RESIDENTIAL SATISFACTION:

FIRST-TIME HOMEOWNERSHIP AND COMMON INTEREST DEVELOPMENTS

by

DYNA TY

(Under the Direction of Andrew T. Carswell)

ABSTRACT

This dissertation investigated determinants of housing satisfaction and neighborhood satisfaction in cross-sectional and longitudinal analyses under Family Housing Adjustment Theory. Using 2015, 2017, and 2019 American Housing Survey national samples, research questions were addressed through incorporating first-time homebuyers (FTHBs) and common interest developments (CIDs) in ordered choice regressions. *Ceteris paribus*, the results suggested that each satisfaction type was a significant determinant. Bothersome neighborhood features adversely affected housing and neighborhood satisfaction over time. Females were more likely to be satisfied with housing than males. African-Americans were more likely to be satisfied with housing, not neighborhood, than Caucasians. Hispanics were more likely to be satisfied with housing, not neighborhood, than non-Hispanics. Foreign-born householders were more likely to be satisfied with neighborhood, not housing, than native-born householders. FTHBs were more likely to be satisfied with housing than renters. However, FTHBs were less likely to be satisfied with neighborhood than renters and repeat homeowners. Married couples without children were more likely to be satisfied with housing than all other households, not over time. Married couples with children were more likely to be satisfied with neighborhood than married couples without children. Residence duration had no significant

effect on housing satisfaction. Recent moving experience positively affected housing satisfaction, even over time, but it negatively affected neighborhood satisfaction. Same household composition positively affected housing and neighborhood satisfaction, not over time. Property values and housing costs showed the “neutral” magnitude of their effects on housing satisfaction, even over time. Housing subsidies positively affected housing satisfaction but negatively affected neighborhood satisfaction, even over time. Housing adequacy positively affected housing satisfaction, even over time. Householders in single-family detached homes were more likely to be satisfied with housing and neighborhood than all their counterparts. Overcrowding adversely affected housing satisfaction, even over time. Householders in CIDs were more likely to be satisfied with housing and neighborhood than those in standard subdivisions, even over time. Given the CIDs status, repeat homeowners remained more likely to be satisfied with housing and neighborhood than FTHBs. The time effect was not all statistically significant but positive, suggesting individuals’ housing and neighborhood satisfaction likely increased over time.

INDEX WORDS: Residential satisfaction, housing, neighborhood, first-time homeownership, common interest development, planned development, condominium, residential community association, HOAs, fixed-effects.

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DYNA TY

B.S., Florida State University, 2007

M.A., University of Illinois at Chicago, 2010

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DYNA TY

Major Professor:	Andrew T. Carswell
Committee:	Velma Zahirovic-Herbert
	Patryk Babiarz
	Swarn Chatterjee

Electronic Version Approved:

Ron Walcott
Vice Provost for Graduate Education and Dean of the Graduate School
The University of Georgia
August 2022

DEDICATION

To our great-grandparents and grandparents

to my parents:

Sao Sina Somchan and Ty Keth

to my siblings:

Lyna, Lida, and Sereyvathana

and to my family

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I would like to thank my dissertation committee members for their personal time and guidance. It's thanks to all the available software, tools, and persons who helped and gave support directly and indirectly – my families, department of financial planning, housing and consumer economics, college of family and consumer sciences, universities, colleagues, and acquaintances – that I completed this work.

Success is one's defined currency but also everyone's currency…

One way or the other – direct

More complicated than they are – simplify

When we're getting hammered hard – contemplate

Moving forward together is part of this earthly life experience

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CHAPTER 1

INTRODUCTION

1. Overview of the Study

Residential satisfaction is conceptualized as a measure of the differences between individuals' actual and desired (or aspired-to) housing and neighborhood situations (Galster, 1987; Galster & Hesser, 1981). Using a theoretical framework of Theory of Family Housing Adjustment and the national data of the redesigned American Housing Survey, this study incorporated first-time homebuyers (FHTBs) and common interest developments (CIDs) in the cross-sectional and longitudinal analyses in an attempt to further the understanding of the determinants of housing satisfaction and neighborhood satisfaction at one point in time and over time.

2. Background of the Problem

The introduction of the term "residential satisfaction" can be credited to Fried and Gleicher (1961), who examined the former residents' satisfaction of an urban slum. The study of residential satisfaction was fostered by two phenomena – the rise of suburban living and the urban renewal initiatives – that first occurred in developed countries and later in developing countries. Residential satisfaction thus became a globally popular topic of interest not only in the quality of life and well-being research but also across disciplines, including sociology, environmental psychology, urban and regional planning, architecture, geography, economics, and family and consumer sciences (Baillie & Peart, 1992; Bruin & Cook, 1997; Canter & Rees, 1982; Carswell, 2006; Cutter, 1982; Francescato et al., 1974; Galster & Hesser, 1981; James, 2007; Lévy-Leboyer & Ratiu, 1993; Marans & Rodgers, 1975; Michelson, 1977; Nathan, 1995; Weidemann & Anderson, 1985).

Twofold significance contributes to the topic's increasing popularity. First, residential satisfaction is recognized as an important component of individuals' general quality of life. For many households, housing is the largest purchase in their lifetime, and "home" is the setting where one finds refuge, rest, and satisfaction (Adams, 1984). In many developed and developing countries, providing a suitable housing environment for every household has become part of their national housing goals. In housing programs that support different population groups, measures of residential satisfaction offer not only useful insights regarding individuals' experience with housing but also can be used to evaluate the success of the programs (Nathan, 1995). Second, individuals' subjective evaluations of their housing and neighborhood help them to respond to their residential environment and to determine the basis of demands for public action (Dahmann, 1985; Roskruge et al., 2013). In the behavioral conceptualization of migration, low levels of residential satisfaction are postulated to precede housing and mobility behavior (Rossi, 1955; Speare, 1974; Lu, 1998). When individuals feel dissatisfied with their current housing or neighborhood, they consider relocating. Therefore, knowledge about the factors that shape residential satisfaction is important for better understanding households' mobility decision processes (Lu, 1999).

3. Statement of the Problem

A lack of consistent research results about the factors included in the shaping of individuals' satisfaction with their housing and neighborhood is indicative of the inadequacy of residential satisfaction research (Lu, 1999). This problem might be due to the differences in samples, the way key variables were defined, how regression models were used, or how the data were analyzed. Measurement approaches, theoretical frameworks, and methodological techniques have directly influenced the findings and interpretations of residential satisfaction. Given no consensus on how residential satisfaction is conceived, two main approaches have been used to conceptualize resi-

dential satisfaction (Galster, 1987, p. 540). In the "purposive" approach, residential satisfaction measures the degree to which the environment facilitates or inhibits the goals of the user (Canter & Rees, 1982; Mandler, 1984; Oseland, 1990). In the "actual-aspiration gap" approach, by contrast, residential satisfaction measures the differences between individuals' actual and desired (or aspired-to) housing and neighborhood situations (Galster, 1987; Galster & Hesser, 1981).

