broader, so this study cannot be used to assess the net positive or negative contribution of churches to neighborhoods or our society in general. Because this is a large sample statistical study, I cannot provide detailed accounts of how specific churches impact their neighborhoods. For example, while I can make claims about the anti-displacement impact of social services, further research is required to identify the types of social services that have this impact, and which types may not.

6.7 Future Research Implications

This study provides a broad assessment of the impact of churches on neighborhood change. As discussed in section 3.3.1.1, my primary source of church data supports

directional claims of association and impact (e.g. “Increased likelihood of gentrification” rather than “X% more likely to gentrify”). Future research could focus on specific neighborhoods and sets of churches, gathering more granular data on church characteristics not based solely on key informant interviews. These findings could be compared to my study’s predictions to develop a research framework that incorporates a spectrum of data availability, from high-level nationally representative data, to city-specific or neighborhood-specific data. By using common constructs and methods, researchers could maintain national-level views of church impact (like my study), and create community-specific views of church impact. This framework could be used, for example, to develop a replicable, scalable method to produce a community impact study for a church considering locating to a specific neighborhood. Such a framework could also incorporate mixed methods and qualitative research such as case studies and ethnographies to create a more complete picture of the interaction of church and neighborhood.

My bridging and bonding indices are an important step forward in characterizing the complex set of social capital generating activities in which churches engage. Future studies should use these indices, paying attention to their construct validity. For example, my structurally based social capital indices could be expanded by measuring the cognitive social capital (Krishna & Shrader, 1999) of individuals within the orbit of a church’s influence. This would shed light on the specific ways that church social capital

impacts neighborhoods, and, as an alternative measure of social capital, help to determine the construct validity of my bridging and bonding indices. My indices were also limited by data availability in the NCS. Ideally the indices would be extended to more clearly distinguish between linking social capital that focuses on structural change, and interpersonal bridging and bonding activities. This is particularly important because some Christian theologies, particularly Evangelical, focus extensively on personal relationships rather than relationships with institutions and powers. Indices that more clearly measure this distinction can help determine their relative impacts and benefits to the surrounding communities.

The relationship of a church's general political stance to its neighborhood impact points to an interesting set of potential research questions. While the NCS data does provide a simple assessment of where a church lies on the political spectrum, it was not incorporated into this study. Specifically, the interaction of a church's political stance with church activities such as social capital generation, could point to differences in approaches and impacts along the political spectrum.

The impact of church social services needs more study to understand the specific mechanisms that link these services with neighborhood change. The anti-displacement impact uncovered in my study is a promising finding, but future research should identify the specific types of social services that help residents stay in their neighborhoods. Additional research is also required to understand the interaction of social services with

the geographic dispersion of attendees as well as how demographic differences between attendees and neighborhood residents may impact the effectiveness of these services.

There is a significant gap in research on church locational decisions, with no nationally representative data available. While ongoing surveys such as the National Congregation Study will provide insight into long-term trends on the types of neighborhoods in which churches are located, more focused research on new churches, as well as churches that are closing, is required.

Finally, researchers of neighborhood change can do more to incorporate church effects into their studies, for example, to strengthen metrics to identify neighborhoods at greatest risk of gentrification or decline. A “neighborhood church impact metric” could be developed, using the research framework outlined above, to combine the collective impact of churches within a neighborhood as one predictor of neighborhood change. More empirical research is required, as are case studies on the role of churches in neighborhoods, but these studies should combine the efforts of theologians, church practitioners, scholars of religious institutions, and urban scholars, to recognize the vibrant intersection of community and church that this study has explored and exposed.

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Appendix A: HLM Regression Results

Table 34: Model 1a – Gentrify – No Interaction Terms

Multilevel Logistic Regression -- Gentrify (1990 - 2010)				
	All neighborhoods		Metro neighborhoods	
Predictors	*Log-Odds*	*p*	*Log-Odds*	*p*
(Intercept)	-7.19	<0.001	-7.28	<0.001
ReligousTraditionEvangelical	-0.72	0.352	-1.37	0.125
ReligousTraditionBlack Protestant	-0.22	0.842	-0.42	0.738
ReligousTraditionWhite Liberal	-0.91	0.225	-0.96	0.244
LONGDRIVEPCT	-0.64	0.126	-0.96	0.063
SOCIAL SERVICE Index	-0.86	0.077	-0.95	0.087
BRIDGING INDEX SOCIAL	1.05	0.136	1.42	0.106
BRIDGING INDEX POLITICAL	-0.25	0.730	-0.63	0.470
BONDING INDEX	0.07	0.872	-0.09	0.872
POORPCT	-1.69	<0.001	-1.91	<0.001
RICHPCT	0.39	0.475	0.45	0.467
DIFF WHITE	0.01	0.984	-0.08	0.898
DIFF COLLEGE	-0.67	0.132	-0.30	0.572
Rel Med income	-10.56	<0.001	-10.10	<0.001
Rel POVRATE	-3.64	<0.001	-3.67	0.001
Rel PCT Black	-2.63	0.011	-2.87	0.013
Rel PCT Hispanic	1.20	0.005	1.28	0.006
Rel PCT Foreign	-1.38	0.023	-1.68	0.015
Rel PCT Under 18	-1.69	0.003	-1.29	0.030
Rel Share multi units	-1.50	0.025	-0.81	0.301
Rel Med home val	1.70	0.077	1.46	0.164
Rel Med rent	-0.34	0.626	0.29	0.726
Rel PCT HOUSES OLDER 1960	-0.17	0.728	0.27	0.624
Surrounding PCT Gentrify	0.75	0.015	1.21	0.002
Surrounding PCT Upgrade	0.86	0.012	0.72	0.072
Surrounding PCT Decline	-2.00	0.002	-2.62	0.001
Rel Med income change 1970 1990	-1.81	<0.001	-2.08	0.001
CBSA AVG Med homeval	-0.23	0.878	-0.32	0.873
CBSA AVG Med homeval change 1990 2010	-1.06	0.129	-1.32	0.148
CBSA POP	0.74	0.610	2.07	0.297
CBSA POPGROWTH 1990 2010	0.10	0.923	-0.44	0.730
CBSA POVRATE	0.23	0.846	0.86	0.604
CBSA AVG Med income change 1990 2010	-0.11	0.899	-0.49	0.695
CBSA PCT HOUSES OLDER 1960	-1.41	0.253	-1.99	0.250
CBSA PCT College	-0.74	0.516	-0.59	0.673
CBSA PCT Foreign	-3.24	0.022	-3.94	0.026
CBSA PCT White	-2.84	0.031	-3.11	0.069
CBSA PCT Owner occupied	-0.79	0.454	-1.36	0.386
CBSA PCT Under 18	-2.71	0.003	-2.99	0.008