Understanding and measuring residential satisfaction at one point in time and over time has been particularly relevant to housing policies because it can capture the effect of heterogeneity across individuals. Despite a large literature on residential satisfaction, few research studies investigated residential satisfaction over time. There is little evidence to explain the factors that influenced residential satisfaction over time since most previous research studies used cross-sectional data in their analysis. One obvious reason for this dearth was a longitudinal data availability constraint (Campbell et al., 1976; Diaz-Serrano, 2006; Dekker et al., 2011; Kabisch et al., 2021; Varady & Carrozza, 2000). In their longitudinal analysis of residential satisfaction, the approach of Kabisch et al. (2021) was based on the dichotomous dependent variables "Do you feel comfortable in the apartment/estate?" as proxies for "being satisfied with the apartment/estate." Diaz-Serrano (2006), on the other hand, conducted separate analyses on housing satisfaction for homeowners and renters and treated housing satisfaction, neighborhood satisfaction, and residential satisfaction interchangeably. In this study, the American Housing Survey (AHS), a longitudinal housing unit survey (i.e., the survey returned to the same housing units for every survey year to gather data on the quality of housing and the households occupying them), was used because the panel data from pooling these cross-sectional AHS surveys provided this study the opportunity to examine the longitudinal effects of the relevant factors on housing satisfaction and neighborhood satisfaction and furthered the understanding of residential satisfaction through the temporal dimension.

Since the 1960s, a different type of residential subdivision, commonly known as common interest development (CID), expanded significantly across the United States (U.S.). As of 2020, these CIDs were home to 74.1 million residents and 27.5 million housing units, approximately 25-27 percent of the U.S. population and USD $9.2 trillion in property values (≈ 44 percent of U.S. GDP) (Treese, 2020). Besides the CIDs' overall attractiveness to residents, another contributing factor to their popularity has been the "inherent benefits" that households valued (i.e., living in communities of CIDs offered to preserve, maintain, and enhance property values and community standards). Due to their popularity and population, CIDs were included in this study as another possible factor in further understanding the formation of residential satisfaction.

Based on the theoretical framework of Theory of Family Housing Adjustment and the unique national data of the redesigned AHS, this study conducted cross-sectional and longitudinal analyses that investigated the effects of explanatory variables, which included the effects of FTHBs and CIDs in the quantitative analysis of residential satisfaction. The relevant socio-demographic, housing, and neighborhood characteristics that were included in this study had been regarded in the literature as important in shaping individuals' residential satisfaction.

4. Purpose of the Study

Homeownership has been an important symbol of households' aspirations and social standing. In the U.S., becoming a homeowner, particularly a first-time homeowner, has been not only considered a part of the family norms but also a part of the cultural norms – *in pursuit of the American Dream*. In contrast to previous studies, this study explicitly defined first-time homeowners as first-time homebuyers (FTHBs) who had ever owned their first homes. The reason was that being considered first-time homeowners in general might not mean that those first-time homeowners never own their first homes previously, given that one of the qualification criteria under the

HUD Homeownership Centers Reference Guide stated a qualified first-time homebuyer referred to an individual who had no ownership in a principal residence in the preceding three years (U.S. HUD, 2012). As a result, the residential real estate practice in the U.S. allowed the qualified individuals to become first-time homebuyers more than one time in their lifetime.

Through incorporating the effects of FTHBs and CIDs in empirical models, this study further explained the differences in individuals' satisfaction regarding their housing tenure (i.e., comparing first-time homeowners' housing and neighborhood satisfaction with those satisfaction of renters and repeat homeowners) and their types of residential subdivision (i.e., comparing householders' housing and neighborhood satisfaction in CIDs with those householders' housing and neighborhood satisfaction in standard subdivisions). In the empirical analysis, this study used the secondary data of the 2015, 2017, and 2019 AHS national samples and the ordered choice regressions for the ordinal dependent variables, *Housing satisfaction* and *Neighborhood satisfaction* – two observed indicators of residential satisfaction. The justification for using the ordered choice models in the analysis was that the usual assumptions of multiple regression models were violated when these linear regressions were used for the dependent variables that were ordinal responses (McKelvey & Zavoina, 1975).

This study asked the following research questions:

1) How satisfied are first-time homeowners with their housing and neighborhood in comparison with renters or repeat homeowners?
2) How satisfied are individuals with their housing and neighborhood if their places of residence are in CIDs in comparison with those in standard subdivisions?
3) What are the significant effects of these relevant factors on housing satisfaction and neighborhood satisfaction over time?

Accordingly, this study hypothesized that:

1) First-time homeowners are more likely to express high levels of satisfaction with their housing and neighborhood than those householders who are renters or repeat homeowners, given cultural and/or family norms such as *in pursuit of the American Dream.*

2) Householders whose residences are in CIDs are more likely to express high levels of satisfaction with their housing and neighborhood than those in standard subdivisions, given all attractive amenities and services CIDs have to offer their residents.

3) Changes in the characteristics of households, housing, and neighborhood affect individuals' satisfaction with housing and neighborhood over time.

5. Significance of the Study

By precisely considering householders' housing tenure (i.e., renters, first-time homeowners, and repeat homeowners), this study captured the "true" effect of first-time homebuyers on residential satisfaction, which contrasted with the previous findings. Figure 1 indicates that by the number of home loans originated for first-time and repeat homebuyers in the U.S. over the period of January 2002 through December 2018, first-time homebuyers accounted for approximately half the mortgages each year. The lowest and highest shares of first-time homebuyers' loans were in 2006 and 2009 (Consumer Financial Protection Bureau, 2020). As of the fourth quarter of 2020, the homeownership rate in the U.S. was 65.8 percent, whereas the rental and homeowner vacancy rates were 6.5% and 1.0%, respectively (U.S. Census Bureau, 2021a). Moreover, the proliferation of CIDs in the U.S. since 1960s did not go unnoticed. With (at least) 355,000 communities across the country as of 2020, their impacts on residents, entities, and economies became significant. First, the significant expansion of CIDs and their residential community associations (RCAs) such

as homeowner's associations (HOAs) were regarded as an important provider of local public services. The location and timing of an association's formation might be driven by demand-side, supply-side, and institutional factors (Cheung & Meltzer, 2014). Second, nearly 60 percent of recently built single-family houses and 80 percent of houses in new subdivisions were part of HOAs (Clarke & Freedman, 2019). Investigating the price premium on property values in CIDs was of interest. Recent studies that examined their relationship with housing prices generally found a positive price premium under 5% for houses in CIDs (Agan & Tabarrok, 2005; Angjellari-Dajci et al., 2015; Clarke & Freedman, 2019; Do & Sirmans, 1994; Goodwin et al., 2020; Grace & Hall, 2019; Groves, 2008; Hopkins, 2016; Meltzer & Cheung, 2014; Scheller, 2014).