CBSA Church ADHRATE	-0.53	0.512	-0.55	0.635
CBSA EVANGELICAL CONGPER 1000	0.62	0.532	2.26	0.201
CBSA MAINLINE CONGPER 1000	1.08	0.159	0.93	0.475
CBSA CATHOLIC CONGPER 1000	1.26	0.170	1.83	0.243
CBSA BLACK CONGPER 1000	-1.56	0.021	-2.16	0.024
CBSA PCT Decline	-0.20	0.828	0.14	0.928
CBSA PCT Upgrade	-1.48	0.074	-1.69	0.179
CBSA PCT Gentrify	1.86	0.004	2.23	0.081
Random Effects				
σ^2	3.29		3.29	
τ_{00}	5.62 $_{CBSA}$		7.04 $_{CBSA}$	
ICC	0.63 $_{CBSA}$		0.68 $_{CBSA}$	
Observations	2088		1826	
Marginal R^2 / Conditional R^2	0.710 / 0.893		0.711 / 0.908	

Table 35: Model 1b – Gentrify – with interaction terms

Multilevel Logistic Regression -- Gentrify (1990 - 2010) -- w/interaction terms				
	All neighborhoods		Metro neighborhoods	
Predictors	*Log-Odds*	*p*	*Log-Odds*	*p*
(Intercept)	-7.65	<0.001	-8.29	<0.001
ReligousTraditionEvangelical	-1.26	0.146	-2.28	0.026
ReligousTraditionBlack Protestant	-0.76	0.578	-1.21	0.456
ReligousTraditionWhite Liberal	-1.77	0.041	-2.20	0.027
LONGDRIVEPCT	-0.78	0.181	-1.08	0.146
SOCIAL SERVICE Index	-0.93	0.090	-1.16	0.084
BRIDGING INDEX SOCIAL	0.85	0.279	2.09	0.054
BRIDGING INDEX POLITICAL	0.04	0.963	-1.12	0.281
BONDING INDEX	0.15	0.768	-0.41	0.527
WHITEPCT	-0.06	0.951	-0.57	0.625
COLLEGEPCT	-0.62	0.315	0.17	0.825
POORPCT	-2.49	<0.001	-3.06	<0.001
RICHPCT	-0.19	0.754	-0.23	0.741
DIVERSITY	0.11	0.867	0.06	0.938
Rel Med income	-14.04	<0.001	-16.29	<0.001
Rel POVRATE	-5.49	<0.001	-7.12	<0.001
Rel PCT White	-0.90	0.334	-1.13	0.308
Rel PCT Black	-3.21	0.007	-3.56	0.011
Rel PCT Hispanic	1.67	0.001	2.05	0.001
Rel PCT Foreign	-2.14	0.004	-2.75	0.003
Rel PCT College	2.33	0.013	3.12	0.008
Rel PCT Under 18	-1.95	0.005	-1.34	0.115
Rel Share multi units	-2.47	0.003	-2.28	0.027
Rel Med home val	0.78	0.484	-0.07	0.968
Rel Med rent	-0.48	0.563	0.50	0.660
Rel PCT HOUSES OLDER 1960	-0.28	0.622	-0.17	0.794
Surrounding PCT Gentrify	1.10	0.004	1.96	0.001
Surrounding PCT Upgrade	1.27	0.001	1.26	0.015
Surrounding PCT Decline	-1.91	0.006	-2.52	0.006
Rel Med income change 1970 1990	-1.91	<0.001	-2.02	0.004
CBSA AVG Med homeval	-0.34	0.843	-0.83	0.754
CBSA AVG Med homeval change 1990 2010	-1.19	0.117	-1.81	0.109
CBSA POP	0.86	0.601	1.81	0.451
CBSA POPGROWTH 1990 2010	-0.60	0.610	-1.62	0.306
CBSA POVRATE	0.13	0.928	0.88	0.675
CBSA AVG Med income change 1990 2010	-0.29	0.763	-0.97	0.518
CBSA PCT HOUSES OLDER 1960	-2.28	0.110	-3.45	0.126
CBSA PCT College	-0.55	0.676	0.19	0.920
CBSA PCT Foreign	-4.04	0.014	-4.92	0.027
CBSA PCT White	-3.15	0.031	-3.26	0.126
CBSA PCT Owner occupied	-1.16	0.337	-2.07	0.287

CBSA PCT Under 18	-3.00	0.005	-3.25	0.025
CBSA Church ADHRATE	-0.66	0.448	-0.14	0.925
CBSA EVANGELICAL CONGPER 1000	0.70	0.524	2.69	0.251
CBSA MAINLINE CONGPER 1000	1.24	0.148	0.85	0.601
CBSA CATHOLIC CONGPER 1000	1.55	0.115	2.06	0.270
CBSA BLACK CONGPER 1000	-1.70	0.030	-3.08	0.015
CBSA PCT Decline	-0.43	0.673	0.58	0.763
CBSA PCT Upgrade	-2.34	0.016	-3.20	0.058
CBSA PCT Gentrify	2.18	0.002	1.99	0.215
WHITEPCT:Rel_PCT_White	-2.83	0.001	-3.22	0.002
COLLEGEPCT:Rel_PCT_College	-1.52	0.117	-1.67	0.123
LONGDRIVEPCT:WHITEPCT	2.90	0.052	3.65	0.036
SOCIAL_SERVICE_Index:Rel_PCT_White	4.63	<0.001	5.41	<0.001
Random Effects				
σ^2	3.29		3.29	
τ_{00}	7.28 $_{CBSA}$		11.79 $_{CBSA}$	
ICC	0.69 $_{CBSA}$		0.78 $_{CBSA}$	
Observations	2088		1826	
Marginal R^2 / Conditional R^2	0.778 / 0.931		0.776 / 0.951	

Table 36: Model 2 – Upgrade

Multilevel Logistic Regression -- Upgrade (1990 - 2010)				
	All neighborhoods		Metro neighborhoods	
Predictors	*Log-Odds*	*p*	*Log-Odds*	*p*
(Intercept)	-7.33	<0.001	-8.82	<0.001
ReligousTraditionEvangelical	-0.16	0.869	0.29	0.788
ReligousTraditionBlack Protestant	0.00	1.000	-0.49	0.821
ReligousTraditionWhite Liberal	-0.80	0.393	-0.35	0.745
LONGDRIVEPCT	-1.06	0.162	-2.40	0.236
SOCIAL SERVICE Index	0.16	0.771	1.44	0.293
BRIDGING INDEX SOCIAL	0.52	0.505	-0.96	0.660
BRIDGING INDEX POLITICAL	-0.07	0.932	1.95	0.398
BONDING INDEX	0.57	0.283	1.08	0.518
WHITEPCT	-0.14	0.915	-2.33	0.303
COLLEGEPCT	0.91	0.146	1.73	0.216
POORPCT	0.35	0.394	1.08	0.367
RICHPCT	-1.38	0.074	-4.35	0.159
DIVERSITY	0.14	0.852	1.32	0.442
Rel Med income	-2.85	0.163	-7.04	0.047
Rel POVRATE	-1.98	0.272	-1.85	0.088
Rel PCT White	4.79	0.001	9.55	<0.001
Rel PCT Black	-2.72	0.226	-0.61	0.280
Rel PCT Hispanic	0.61	0.422	0.01	0.976
Rel PCT Foreign	1.24	0.037	1.17	0.013
Rel PCT College	-1.56	0.155	-1.36	0.173
Rel PCT Under 18	1.10	0.241	4.80	0.053
Rel Share multi units	-0.31	0.738	0.31	0.649
Rel Med home val	2.35	0.005	3.64	0.001
Rel Med rent	-1.88	0.034	-5.52	0.005
Rel PCT HOUSES OLDER 1960	-2.01	0.023	-2.13	0.008
Surrounding PCT Gentrify	0.19	0.606	1.25	0.433
Surrounding PCT Upgrade	0.82	0.003	5.13	0.001
Surrounding PCT Decline	-0.94	0.094	-3.39	0.083
Rel Med income change 1970 1990	0.65	0.190	2.96	0.029
CBSA AVG Med homeval	-1.43	0.301	-3.63	0.232
CBSA AVG Med homeval change 1990 2010	-0.76	0.324	-4.61	0.060
CBSA POP	-0.39	0.747	0.71	0.813
CBSA POPGROWTH 1990 2010	1.64	0.090	0.99	0.712
CBSA POVRATE	-0.05	0.957	-1.95	0.889
CBSA AVG Med income change 1990 2010	-0.39	0.594	8.03	0.201
CBSA PCT HOUSES OLDER 1960	0.64	0.578	1.41	0.791
CBSA PCT College	0.44	0.668	-7.74	0.445
CBSA PCT Foreign	0.00	1.000	7.74	0.455
CBSA PCT White	0.15	0.914	11.39	0.115
CBSA PCT Owner occupied	0.18	0.849	-11.31	0.279

CBSA PCT Under 18	-0.66	0.415	-7.01	0.718
CBSA Church ADHRATE	1.32	0.071	7.37	0.060
CBSA EVANGELICAL CONGPER 1000	0.52	0.514	0.87	0.553
CBSA MAINLINE CONGPER 1000	-0.34	0.667	-2.10	0.327
CBSA CATHOLIC CONGPER 1000	-0.66	0.464	-13.20	0.218
CBSA BLACK CONGPER 1000	-0.57	0.365	1.62	0.908
CBSA PCT Decline	-0.95	0.178	-0.25	0.982
CBSA PCT Upgrade	1.64	0.001	52.14	0.013
CBSA PCT Gentrify	0.71	0.181	12.04	0.349
WHITEPCT:Rel_PCT_White	2.59	0.091	8.32	0.031
COLLEGEPCT:Rel_PCT_College	1.28	0.192	2.32	0.167
LONGDRIVEPCT:WHITEPCT	-1.39	0.142	-8.83	0.020
Random Effects				
σ^2	3.29		3.29	
τ_{00}	1.83 $_{CBSA}$		2.01 $_{CBSA}$	
ICC	0.36 $_{CBSA}$		0.38 $_{CBSA}$	
Observations	2088		1826	
Marginal R^2 / Conditional R^2	0.708 / 0.812		0.797 / 0.874	

Table 37:Model 3 - Decline

Multilevel Logistic Regression -- Decline (1990 - 2010)				
	All neighborhoods		Metro neighborhoods	
Predictors	*Log-Odds*	*p*	*Log-Odds*	*p*
(Intercept)	-4.69	<0.001	-3.65	<0.001
ReligousTraditionEvangelical	-0.28	0.657	-1.34	0.046
ReligousTraditionBlack Protestant	0.44	0.637	0.09	0.927
ReligousTraditionWhite Liberal	0.09	0.883	-1.03	0.122
LONGDRIVEPCT	0.06	0.835	-0.26	0.716
SOCIAL SERVICE Index	0.22	0.539	-0.05	0.951
BRIDGING INDEX SOCIAL	0.78	0.133	2.69	0.042
BRIDGING INDEX POLITICAL	-0.93	0.065	-2.54	0.048
BONDING INDEX	0.49	0.131	1.56	0.105
WHITEPCT	1.09	0.128	2.10	0.078
COLLEGEPCT	-0.06	0.863	-0.20	0.776
POORPCT	0.74	0.006	1.22	0.089
RICHPCT	-1.04	0.008	-3.60	0.007
DIVERSITY	0.32	0.412	0.81	0.317
Rel Med income	4.41	<0.001	5.14	<0.001
Rel POVRATE	-5.56	<0.001	-3.42	<0.001
Rel PCT White	-1.90	0.003	-1.31	0.156
Rel PCT Black	1.04	0.032	0.53	<0.001
Rel PCT Hispanic	0.37	0.530	0.23	0.341
Rel PCT Foreign	-0.10	0.825	0.09	0.748
Rel PCT College	0.24	0.690	0.21	0.685
Rel PCT Under 18	0.07	0.887	1.93	0.080
Rel Share multi units	3.01	<0.001	2.08	<0.001
Rel Med home val	-3.87	<0.001	-3.35	<0.001
Rel Med rent	-0.19	0.682	-0.64	0.457
Rel PCT HOUSES OLDER 1960	-0.56	0.187	0.07	0.822
Surrounding PCT Gentrify	-1.55	0.001	-6.29	0.015
Surrounding PCT Upgrade	-0.39	0.216	-2.19	0.236
Surrounding PCT Decline	1.16	<0.001	4.93	<0.001
Rel Med income change 1970 1990	0.20	0.457	0.10	0.873
CBSA AVG Med homeval	-1.64	0.067	-2.95	0.055
CBSA AVG Med homeval change 1990 2010	-1.21	0.008	-1.10	0.275
CBSA POP	0.29	0.704	-0.97	0.449
CBSA POPGROWTH 1990 2010	-0.93	0.112	-2.27	0.050
CBSA POVRATE	-1.23	0.065	-19.07	0.012
CBSA AVG Med income change 1990 2010	1.59	0.001	7.71	0.011
CBSA PCT HOUSES OLDER 1960	-1.22	0.090	-4.35	0.104
CBSA PCT College	0.70	0.281	2.70	0.573
CBSA PCT Foreign	2.10	0.020	17.71	0.001
CBSA PCT White	-0.01	0.990	0.73	0.825
CBSA PCT Owner occupied	1.88	0.005	13.03	0.016