Property taxes and membership fees, however, were viewed as "double taxation" for the property owners in CID- or association-governed communities. The reason was that the owners still paid their property and other local taxes and their membership fees, which were nondeductible tax expenses (H&R Block, n.d.; Kiernan, 2020). These membership fees went toward common services that were delivered privately by their associations or were provided publicly in other parts of the same jurisdiction in which these associations were located (Nelson, 2009). Given the contention, this study is among few studies that examined the effects of CIDs and association membership fees on individuals' housing and neighborhood satisfaction. Figures 2 through 4 describe the characteristics of CIDs by number, growth, and state across the U.S. Figure 2 shows that the number of CID communities, housing units, and residents significantly increased between 1970 and 2020. As of 2020, these 355,000 communities housed 74.1 million residents and 27.5 million housing units across the U.S. with the estimated property values of USD $9.2 trillion (Treese, 2020). By coordinating the numbers of CIDs in Figure 3 with the U.S. census regions and divisions in Figure 4, the southern region appeared to have the highest number of communities of CIDs.

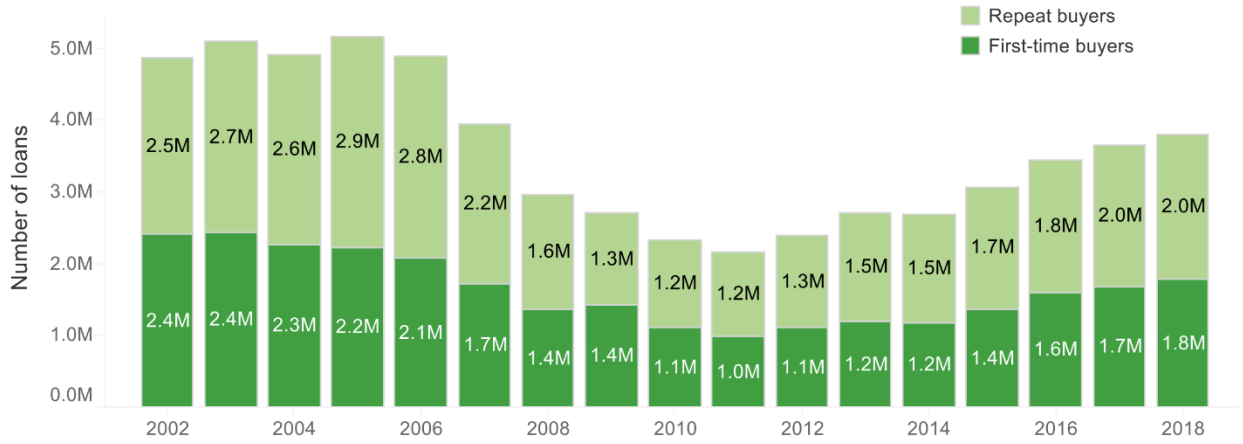


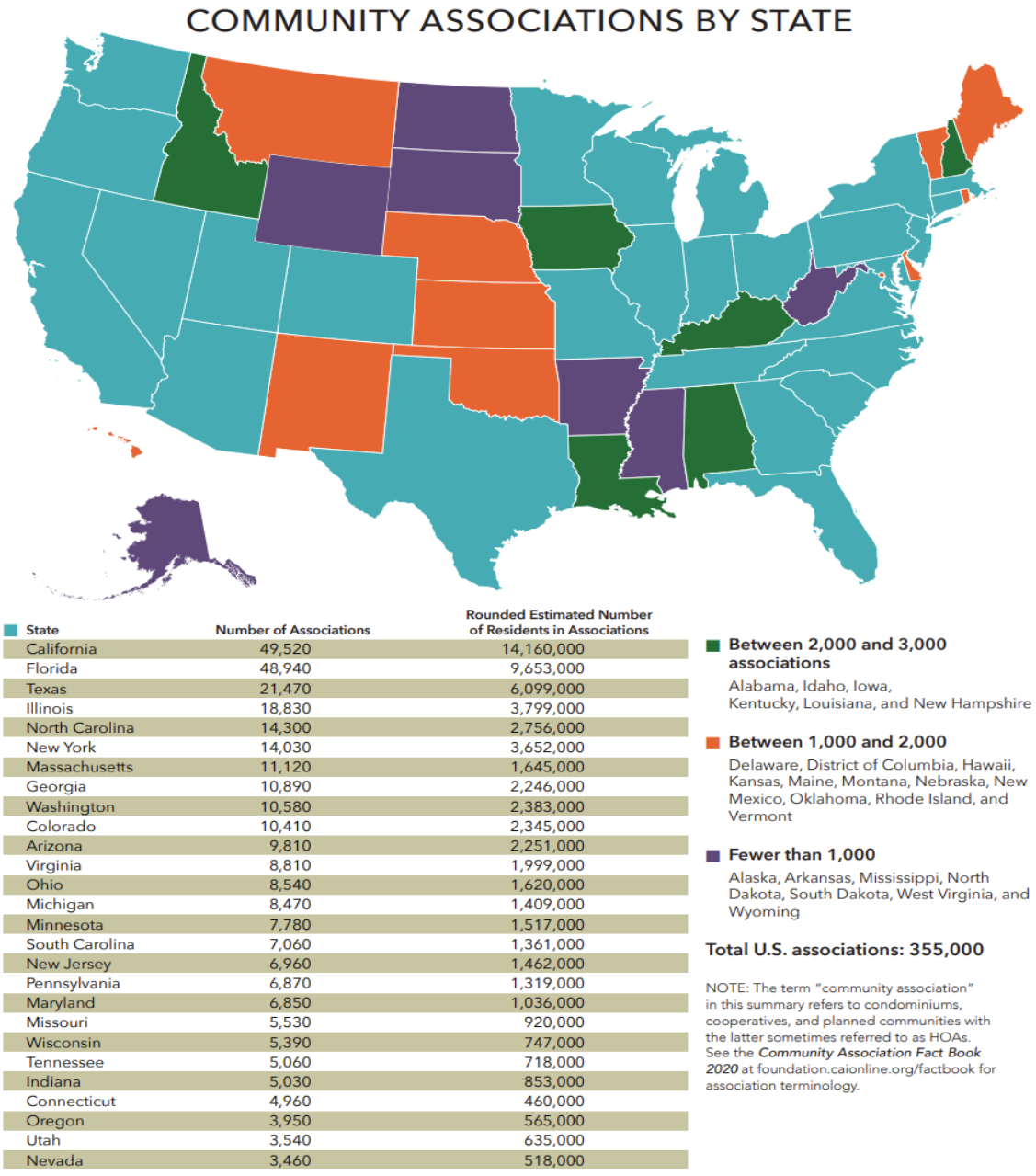
Figure 1: Market snapshot: first-time homebuyers in the U.S.