CBSA PCT Under 18	0.13	0.792	5.68	0.535
CBSA Church ADHRATE	-0.20	0.686	0.83	0.688
CBSA EVANGELICAL CONGPER 1000	0.30	0.565	1.36	0.137
CBSA MAINLINE CONGPER 1000	0.45	0.341	-0.20	0.865
CBSA CATHOLIC CONGPER 1000	-0.50	0.398	-9.50	0.126
CBSA BLACK CONGPER 1000	-0.16	0.711	-1.35	0.849
CBSA PCT Decline	1.18	0.008	8.08	0.164
CBSA PCT Upgrade	-0.24	0.423	-11.08	0.219
CBSA PCT Gentrify	0.22	0.498	-1.86	0.772
WHITEPCT:Rel_PCT_White	-1.97	0.010	-3.68	0.029
COLLEGEPCT:Rel_PCT_College	0.88	0.152	1.16	0.226
LONGDRIVEPCT:WHITEPCT	-0.49	0.345	-1.67	0.385
Random Effects				
σ^2	3.29		3.29	
τ_{00}	2.23 $_{CBSA}$		1.10 $_{CBSA}$	
ICC	0.40 $_{CBSA}$		0.25 $_{CBSA}$	
Observations	2088		1826	
Marginal R^2 / Conditional R^2	0.700 / 0.821		0.775 / 0.832	

Table 38: Model 4 – Stable

Multilevel Logistic Regression -- Stable (1990 - 2010)						
	All neighborhoods		Metro		Low income neighborhoods	
Predictors	*Log-Odds*	*p*	*Log-Odds*	*p*	*Log-Odds*	*p*
(Intercept)	1.85	<0.001	1.49	<0.001	0.84	0.241
ReligousTraditionEvangelical	0.66	0.088	1.00	0.015	1.61	0.019
ReligousTraditionBlack Protestant	-0.02	0.979	0.20	0.756	1.65	0.083
ReligousTraditionWhite Liberal	0.38	0.307	0.52	0.186	1.62	0.023
LONGDRIVEPCT	0.43	0.038	0.93	0.066	2.44	0.001
SOCIAL SERVICE Index	0.07	0.767	0.59	0.271	-0.37	0.668
BRIDGING INDEX SOCIAL	-0.49	0.146	-1.29	0.139	-3.43	0.020
BRIDGING INDEX POLITICAL	0.36	0.279	0.88	0.299	3.84	0.014
BONDING INDEX	-0.50	0.016	-0.73	0.230	-1.14	0.288
WHITEPCT	-0.93	0.038	-1.20	0.099	-0.68	0.539
COLLEGEPCT	0.16	0.504	0.21	0.663	-0.22	0.807
POORPCT	0.08	0.653	0.92	0.048	0.01	0.994
RICHPCT	0.53	0.022	1.80	0.020	0.18	0.909
DIVERSITY	-0.43	0.099	-1.05	0.052	-1.99	0.027
Rel Med income	0.26	0.690	1.47	0.136	-5.63	0.032
Rel POVRATE	2.29	<0.001	1.43	<0.001	0.49	0.285
Rel PCT White	0.92	0.019	0.92	0.094	1.21	0.175
Rel PCT Black	0.08	0.817	-0.02	0.856	0.03	0.828
Rel PCT Hispanic	-0.40	0.133	-0.18	0.088	-0.20	0.237
Rel PCT Foreign	0.41	0.110	0.21	0.208	0.23	0.380
Rel PCT College	-0.40	0.312	-0.61	0.082	-0.98	0.090
Rel PCT Under 18	0.84	0.009	0.58	0.405	2.20	0.052
Rel Share multi units	-0.53	0.086	-0.44	0.032	0.16	0.645
Rel Med home val	0.26	0.573	0.14	0.771	-1.93	0.083
Rel Med rent	0.70	0.030	1.12	0.066	6.13	<0.001
Rel PCT HOUSES OLDER 1960	1.01	<0.001	0.58	0.004	0.51	0.142
Surrounding PCT Gentrify	-0.25	0.164	-2.12	0.004	-2.05	0.065
Surrounding PCT Upgrade	-0.39	0.016	-2.06	0.023	-4.41	0.010
Surrounding PCT Decline	-0.42	0.022	-1.79	0.004	-0.56	0.623
Rel Med income change 1970 1990	0.09	0.621	-0.04	0.923	2.18	0.012
CBSA AVG Med homeval	1.06	0.135	1.76	0.203	-0.18	0.942
CBSA AVG Med homeval change 1990 2010	1.36	<0.001	2.47	0.006	3.05	0.047
CBSA POP	-0.39	0.538	0.56	0.634	-6.33	0.009
CBSA POPGROWTH 1990 2010	-0.14	0.764	0.29	0.782	-0.48	0.813
CBSA POVRATE	0.55	0.277	4.86	0.438	-6.10	0.577
CBSA AVG Med income change 1990 2010	-0.76	0.043	-3.03	0.258	0.00	0.999
CBSA PCT HOUSES OLDER 1960	0.70	0.223	2.67	0.263	5.42	0.203
CBSA PCT College	-0.58	0.262	-2.77	0.513	3.48	0.686
CBSA PCT Foreign	0.29	0.674	-0.46	0.921	18.81	0.037

CBSA PCT White	1.13	0.084	2.20	0.379	4.16	0.307
CBSA PCT Owner occupied	-0.31	0.539	-0.43	0.925	6.24	0.413
CBSA PCT Under 18	0.55	0.184	8.05	0.341	21.04	0.189
CBSA Church ADHRATE	0.05	0.893	-1.12	0.510	2.45	0.430
CBSA EVANGELICAL CONGPER 1000	-0.93	0.026	-1.60	0.046	-2.18	0.067
CBSA MAINLINE CONGPER 1000	-0.34	0.362	0.27	0.776	-0.98	0.479
CBSA CATHOLIC CONGPER 1000	-0.01	0.972	0.61	0.898	-8.38	0.235
CBSA BLACK CONGPER 1000	0.62	0.054	9.30	0.131	22.30	0.056
CBSA PCT Decline	-0.20	0.541	-5.68	0.228	8.26	0.171
CBSA PCT Upgrade	-0.14	0.544	5.64	0.424	1.06	0.881
CBSA PCT Gentrify	-0.73	0.006	-8.26	0.145	-21.32	0.003
WHITEPCT:Rel_PCT_White	1.32	0.002	2.43	0.006	2.52	0.072
COLLEGEPCT:Rel_PCT_College	-0.66	0.096	-0.73	0.225	-3.89	0.011
LONGDRIVEPCT:WHITEPCT	0.10	0.766	0.22	0.858	0.56	0.757
Random Effects						
σ^2	3.29		3.29		3.29	
τ_{00}	2.23 $_{CBSA}$		1.92 $_{CBSA}$		6.96 $_{CBSA}$	
ICC	0.40 $_{CBSA}$		0.37 $_{CBSA}$		0.68 $_{CBSA}$	
Observations	2088		1826		1125	
Marginal R^2 / Conditional R^2	0.368 / 0.624		0.406 / 0.625		0.480 / 0.833	

Table 39: Model 5 – Relative Median Income Change (1990-2010)

Multilevel Regression -- Median Income Change (1990 - 2010)						
	All neighborhoods		Low income neighborhoods		Very low income neighborhoods	
Predictors	*Estimates*	*p*	*Estimates*	*p*	*Estimates*	*p*
(Intercept)	0.01	0.662	0.04	0.030	0.06	0.003
ReligousTraditionEvangelical	-0.00	0.841	-0.00	0.827	-0.00	0.777
ReligousTraditionBlack Protestant	-0.04	0.043	-0.04	0.048	-0.05	0.021
ReligousTraditionWhite Liberal	-0.01	0.658	0.00	0.870	0.01	0.636
LONGDRIVEPCT	-0.01	0.137	-0.03	0.002	-0.02	0.073
SOCIAL SERVICE Index	-0.00	0.966	-0.01	0.192	-0.03	0.017
BRIDGING INDEX SOCIAL	-0.03	0.028	-0.02	0.155	-0.03	0.080
BRIDGING INDEX POLITICAL	0.03	0.032	0.03	0.063	0.03	0.051
BONDING INDEX	0.00	0.848	0.02	0.052	0.03	0.012
WHITEPCT	-0.03	0.039	-0.06	0.001	-0.03	0.114
COLLEGEPCT	-0.02	0.013	-0.02	0.216	-0.02	0.216
POORPCT	-0.02	0.007	-0.02	0.002	-0.03	0.001
RICHPCT	0.03	<0.001	0.03	0.022	0.04	0.003
DIVERSITY	-0.01	0.348	-0.01	0.222	-0.01	0.529
Rel Med income	-0.19	<0.001	-0.20	<0.001	-0.13	0.006
Rel POVRATE	0.01	0.635	-0.03	0.042	-0.02	0.171
Rel PCT White	0.02	0.254	-0.02	0.264	-0.00	0.890
Rel PCT Black	-0.01	0.343	-0.01	0.184	0.00	0.928
Rel PCT Hispanic	0.00	0.690	-0.00	0.602	0.01	0.106
Rel PCT Foreign	-0.02	0.036	-0.03	0.008	-0.03	0.006
Rel PCT College	0.02	0.184	0.07	<0.001	0.10	<0.001
Rel PCT Under 18	-0.01	0.333	-0.01	0.276	-0.02	0.179
Rel Share multi units	-0.10	<0.001	-0.09	<0.001	-0.08	<0.001
Rel Med home val	0.09	<0.001	0.07	0.002	0.05	0.033
Rel Med rent	-0.03	0.012	-0.04	0.012	-0.06	0.002
Rel PCT HOUSES OLDER 1960	-0.00	0.747	-0.03	0.008	-0.04	0.001
Surrounding PCT Gentrify	0.03	<0.001	0.02	0.014	0.01	0.147
Surrounding PCT Upgrade	0.04	<0.001	0.02	0.019	0.02	0.045
Surrounding PCT Decline	-0.08	<0.001	-0.09	<0.001	-0.12	<0.001
Rel Med income change 1970 1990	-0.02	0.019	-0.00	0.880	-0.02	0.103
CBSA AVG Med homeval	-0.02	0.557	0.00	0.940	0.02	0.657
CBSA AVG Med homeval change 1990 2010	-0.01	0.611	-0.03	0.090	-0.04	0.048
CBSA POP	0.01	0.596	0.01	0.778	0.01	0.701
CBSA POPGROWTH 1990 2010	0.02	0.381	0.04	0.070	0.03	0.163
CBSA POVRATE	-0.02	0.363	0.00	0.925	0.01	0.834
CBSA AVG Med income change 1990 2010	-0.02	0.274	-0.01	0.768	0.01	0.789
CBSA PCT HOUSES OLDER 1960	-0.00	1.000	-0.00	0.924	-0.00	0.905
CBSA PCT College	-0.01	0.519	-0.01	0.564	-0.02	0.470
CBSA PCT Foreign	-0.07	0.024	-0.02	0.507	-0.01	0.749
CBSA PCT White	-0.03	0.295	-0.02	0.611	-0.03	0.416

CBSA PCT Owner occupied	-0.04	0.063	0.01	0.606	0.00	0.891
CBSA PCT Under 18	-0.02	0.206	-0.03	0.132	-0.04	0.051
CBSA Church ADHRATE	0.01	0.649	0.01	0.757	-0.01	0.805
CBSA EVANGELICAL CONGPER 1000	-0.00	0.954	0.01	0.576	0.06	0.028
CBSA MAINLINE CONGPER 1000	-0.00	0.864	0.04	0.082	0.04	0.067
CBSA CATHOLIC CONGPER 1000	0.02	0.195	0.04	0.119	0.05	0.045
CBSA BLACK CONGPER 1000	-0.02	0.187	-0.04	0.036	-0.04	0.008
CBSA PCT Decline	-0.03	0.065	-0.01	0.562	0.01	0.548
CBSA PCT Upgrade	0.02	0.126	-0.00	0.869	-0.02	0.310
CBSA PCT Gentrify	0.01	0.554	-0.01	0.564	-0.00	0.911
WHITEPCT:Rel_PCT_White	-0.03	0.069	-0.06	<0.001	-0.02	0.245
COLLEGEPCT:Rel_PCT_College	-0.01	0.645	-0.01	0.742	-0.01	0.571
LONGDRIVEPCT:WHITEPCT	0.01	0.399	0.00	0.991	0.00	0.742
Random Effects						
σ^2	0.02		0.01		0.01	
τ_{00}	0.01_{CBSA}		0.01_{CBSA}		0.01_{CBSA}	
ICC	0.24_{CBSA}		0.34_{CBSA}		0.30_{CBSA}	
Observations	2088		1125		935	
Marginal R^2 / Conditional R^2	0.264 / 0.440		0.239 / 0.497		0.281 / 0.498	