Note. The graph shows the number of home purchase loans originated for first-time and repeat homebuyers in the United States from January 2002 to December 2018 based on the data of National Mortgage Database (NMDB). Adapted from *Market Snapshot: First-time Homebuyers*, by Consumer Financial Protection Bureau, 2020 (https://www.consumerfinance.gov/data-research/research-reports/market-snapshot-first-time-homebuyers/). In the public domain.

Entity of CID	1970	2020	Change (%)
Communities	10,000	355,000	3550
Housing units	701,000	27,500,000	3923
Residents	2,100,000	74,100,000	3429

Figure 2: Common interest development: communities, housing units, and residents in the U.S.

Note: The figure shows the number of common interest developments' communities, housing units, and residents in the United States between 1970 and 2020. These communities include all CID types of ownership – planned developments, condominiums, cooperatives, and community apartments. All CIDs provide for a system of self-governance through their residential community associations of the homeowners (i.e., an association manages common areas and enforces CC&Rs within the CID). Of all associations., homeowner's associations account for about 58–63% of the totals, condominium communities for 35-40%, and cooperatives for 2-4% (Treese, 2020).



State	Number of Associations	Rounded Estimated Number of Residents in Associations
California	49,520	14,160,000
Florida	48,940	9,653,000
Texas	21,470	6,099,000
Illinois	18,830	3,799,000
North Carolina	14,300	2,756,000
New York	14,030	3,652,000
Massachusetts	11,120	1,645,000
Georgia	10,890	2,246,000
Washington	10,580	2,383,000
Colorado	10,410	2,345,000
Arizona	9,810	2,251,000
Virginia	8,810	1,999,000
Ohio	8,540	1,620,000
Michigan	8,470	1,409,000
Minnesota	7,780	1,517,000
South Carolina	7,060	1,361,000
New Jersey	6,960	1,462,000
Pennsylvania	6,870	1,319,000
Maryland	6,850	1,036,000
Missouri	5,530	920,000
Wisconsin	5,390	747,000
Tennessee	5,060	718,000
Indiana	5,030	853,000
Connecticut	4,960	460,000
Oregon	3,950	565,000
Utah	3,540	635,000
Nevada	3,460	518,000

Figure 3: The number of common interest developments by states and residents in the U.S.

Note: The image describes the number of common interest developments by states and residents in the U.S. Adapted from *Statistical Review 2020: Summary of Key Association Data and Information*, by C. J. Treese, 2020 (https://foundation.caionline.org/publications/factbook/). Copyright 2020 by Foundation for Community Association Research. Adapted with permission.

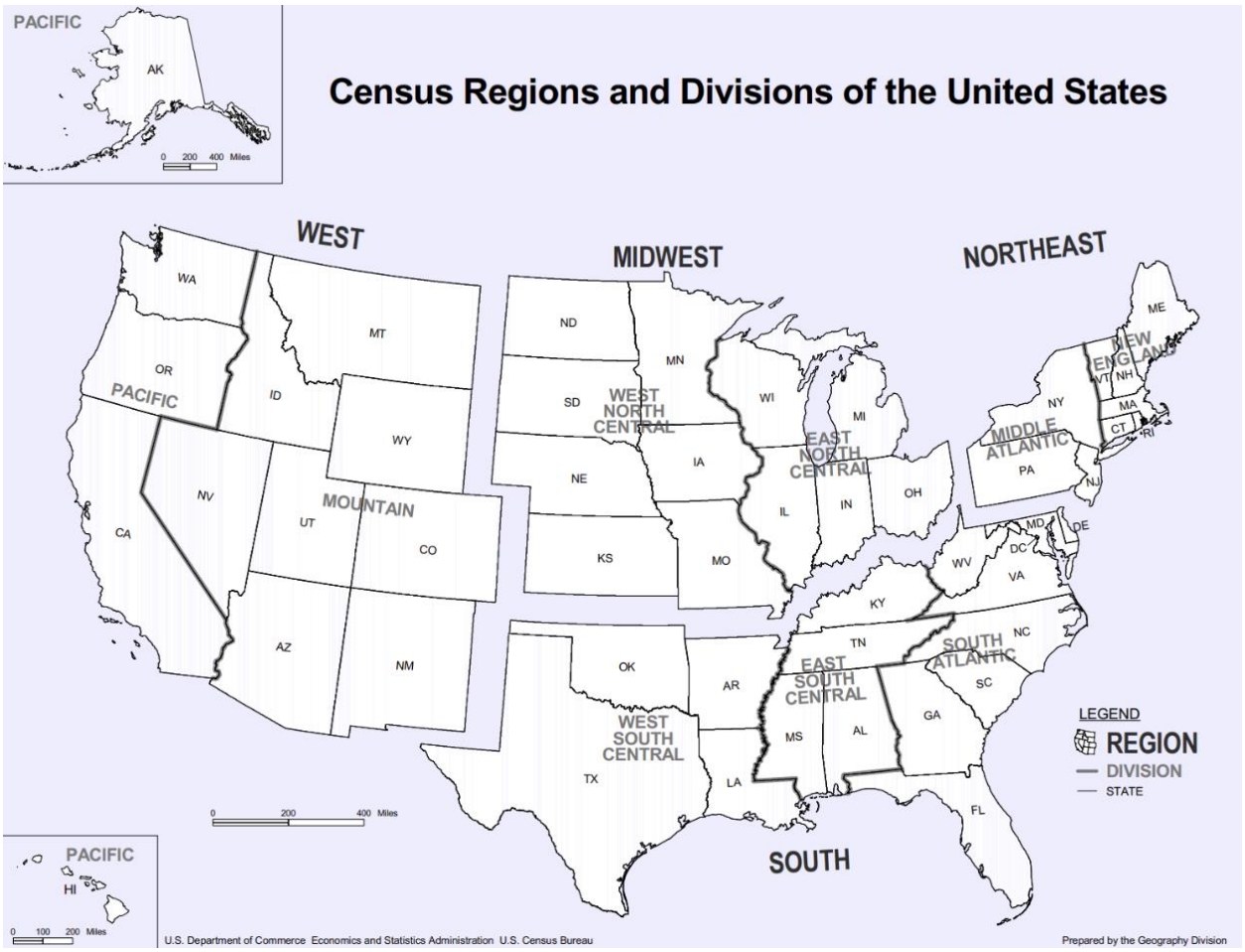


Figure 4: 2010 census regions and divisions of the United States

Note: The map shows four census regions (1: Northeast, 2: Midwest, 3: South, 4: West) and nine divisions (1: New England, 2: Middle Atlantic, 3: East North Central, 4: West North Central, 5: South Atlantic, 6: East South Central, 7: West South Central, 8: Mountain, 9: Pacific) of the United States. Adapted from *2010 Census Regions and Divisions of the United States*, by U.S. Census Bureau, 2010 (https://www.census.gov/geographies/reference-maps/2010/geo/2010-census-regions-and-divisions-of-the-united-states.html). In the public domain.