Table 40: Model 5 – Relative Median Income Change (1990-2010) – Metro-areas only

Multilevel Regression -- Median Income Change (1990 - 2010)						
	All metro neighborhoods		Low income neighborhoods		Very low income neighborhoods	
Predictors	*Estimates*	*p*	*Estimates*	*p*	*Estimates*	*p*
(Intercept)	-0.00	0.967	0.05	0.007	0.07	<0.001
ReligousTraditionEvangelical	0.00	0.917	-0.02	0.208	-0.02	0.221
ReligousTraditionBlack Protestant	-0.03	0.069	-0.05	0.011	-0.05	0.012
ReligousTraditionWhite Liberal	0.01	0.597	0.01	0.661	0.02	0.339
LONGDRIVEPCT	-0.01	0.159	-0.03	0.002	-0.02	0.040
SOCIAL SERVICE Index	-0.00	0.963	-0.02	0.112	-0.03	0.009
BRIDGING INDEX SOCIAL	-0.03	0.014	-0.02	0.276	-0.02	0.168
BRIDGING INDEX POLITICAL	0.03	0.022	0.02	0.132	0.03	0.100
BONDING INDEX	-0.00	0.847	0.02	0.077	0.02	0.075
WHITEPCT	-0.03	0.023	-0.06	<0.001	-0.03	0.094
COLLEGEPCT	-0.02	0.040	-0.01	0.524	-0.01	0.493
POORPCT	-0.02	0.016	-0.02	0.007	-0.03	0.001
RICHPCT	0.03	<0.001	0.03	0.013	0.03	0.005
DIVERSITY	-0.01	0.490	-0.01	0.286	-0.01	0.555
Rel Med income	-0.17	<0.001	-0.18	<0.001	-0.08	0.078
Rel POVRATE	0.01	0.623	-0.04	0.034	-0.02	0.267
Rel PCT White	0.01	0.457	-0.01	0.588	0.01	0.572
Rel PCT Black	-0.02	0.065	-0.01	0.299	0.01	0.498
Rel PCT Hispanic	0.00	0.662	-0.00	0.841	0.02	0.028
Rel PCT Foreign	-0.02	0.007	-0.03	0.001	-0.04	0.001
Rel PCT College	0.01	0.321	0.07	<0.001	0.09	<0.001
Rel PCT Under 18	-0.01	0.523	-0.00	0.954	-0.01	0.564
Rel Share multi units	-0.07	<0.001	-0.06	<0.001	-0.06	<0.001
Rel Med home val	0.08	<0.001	0.05	0.037	0.02	0.379
Rel Med rent	-0.02	0.051	-0.02	0.254	-0.04	0.045
Rel PCT HOUSES OLDER 1960	0.00	0.913	-0.03	0.016	-0.03	0.001
Surrounding PCT Gentrify	0.03	<0.001	0.02	0.001	0.02	0.010
Surrounding PCT Upgrade	0.04	<0.001	0.03	0.008	0.02	0.063
Surrounding PCT Decline	-0.09	<0.001	-0.09	<0.001	-0.12	<0.001
Rel Med income change 1970 1990	0.00	0.758	0.02	0.122	-0.00	0.733
CBSA AVG Med homeval	-0.03	0.374	-0.03	0.464	-0.01	0.880
CBSA AVG Med homeval change 1990 2010	-0.01	0.504	-0.02	0.272	-0.03	0.111
CBSA POP	0.04	0.130	0.01	0.779	0.02	0.534
CBSA POPGROWTH 1990 2010	0.01	0.652	0.03	0.212	0.03	0.264
CBSA POVRATE	-0.02	0.563	-0.03	0.374	-0.00	0.898
CBSA AVG Med income change 1990 2010	-0.02	0.312	-0.02	0.514	0.00	0.877
CBSA PCT HOUSES OLDER 1960	-0.02	0.366	-0.03	0.389	-0.02	0.557
CBSA PCT College	-0.01	0.519	-0.01	0.576	-0.02	0.500
CBSA PCT Foreign	-0.08	0.009	-0.04	0.346	-0.02	0.499
CBSA PCT White	-0.04	0.274	-0.04	0.323	-0.05	0.145

CBSA PCT Owner occupied	-0.06	0.022	-0.02	0.512	-0.01	0.631
CBSA PCT Under 18	-0.03	0.137	-0.04	0.120	-0.04	0.072
CBSA Church ADHRATE	0.02	0.305	0.03	0.310	0.00	0.869
CBSA EVANGELICAL CONGPER 1000	-0.02	0.584	0.03	0.500	0.09	0.029
CBSA MAINLINE CONGPER 1000	0.01	0.590	0.01	0.612	0.02	0.493
CBSA CATHOLIC CONGPER 1000	0.02	0.454	0.02	0.442	0.04	0.165
CBSA BLACK CONGPER 1000	-0.03	0.044	-0.04	0.030	-0.05	0.012
CBSA PCT Decline	0.01	0.609	-0.02	0.557	0.00	0.904
CBSA PCT Upgrade	-0.00	0.875	0.00	0.949	-0.01	0.782
CBSA PCT Gentrify	-0.00	0.933	0.00	0.841	-0.00	0.913
WHITEPCT:Rel_PCT_White	-0.03	0.050	-0.06	0.001	-0.02	0.328
COLLEGEPCT:Rel_PCT_College	-0.02	0.253	-0.01	0.830	-0.01	0.727
LONGDRIVEPCT:WHITEPCT	0.00	0.635	-0.00	0.804	0.00	0.770
Random Effects						
σ^2	0.02		0.01		0.01	
τ_{00}	0.00_{CBSA}		0.01_{CBSA}		0.00_{CBSA}	
ICC	0.21_{CBSA}		0.32_{CBSA}		0.29_{CBSA}	
Observations	1826		992		825	
Marginal R^2 / Conditional R^2	0.303 / 0.449		0.259 / 0.498		0.304 / 0.503	

Table 41: Model 6 – Difference in neighborhood %white (1990-2010)

Multilevel Regression -- Diff in white neighborhood % (1990 - 2010)						
	All neighborhoods		Low income neighborhoods		Very low income neighborhoods	
Predictors	*Estimates*	*p*	*Estimates*	*p*	*Estimates*	*p*
(Intercept)	0.01	0.080	0.02	0.075	0.01	0.589
ReligousTraditionEvangelical	-0.03	<0.001	-0.05	<0.001	-0.05	<0.001
ReligousTraditionBlack Protestant	-0.02	0.096	-0.03	0.081	-0.03	0.169
ReligousTraditionWhite Liberal	-0.02	0.011	-0.03	0.051	-0.03	0.061
CBSA Change pct white 1990 2010	0.08	<0.001	0.07	<0.001	0.07	0.001
LONGDRIVEPCT	-0.01	0.030	-0.02	0.011	-0.02	0.017
SOCIAL SERVICE Index	0.01	0.250	0.01	0.097	0.01	0.597
BRIDGING INDEX SOCIAL	-0.02	0.010	-0.05	0.001	-0.05	<0.001
BRIDGING INDEX POLITICAL	0.02	0.057	0.04	0.008	0.05	0.001
BONDING INDEX	0.01	0.040	0.02	0.009	0.02	0.020
WHITEPCT	-0.00	0.799	0.00	0.901	0.03	0.097
COLLEGEPCT	0.00	0.792	-0.01	0.271	-0.01	0.208
POORPCT	-0.01	0.086	-0.00	0.482	-0.01	0.334
RICHPCT	0.01	0.212	0.01	0.139	0.01	0.201
DIVERSITY	-0.03	<0.001	-0.03	0.001	-0.02	0.028
Rel Med income	0.01	0.456	-0.02	0.527	-0.02	0.572
Rel POVRATE	0.04	<0.001	0.03	0.057	0.03	0.032
Rel PCT White	-0.10	<0.001	-0.14	<0.001	-0.14	<0.001
Rel PCT Black	0.01	0.027	0.01	0.456	0.01	0.198
Rel PCT Hispanic	-0.01	0.303	0.00	0.584	0.02	0.022
Rel PCT Foreign	-0.04	<0.001	-0.03	<0.001	-0.04	<0.001
Rel PCT College	0.06	<0.001	0.12	<0.001	0.11	<0.001
Rel PCT Under 18	-0.03	<0.001	-0.01	0.158	-0.02	0.037
Rel Share multi units	-0.06	<0.001	-0.06	<0.001	-0.05	<0.001
Rel Med home val	0.04	<0.001	0.03	0.170	0.00	0.851
Rel Med rent	-0.04	<0.001	-0.04	0.005	-0.00	0.842
Rel PCT HOUSES OLDER 1960	-0.01	0.033	-0.02	0.020	-0.02	0.009
Surrounding PCT Gentrify	0.02	<0.001	0.02	0.001	0.03	<0.001
Surrounding PCT Upgrade	0.01	0.030	0.03	<0.001	0.02	0.055
Surrounding PCT Decline	-0.02	<0.001	-0.03	0.003	-0.05	<0.001
Rel Med income change 1970 1990	0.02	<0.001	0.04	<0.001	0.04	<0.001
CBSA AVG Med homeval	0.01	0.518	-0.02	0.363	-0.02	0.572
CBSA AVG Med homeval change 1990 2010	0.00	0.646	-0.01	0.657	-0.00	0.770
CBSA POP	-0.03	0.039	-0.04	0.055	-0.05	0.090
CBSA POPGROWTH 1990 2010	0.00	0.944	0.02	0.255	0.02	0.247
CBSA POVRATE	-0.00	0.707	-0.01	0.511	-0.02	0.435
CBSA AVG Med income change 1990 2010	-0.00	0.867	0.00	0.824	0.00	0.988
CBSA PCT HOUSES OLDER 1960	0.00	0.881	0.01	0.733	-0.01	0.692
CBSA PCT College	0.00	0.713	0.02	0.289	0.02	0.325