Lastly, individuals used cultural and family norms to judge their housing conditions and continuously evaluated their housing in accordance with these norms, given the family life cycle stage in which they found themselves (Morris & Winter, 1975). When their housing did not meet the norms, normative housing deficits were said to exist – *dissatisfaction*. With the five housing

norms (housing space norms, tenure norms, structure type norms, quality norms, and neighborhood and location norms) and the racial and ethnical composition and diversity of the U.S. population (Jensen et al., 2021), this study was able to use the redesigned AHS data to re-examine the effects of the relevant socio-demographic variables, housing, and neighborhood characteristics on individuals' residential satisfaction as well as to learn the effect of household crowding on residential satisfaction of the ethnic and nativity groups, given that overcrowding in the U.S. was likely to be found in Hispanic and foreign-born households (Blake et al., 2007).

6. Definitions and Terms

For clarity of terminology, Appendix A and this subsection define key terms and how they will be used in this study.

Common Interest Development (CID). In a common interest development, or common interest subdivision of residential development, the homeowner has the ownership of both a divided interest (i.e., the lot, unit, or right to the exclusive use of a portion of property) and an undivided interest (i.e., common areas or facilities, with the right to use them, are owned jointly with other owners) of ownership within the subdivision. By law, each CID is required to establish a residential community association (e.g., a homeowner's association). The association is governed by a board of directors who are elected from membership and actively participating homeowners. A CID is categorized by one of the following types of ownership in residential subdivisions: planned development, condominium, stock cooperative, and community apartment. *Planned Development*. In a planned development, a planned unit/urban development (PUD), or a planned community, the homeowner has the ownership over 1) (separately) a lot/unit, including the property the lot/unit

sits on and the residential dwelling itself of any type of unit structure and 2) (not as tenant-in-common) common area property or facilities by virtue of the homeowner's membership in a homeowner's association (HOA) that manages it. *Condominium*. In a condominium, the homeowner has the ownership over 1) (separately) a housing unit of any structural type, not just condo-style units, with a three-dimensional space filled with air, earth and/or water), 2) (tenant-in-common) common area as a co-owner, and 3) common area property or facilities by virtue of the homeowner's membership in a condominium association that manages it. *Stock Cooperative or Cooperative*. In a cooperative, the homeowner has the ownership over 1) shares in corporation that owns residential property and 2) an exclusive right to occupy a housing unit or portion of the property that is managed by a cooperative association. *Community Apartment*. In a community apartment project, the homeowner has the ownership over 1) the entire apartment project as one of co-owners and 2) an exclusive right to occupy an apartment in the building. Additional discussions on CIDs and their various names are in Appendix B.

First-Time Homeowner. A first-time homeowner in this study refers to a first-time homebuyer (FTHB) ever. This is worth mentioning because 1) the current practice of residential real estate in the U.S. allows the residents to be qualified for being a first-time homebuyer more than one time (U.S. HUD, 2012); 2) how a qualified first-time homebuyer is determined depends on individual organizations' practice. For example, in the National Mortgage Database (NMDB) program a first-time buyer is defined as a borrower who appears to have no previous mortgage in the preceding seven years (Consumer Financial Protection Bureau, 2020). In the

Homeownership Centers Reference Guide of the U.S. Department of Housing and Urban Development (HUD), one of the criteria used to identify a qualified first-time homebuyer is that a first-time homebuyer is an individual who has had no ownership in the principal residence in the preceding three years ending on the date of purchase of the property. This criterion also includes a spouse if he or she meets this test (U.S. HUD, 2012). In the redesigned American Housing Survey (i.e., the post-2013 surveys), a first-time homeowner is a first-time homebuyer who has ever owned his or her first house (U.S. Census Bureau, 2015, 2017, 2019).

7. Assumptions, Limitations, and Delimitations

7.1. Assumptions and Delimitations

This study used the publicly accessible data of the American Housing Survey (AHS), known as the public use file (PUF) microdata. Due to maintain the privacy of the respondents, certain variables were only accessible in the AHS internal use file (IUF) microdata. Like any survey data, there existed data errors (errors inputting data) in the AHS PUF microdata. This study therefore assumed the AHS surveys had the data reliability because they were the nationally representative samples of all housing units in the United States. Furthermore, key variables of interest in the microdata of AHS PUFs were self-identified by the respondents. This study recognized all potential measurement error problems in the survey data. An example of this was the reported amounts of household income and housing costs. Householders were less likely to report a true amount of their household income, whereas they were more likely to report a high amount of their housing costs. This study experienced extreme values in the data.

The AHS was considered a longitudinal housing survey (i.e., it followed individual housing units and not individual householders over time). It was a challenging task to identify the same

individuals over the survey years (i.e., 2015, 2017, and 2019) because different individuals lived in same housing units as well as different household members answered the questionnaires between the survey years. To obtain a *same-unit, same-person* sample from the pooled three waves of AHS national data for the empirical analysis of this study, potential dropouts of the same persons across panels might have occurred even though the process of elimination ("the lesser of two evils") was set based on differences in individuals' age, sex, ethnicity, citizenship, education, housing tenure, and previous participation between the survey years. Considerably, approximately 61% of the pooled data (i.e., the final sample was n = 35,229 units/householders) remained for the analysis of this study. Furthermore, this study assumed that the same individual householders' housing tenure did not change over the survey years, i.e., renters as renters, FTHBs as FTHBs, and repeat homeowners as repeat homeowners through all the periods under investigation. The data showed that a small number of the same householders either inconsistently reported or changed their housing tenure in their same housing units. However, this assumption was validly reasonable. For example, for the exactly same housing unit a householder's tenure was considered a first-time (or repeat) homeowner when his or her housing tenure changed from being a renter to being a first-time (or repeat) homeowner, and vice versa. The rationale behind it was that dissatisfied householders would relocate rather than changed their housing tenure for the exactly same housing units between the survey years.

Moreover, this study filled the missing data points in the surveys with relatedly reported non-missing values where applicable. For example, if a variable for a particular householder missed two data points of the three, then the missing values were filled in based on that data point provided in one of the three years. This procedure was logical in this study because in the AHS data most of the missing values came from the variables that did not frequently or easily alter

between every two-year period. Some examples of these variables were condominiums and subdivisions. Having said that, some variables might appear to change their forms within a short period of time. An example was residential community associations (RCAs). Homeowner's associations (HOAs), one type of RCAs, often formed within a short period of time. Since the data in the surveys did not offer specific information regarding how and when RCAs were created, this study assumed they all pre-existed at the time of the survey year (e.g., 2015 and thereafter). For example, if the same householder reported that he or she belonged to a HOA in 2019, his or her HOA membership was also assumed to exist in 2015 and 2017. This assumption was reasonable for these types of variables because their creation was within reason. However, this might be seen as one of the limitations in this study since residential satisfaction was the focus after all. It would be interesting, for instance, to see the transitional effect of HOAs on residential satisfaction – a potential topic of future research. To reiterate, this study also assumed these variable types had no transition between the periods although, again, the data indicated that a small number of observations had the transition or the inconsistently reported answers between the three periods.