CBSA PCT Foreign	-0.02	0.273	0.01	0.778	0.00	0.938
CBSA PCT White	-0.01	0.470	-0.01	0.652	-0.02	0.405
CBSA PCT Owner occupied	-0.01	0.507	-0.01	0.588	-0.01	0.594
CBSA PCT Under 18	-0.00	0.919	-0.01	0.697	-0.00	0.785
CBSA Church ADHRATE	-0.00	0.658	-0.01	0.443	-0.02	0.323
CBSA EVANGELICAL CONGPER 1000	0.01	0.366	0.04	0.037	0.05	0.029
CBSA MAINLINE CONGPER 1000	0.01	0.368	-0.00	0.953	0.00	0.910
CBSA CATHOLIC CONGPER 1000	0.00	0.964	0.02	0.355	0.03	0.124
CBSA BLACK CONGPER 1000	-0.03	<0.001	-0.03	0.022	-0.03	0.020
CBSA PCT Decline	0.01	0.459	0.01	0.341	0.03	0.068
CBSA PCT Upgrade	-0.00	0.465	-0.01	0.582	-0.01	0.440
CBSA PCT Gentrify	0.00	0.991	0.00	0.971	-0.00	0.891
WHITEPCT:Rel_PCT_White	0.04	<0.001	0.02	0.242	0.02	0.164
COLLEGEPCT:Rel_PCT_College	-0.02	0.016	-0.06	0.002	-0.04	0.060
LONGDRIVEPCT:WHITEPCT	-0.02	0.017	-0.02	0.092	-0.02	0.058
Random Effects						
σ^2	0.01		0.01		0.01	
τ_{00}	0.00 $_{CBSA}$		0.00 $_{CBSA}$		0.00 $_{CBSA}$	
ICC	0.12 $_{CBSA}$		0.17 $_{CBSA}$		0.26 $_{CBSA}$	
Observations	2088		1125		935	
Marginal R^2 / Conditional R^2	0.413 / 0.482		0.439 / 0.533		0.456 / 0.598	

Table 42: Model 6: Difference in neighborhood %white (1990-2010) – Metro-areas

Multilevel Regression -- Diff in white neighborhood % (1990 - 2010)						
	All metro neighborhoods		Low income neighborhoods		Very low income neighborhoods	
Predictors	*Estimates*	*p*	*Estimates*	*p*	*Estimates*	*p*
(Intercept)	0.02	0.057	0.03	0.053	0.01	0.588
ReligousTraditionEvangelical	-0.03	0.001	-0.05	<0.001	-0.05	0.001
ReligousTraditionBlack Protestant	-0.02	0.242	-0.04	0.070	-0.03	0.203
ReligousTraditionWhite Liberal	-0.02	0.040	-0.02	0.157	-0.02	0.172
CBSA Change pct white 1990 2010	0.07	<0.001	0.07	0.002	0.07	0.005
LONGDRIVEPCT	-0.01	0.209	-0.02	0.066	-0.02	0.060
SOCIAL SERVICE Index	0.01	0.173	0.01	0.160	0.00	0.708
BRIDGING INDEX SOCIAL	-0.03	0.003	-0.05	0.001	-0.06	0.001
BRIDGING INDEX POLITICAL	0.02	0.037	0.04	0.009	0.05	0.002
BONDING INDEX	0.01	0.116	0.02	0.021	0.02	0.047
WHITEPCT	0.00	0.809	-0.00	0.998	0.02	0.156
COLLEGEPCT	-0.00	0.971	-0.02	0.151	-0.02	0.170
POORPCT	-0.01	0.023	-0.01	0.378	-0.01	0.280
RICHPCT	0.01	0.232	0.02	0.116	0.02	0.161
DIVERSITY	-0.03	0.001	-0.03	0.003	-0.02	0.054
Rel Med income	-0.01	0.570	-0.06	0.131	-0.05	0.307
Rel POVRATE	0.04	<0.001	0.02	0.256	0.03	0.111
Rel PCT White	-0.10	<0.001	-0.13	<0.001	-0.14	<0.001
Rel PCT Black	0.01	0.116	0.01	0.281	0.01	0.164
Rel PCT Hispanic	-0.01	0.388	0.01	0.459	0.02	0.020
Rel PCT Foreign	-0.03	<0.001	-0.03	0.001	-0.04	<0.001
Rel PCT College	0.08	<0.001	0.14	<0.001	0.12	<0.001
Rel PCT Under 18	-0.02	0.005	-0.01	0.408	-0.02	0.087
Rel Share multi units	-0.07	<0.001	-0.07	<0.001	-0.06	<0.001
Rel Med home val	0.04	<0.001	0.03	0.201	0.00	0.859
Rel Med rent	-0.04	<0.001	-0.04	0.032	0.00	0.879
Rel PCT HOUSES OLDER 1960	-0.02	0.019	-0.03	0.008	-0.03	0.004
Surrounding PCT Gentrify	0.02	<0.001	0.02	0.003	0.03	<0.001
Surrounding PCT Upgrade	0.01	0.134	0.03	0.004	0.02	0.104
Surrounding PCT Decline	-0.03	<0.001	-0.02	0.020	-0.05	<0.001
Rel Med income change 1970 1990	0.03	<0.001	0.05	<0.001	0.05	<0.001
CBSA AVG Med homeval	0.03	0.094	0.01	0.757	0.01	0.863
CBSA AVG Med homeval change 1990 2010	0.01	0.438	-0.01	0.660	-0.01	0.749
CBSA POP	-0.05	0.010	-0.04	0.127	-0.04	0.200
CBSA POPGROWTH 1990 2010	-0.02	0.179	-0.00	0.941	0.01	0.653
CBSA POVRATE	0.01	0.524	-0.00	0.916	-0.00	0.897
CBSA AVG Med income change 1990 2010	0.00	0.814	0.02	0.329	0.01	0.660
CBSA PCT HOUSES OLDER 1960	0.01	0.671	0.01	0.843	-0.01	0.679
CBSA PCT College	0.01	0.555	0.01	0.470	0.01	0.653