A variable for CIDs in this study was a derived variable because there was no specific question directly asking about CIDs. Given that a few questions in the AHS were related to CID types (e.g., condominiums), the variable *CID* was constructed from the information of the three primary variables (i.e., *CONDO*, *SUBDIV*, and *HOA*) in the AHS. Furthermore, this study neither had the detailed information on CIDs and their Declaration of Covenants, Conditions, and Restrictions (CC&Rs) such as community sizes, restrictions, and amenities, nor had the specific information in the survey to identify types of restrictions under law within individual CIDs. This study therefore assumed that CIDs had uniform restrictions across locations and states. For example, this study had no information about the total number of parcels or rental restrictions in each

RCA-governed community. The public information on them might be available in some states. In the state of California, an association had an existing rental cap that conformed up to 25 percent of the total number of units in a development as of January 1, 2021 (Adams Stirling PLC, n.d.). All condominiums were also assumed to have condominium associations, regardless of the survey respondents' reportedly missing values. Lastly, the information on subdivisions or housing development in the survey was primarily used to identify traditional standard subdivisions.

7.2. Limitations

Lu (1999) emphasized that the way residential satisfaction is measured is important in empirical analysis because it directly influences the findings. For the empirical analysis of this study, the measures of housing satisfaction and neighborhood satisfaction were regrouped into four ordered categories: least satisfied (original levels 1-4), moderately satisfied (levels 5-6), very satisfied (levels 7-8), and most satisfied (levels 9-10). This study was not the first one to take this approach (Basolo & Strong, 2002; Chapman & Lombard, 2006; Jagun et al., 1990; Lu, 1999). Although the regrouping was necessary due to a small number of observations in the original satisfaction levels of 1 through 4 in the AHS and the need for a relatively easy interpretation of the results, the findings in this study might not be generalized across geographic locations and demographic groups outside the U.S. Cultural norms and family norms do not always coincide, and the housing norms in the U.S. may differ considerably from those norms in other countries.

Second, this study was aware of the problem of controlling for endogenous variables, which could lead to biases in the coefficient estimates of the variables of interest. One might be concerned with the endogenous variables *Residential satisfaction*, *Housing quality*, *Housing tenure,* and *Type of residence*. The endogenous variable *Residential satisfaction* was considered a latent variable and defined as an individual's subjective assessment of living conditions (Galster,

1987; Galster & Hesser, 1981). Therefore, this study considered *Housing satisfaction* and *Neighborhood satisfaction* as the two observed indicators of *Residential satisfaction*. The endogenous explanatory variable *Housing quality* was also considered a latent variable. In this study, a composite index compiled by the AHS was used as an indicator of *Housing quality*, given that physical adequacy is related to housing quality (US HUD, 2013). Another endogenous explanatory variable was *Housing tenure,* which referred to an individual's homeownership status and was hypothesized to positively affect *Residential satisfaction.* Homeowners tend to be more satisfied with their housing and neighborhood than renters as they generally put more economic and social investments in their place of residence (Hipp, 2009; Lu, 1999; Ren & Folmer, 2016; Roskruge et al., 2013). The next endogenous explanatory variable of *Residential satisfaction* was *Type of residence*, or *Community type* in some studies. Households highly appreciate good environmental quality and safe neighborhoods such as accessible leisure facilities or local shops and public services (Dekker et al., 2011; Hipp, 2009; Ren & Folmer, 2016). Logically, one may take *Housing quality* as an endogenous variable which is affected by the endogenous variables *Housing tenure* and *Type of residence*. The reason for these relationships is that homeowners tend to improve the quality of their housing (Davidson & Leather, 2000; Dekker et al., 2011), and *Type of residence* positively affects *Housing quality* (Henderson, 1985). As a result, *Housing tenure* and *Type of residence* may have indirect effects on *Residential satisfaction* via *Housing quality* (Ren & Folmer, 2016). In this regard, a structural equation modeling (SME) technique is typically used to examine the causal effects of determinants of residential satisfaction.

Proxy variables are close substitutes for latent variables, and the consequences of using proxy variables in place of their unobservable counterparts in a regression model are the same as in the case of measurement errors (Kmenta, 1991). Moreover, the approach of measuring residen-

tial satisfaction through (direct) single questions about an individual's satisfaction with his or her residential situation has been more preferred in empirical studies. The reason is that it helps avoid the complication of constructing externally calculated reliable measures of residential satisfaction (Lu, 1999; Moore, 1986; Vera-Toscano & Ateca-Amestoy, 2008). Furthermore, this approach can be used with the same data sources for the analysis of residential satisfaction. However, the empirical results may not be comparable. For example, the AHS microdata was used in several ways by many studies to assess residential satisfaction for specific populations and social groups, but such studies somewhat defined residential satisfaction differently (Ahn & Lee, 2015; Barcus, 2004; Boehm & Schlottmann, 2008; James, 2007, 2008; Lee & Parrott, 2010; Liu & Crull, 2006; Lu, 1999; Peek & Carswell, 2018). This study is to discuss additional limitations in the later chapters. Appendix B has discussions on latent variables.

8. Conclusion

This study incorporated first-time homebuyers (FHTBs) and common interest developments (CIDs) in the cross-sectional and longitudinal analyses in an attempt to further the understanding of the determinants of residential satisfaction at one point in time and over time, using the unique redesigned AHS national data, the ordered choice regression models, and Theory of Family Housing Adjustment. Through the endeavor, this study is organized into five chapters as each chapter contains its sections and sub-sections. After Chapter 1 (Introduction), Chapter 2 (Literature Review) presents a theoretical framework of conceptualizing residential satisfaction and findings reported in the residential satisfaction literature. Chapter 3 (Research Method) discusses the econometric treatment of residential satisfaction and the data used for the empirical analysis. Chapter 4 (Results) presents the empirical findings. Finally, Chapter 5 provides discussions, implications, and suggestions for future research.

CHAPTER 2

REVIEW OF LITERATURE

The literature underpinned the major conceptualizations of residential satisfaction that had been developed. This chapter discussed the significance of previous research studies and the important variables that had been identified to shape residential satisfaction. The discussion also provided the background and context for this study.