CBSA PCT Foreign	-0.01	0.650	0.01	0.780	-0.00	0.897
CBSA PCT White	-0.00	0.901	-0.02	0.559	-0.03	0.436
CBSA PCT Owner occupied	-0.01	0.673	-0.00	0.995	-0.01	0.757
CBSA PCT Under 18	0.01	0.635	0.01	0.674	0.01	0.771
CBSA Church ADHRATE	0.00	0.946	-0.02	0.306	-0.02	0.272
CBSA EVANGELICAL CONGPER 1000	0.03	0.051	0.08	0.018	0.06	0.137
CBSA MAINLINE CONGPER 1000	0.01	0.358	0.01	0.778	0.01	0.671
CBSA CATHOLIC CONGPER 1000	0.00	0.824	0.03	0.261	0.03	0.275
CBSA BLACK CONGPER 1000	-0.04	<0.001	-0.03	0.039	-0.03	0.069
CBSA PCT Decline	0.05	0.001	0.06	0.025	0.06	0.061
CBSA PCT Upgrade	-0.03	0.028	-0.02	0.389	-0.02	0.355
CBSA PCT Gentrify	-0.01	0.269	-0.01	0.520	-0.00	0.972
WHITEPCT:Rel_PCT_White	0.05	<0.001	0.02	0.217	0.02	0.195
COLLEGEPCT:Rel_PCT_College	-0.03	0.006	-0.07	0.002	-0.04	0.102
LONGDRIVEPCT:WHITEPCT	-0.02	0.009	-0.02	0.063	-0.02	0.071
Random Effects						
σ^2	0.01		0.01		0.01	
τ_{00}	0.00 $_{CBSA}$		0.00 $_{CBSA}$		0.00 $_{CBSA}$	
ICC	0.10 $_{CBSA}$		0.17 $_{CBSA}$		0.27 $_{CBSA}$	
Observations	1826		992		825	
Marginal R^2 / Conditional R^2	0.428 / 0.485		0.448 / 0.541		0.463 / 0.607	

Appendix B: Statistical Matching Balance Statistics

Note: the following are summaries of balance statistics for treatments with statistically significant effects. Complete balance statistic outputs for each covariate are available from the author.

TREATMENT 3 (church %white > .8, rel. neigh. < .2)

Original number of observations (weighted)... 67055.32

Original number of observations..... 67163

Original number of treated obs (weighted).... 82.759

Original number of treated obs..... 91

Matched number of observations..... 82.759

Matched number of observations (unweighted). 91

Number of obs dropped by 'exact' or 'caliper' 0

Before Matching Minimum p.value: < 0.000000000000000222

Variable Name(s): ARDA_FIPS90_ADHRATE ARDA_FIPS90_CONG_PER1000 hinc_diff_HYBRID_70_90 HINC90 MHMVAL90 MRENT90 p18und90 percent_asian90 percent_college90 percent_foreign90 percent_hispanic90 percent_nonhispanic_black90 percent_nonhispanic_white90 percent_owneroccupied90 ppov90 share_multi_units90 perc_houses_before_1960

After Matching Minimum p.value: 0.0039803

Variable Name(s): percent_owneroccupied90

TREATMENT 4 ("White Middle" cluster)

Original number of observations (weighted)... 67055.32
Original number of observations..... 67163
Original number of treated obs (weighted).... 688.877
Original number of treated obs..... 693
Matched number of observations..... 686.877
Matched number of observations (unweighted). 695

Number of obs dropped by 'exact' or 'caliper' 2

Before Matching Minimum p.value: < 0.000000000000000222
Variable Name(s): ARDA_FIPS90_CONG_PER1000 MHMVAL90 percent_hispanic90

After Matching Minimum p.value: 0.0055325
Variable Name(s): percent_nonhispanic_white90

TREATMENT 8 ("White Middle" cluster, low-income)

Original number of observations (weighted)... 67055.32
Original number of observations..... 67163
Original number of treated obs (weighted).... 335.877
Original number of treated obs..... 340
Matched number of observations..... 333.877
Matched number of observations (unweighted). 342
Number of obs dropped by 'exact' or 'caliper' 2

Before Matching Minimum p.value: < 0.000000000000000222
Variable Name(s): hinc_diff_HYBRID_70_90 HINC90 MHMVAL90 MRENT90
percent_asian90 percent_college90 percent_foreign90 percent_nonhispanic_black90
percent_nonhispanic_white90 percent_owneroccupied90 ppov90
perc_houses_before_1960

After Matching Minimum p.value: 0.0058936
Variable Name(s): HINC90

TREATMENT 9 ("White Affluent" cluster, low-income)

Original number of observations (weighted)... 67055.32
Original number of observations..... 67163
Original number of treated obs (weighted).... 282.927
Original number of treated obs..... 290
Matched number of observations..... 282.927
Matched number of observations (unweighted). 294
Number of obs dropped by 'exact' or 'caliper' 0

Before Matching Minimum p.value: < 0.000000000000000222
Variable Name(s): hinc_diff_HYBRID_70_90 HINC90 MHMVAL90 MRENT90
percent_asian90 percent_college90 percent_nonhispanic_black90

percent_nonhispanic_white90 percent_owneroccupied90 ppov90 share_multi_units90 perc_houses_before_1960

After Matching Minimum p.value: 0.009801
Variable Name(s): HINC90

TREATMENT 11 ("Diverse" cluster, low-income)

Original number of observations (weighted)... 67055.32
Original number of observations..... 67163
Original number of treated obs (weighted).... 56.321
Original number of treated obs..... 164
Matched number of observations..... 56.321
Matched number of observations (unweighted). 164
Number of obs dropped by 'exact' or 'caliper' 0

Before Matching Minimum p.value: < 0.000000000000000222
Variable Name(s): HINC90 MHMVAL90 MRENT90 percent_college90 percent_nonhispanic_black90 percent_nonhispanic_white90 percent_owneroccupied90 ppov90 share_multi_units90 perc_houses_before_1960

After Matching Minimum p.value: 0.057268
Variable Name(s): p18und90

Appendix C: Study Findings