1. Background of Residential Satisfaction

Residential satisfaction was considered not only as a multidimensional construct (Bonaiuto et al., 1999) but also as a complex cognitive construct (Lu, 1999), affected by a variety of socio-demographic and environmental variables. Satisfaction, the term's first known use dating back to the 14th century, was defined as "fulfillment of a need or want" (Merriam-Webster, n.d.-b). Many studies have explored various research areas of satisfaction. For example, some empirical studies investigated determinants of life satisfaction (Ferrer-i-Carbonell & Frijters, 2004; Van Praag & Ferrer-i-Carbonell, 2004; Van Praag & Frijters, 1999; Van Praag et al., 2003). Other satisfaction studies examined determinants of job satisfaction (Bryson et al., 2004; Clark, 1997; Clark & Oswald, 1994). Of all satisfaction research topics, residential satisfaction, too, became a globally popular topic outside the housing field of sociological research, including psychology, economics, and family and consumer sciences (Baillie & Peart, 1992; Bruin & Cook, 1997; Canter & Rees, 1982; Carswell, 2006; Cutter, 1982; Francescato et al., 1974; Galster & Hesser, 1981; James, 2007; Lévy-Leboyer & Ratiu, 1993; Marans & Rodgers, 1975; Michelson, 1977; Nathan, 1995; Weidemann & Anderson, 1985).

The reason for the topic's popularity was not only due to the above-mentioned twofold significance but also to the fact that developing countries increasingly recognized the connection of residential satisfaction to their development of national housing policies. Much of the research done on residential satisfaction has been conducted in developed countries due to two phenomena – suburbanization and urban renewal. For example, Levittown built by the real estate development company Levitt & Sons symbolized as the affordable suburban housing for many families during the 1940s and 1950s in the United States after the Home Owners' Loan Act of 1933 (or the Home-owners Refinancing Act) and the National Housing Act of 1934 (or the Federal Housing Administration Act) were enacted to promote homeownership and encourage improvement in housing standards and conditions. Among the early studies of residential satisfaction, Fried and Gleicher (1961) investigated residential satisfaction of the urban slum dwellers from Boston's West End area. Recent studies in developing countries, such as South Africa, Ghana, and Nigeria, have explored residential satisfaction in subsidized low-income housing (Aigbavboa & Thwala, 2018).

The literature recognized that residential satisfaction could be defined or measured differently across geographic locations and among social groups (Abidin et al., 2019; Biswas et al., 2021; Carswell, 2012; Emami & Sadeghlou, 2021; Lu, 1999; Mohit & Raja, 2014; Sam et al., 2012; Terzano, 2014). In this regard, there was no consensus on how residential satisfaction was conceived – the cognitive evaluation, the affective evaluation, or the conative evaluation (Canter & Rees, 1982; Francescato et al., 1989; Galster, 1987). As a result, the findings and the interpretation of residential satisfaction were directly influenced by measurement approaches, theoretical frameworks, and methodological techniques. Appendix B has discussions on how residential satisfaction is distinguished from other similar concepts.

2. Conceptualization of Residential Satisfaction

Researchers with different disciplinary backgrounds attempted to conceptualize residential satisfaction from different perspectives (Lu, 1999; Smith, 2011). Several approaches were used to measure residential satisfaction because, methodologically speaking, residential satisfaction was considered as either a criterion of residential quality or a predictor of behavior (Amérigo & Aragonés, 1997; Weidemann & Anderson, 1985). In the actual-aspiration gap approach, residential satisfaction measured the differences between one's actual and desired (or aspired-to) housing and neighborhood situations (Galster, 1987; Galster & Hesser, 1981). Hence, households' needs and aspirations would influence how they made judgements about residential conditions. One's satisfaction with his or her housing and neighborhood situations might suggest the absence of complaints and a high degree of congruence that one had between actual and desired situations; incongruence between these actual and needed conditions, on the other hand, might lead to dissatisfaction (Lu, 1999). Appendix B contains other related information.

3. Theory of Family Housing Adjustment

Morris and Winter (1975, 1978) introduced the notion of "housing deficit" to conceptualize residential (dis)satisfaction after the complete work of several others including Rossi (1955) and Wolpert (1965). Their housing adjustment model of residential mobility theorized that individuals judged their housing conditions according to both normatively defined norms – cultural norms and family norms. Cultural norms are dictated by societal standards or rules for life conditions, whereas family norms are amounted by households' own standards for housing. Hence, individuals continuously evaluate their housing to determine whether it is in accord with these norms, given the family life cycle stage in which they found themselves (Morris & Winter, 1975). The family norms do not always coincide with the cultural norms, considering housing needs may be viewed as the

cultural norms for housing. For example, a single-family detached structure surrounded by a green lawn and necessary bedroom spaces for parents/adults and children of same/opposite sex are prescribed by the mainstream culture as part of the housing norms (cultural norms) in the United States. Of course, rental arrangements may be favored by some households for other reasons including limited financial resources.

The housing adjustment theory contends that if a household's current housing meets these cultural and family housing norms, the household is likely to express a high level of satisfaction with its housing and neighborhood. An incongruity between the actual housing situation and the housing norms (cultural and/or familial) results in a normative housing deficit, which in turn increases residential dissatisfaction. In this respect, dissatisfied households with a housing deficit are likely to consider one form of the two housing adjustment behaviors. First, households may decide to make "in situ" adjustments to reduce dissatisfaction. In situ adjustments will require households to either revise their needs and aspirations to reconcile the incongruity or to improve the conditions of their housing unit through remodeling or renovation. The second form is that households may relocate to another place and bring their housing into conformity with their housing needs. Residential satisfaction, in fact, has been showed to have a significant influence on mobility behavior (Lu, 1998). Nevertheless, in situ adjustments and migration are subject to the constraints posed by both households' financial resources at disposal and by the information concerning alternative adaptation opportunities. With various constraints on their abilities to engage in adjustment behavior, households may also develop unconventional housing preferences to reduce dissatisfaction (Bruin & Cook, 1997). Housing deficit is demonstrated by many empirical studies to be a useful notion in explaining residential satisfaction and mobility behavior (Baillie, 1990; Bruin & Cook, 1997; Cho et al., 1990; Cook et al., 1994; Crull et al., 1991; Lu, 1999).

4. Determinants of Residential Satisfaction

Most empirical analyses of residential satisfaction were conducted based on one of the major theoretical frameworks (Lu, 1999, p. 267). Galster (1987), Lu (1999), and Wiedemann and Anderson (1985) were among the most significant studies in the research of residential satisfaction. Early studies were conducted to establish the effects of various housing, neighborhood, and household characteristics on residential satisfaction (Baillie & Peart, 1992; Bonnes et al., 1991; Galster, 1987; Galster & Hesser, 1981; Ha & Weber, 1991; Marans & Rodgers, 1975). Besides the general focus of previous studies, several studies also investigated the correlates of residential satisfaction for specific population groups that were defined by socio-demographic characteristics, including urban dwellers (Miller et al., 1980), suburban homeowners (Cutter, 1982), single-parent families (Bruin & Cook, 1997; Cook, 1988; Cook et al., 1994), urban Black adults (Jagun et al., 1990), council housing residents in Spain (Amérigo & Aragonés, 1990), older women in Florida (Baillie & Peart, 1992), elderly residents in subsidized housing (Johnson et al., 1993), residents in rural communities (Vrbka & Combs, 1993), households at risk of serious housing problems (Crull, 1994), residents of a World Bank-sponsored sites and services housing project in India (Nathan, 1995), and residents in gate-guarded neighborhoods (Carvalho et al., 1997).

Recent studies of residential satisfaction have analyzed a host of variables representing individuals' socio-demographic attributes, housing and neighborhood characteristics, as well as individuals' perceptions of residential conditions. With the wide-ranging analysis of variables, differences in model specification and data type preclude a direct comparison of the findings. For example, Lu (1999) stressed the importance of ordinal regression analysis for the ordinal nature of the dependent variables representing residential satisfaction. However, two details of those studies were worth emphasizing. First, the importance of the perceptual variables was recognized based

on the belief that what was important in determining individuals' residential satisfaction was their perception, rather than the actual configuration of residential conditions (Galster & Hesser, 1981; Weidemann & Anderson, 1985). Hence, objective measures of residential attributes alone offered an inadequate explanation of satisfaction. Second, although the two types of satisfaction were closely related, neighborhood satisfaction was considered different and was often analyzed separately from dwelling satisfaction (Crull et al., 1991). Assessment of one's housing was indeed likely to include immediate surroundings, even his or her relationship with neighbors (Fried & Gleicher, 1961; Western et al., 1974).

Overall, a number of important determinants of residential satisfaction had been identified in the literature. For example, regarding individual and household attributes, being older was found to be related to more satisfaction, even over time for different age groups (Kabisch et al., 2021). The reason was that older adults might have had more time to select a favorable environment and to build better living conditions (Campbell et al., 1976; Galster & Hesser, 1981; Lu, 1999; Morris & Winter, 1978; Rogers & Nikkel, 1979). Similarly, having higher income and having a smaller family had been related to more housing satisfaction, given that individuals with the more financial means could select the most desirable homes and neighborhoods (Campbell et al., 1976; Galster & Hesser, 1981; Morris & Winter, 1978; Rogers & Nikkel, 1979). By the tenure status, homeowners, particularly owners of single-family housing units, were found to be more satisfied with their homes and neighborhoods than were renters (Elsinga & Hoekstra, 2005; Lu, 1999; Rohe & Basolo, 1997; Rohe & Stegman, 1994; Vera-Toscano & Ateca-Amestoy, 2008). The rationale was that homeownership was viewed to provide not only security, stability, and a symbol of social status but also to signalize considerable personal achievements such as pride of ownership. For this study, housing tenure was included in the analysis to further measure differences in residential satisfac-

tion between renters, first-time homeowners, and repeat homeowners. First-time homeownership might mean differently to individuals, but it did have both universal appeal and aspiration (in my opinion). For example, in the United States first-time homeownership entrenched itself in the cultural norms beyond the new-house-smell experience, i.e., *in pursuit of the American Dream*. Furthermore, first-time homebuyer programs such as down payment and closing-cost assistance programs in the country had been well supported by both public and private sectors. Therefore, it was worth identifying the "true" effect of first-time homeownership on residential satisfaction.

Previous studies also identified the significant effects of housing and neighborhood condition and locational characteristics. For example, available space in the housing unit was shown to positively affect residential satisfaction because having enough space for individuals' activities and possessions would meet their housing needs (Davies & Crouchley, 1984; Lévy-Leboyer & Ratiu, 1993; Lu, 1999). However, several variables were also shown to have their contradictory effects on residential satisfaction in the literature. For example, duration of residence was found to have the mixed effects on residential satisfaction. Hipp (2009) and Smith (2011) found no effect of length of residence on neighborhood satisfaction. Kasarda and Janowitz (1974) and Marans and Rodgers (1975) found a positive effect of residence duration on neighborhood satisfaction in the U.S. However, Onibokun (1976) showed in his study of subsidized housing in Canada that longer stays were associated with lower levels of neighborhood satisfaction. The latter finding seemed to oppose the notion that the longer residence might lead to better integration into the local milieu, resulting in higher residential satisfaction (Speare, 1974). Moreover, previous studies showed that geographic differences had the significant effects on individuals' assessments of residential situations because the type of place in which one lived mattered. Central city and suburban residents were more likely to feel satisfied with their housing and less likely to feel satisfied with their neigh-

borhood than were residents in non-metropolitan areas (Campbell et al., 1976; Dahmann, 1985; Lee & Guest, 1983; Lu, 1999). In addition to controlling for regional and metropolitan locations, this study further evaluated the effect of residential subdivision type on residential satisfaction – common interest developments vs. standard subdivisions.

Over the period of 1960 through 2020, CIDs and their corresponding residential community associations (RCAs) such as homeowner's associations (HOAs) significantly grew and became popular across the United States in comparison to traditional standard subdivisions of housing developments. These common interest subdivisions were not prevalent outside the U.S., but they could contrast with comparable privately governed communities in other countries, including Australia, Canada, China, Japan, and the United Kingdom (Glasze et al., 2005; McKenzie, 1994, 2011; Wang, 2013). However, opinions were divided between two sides over whether residents were more satisfied with living in their CID communities under the additional rules of private governments. In exerting their quasi-political powers, Guberman (2004) called this proliferation of HOAs [=RCAs] "one of the most significant privatizations of local government functions in history." The advocates contended that CIDs and RCAs were a practical market solution to problems of local public goods such as free-rider problems (Barton & Silverman, 1994; Foldvary, 1994; Marshall et al., 2018; Nelson, 2005). On the other hand, the critics saw CIDs and RCAs as an unregulated hostage crisis with unwitting residents harassed by neighbors being the interfering busybodies (Benson & DeBat, 2014; Lucas, 2013; McKenzie, 1994).

Previous studies related to CIDs or RCAs so far had paid attention to other certain aspects. Some early studies focused on efficiency of RCAs, which might provide legal implications and court rulings such as a matter of all-inclusive neighborhoods (Dilger, 1991, 1992; Foldvary, 1994; Gibson & Lombard, 2005; Helsley & Strange, 1998; Langbein & Spotswood-Bright, 2004; Ma-

kovi, 2018; Nelson, 2009, 2011; Tullock, 1970). Rather a direct analysis of CIDs or RCAs, Currie (2018) examined the quality of RCAs in the context of forming social capital in newly constructed neighborhoods. Currie (2018) found that on the residents' rating of the conditions of stable houses and neighborhoods the effectiveness of homeowner's associations was ranked much higher in stable neighborhoods than in the unstable neighborhoods, reflecting how well HOAs could maintain their neighborhoods and provided relationships and networks within the neighborhoods. Few recent studies examined some form of CIDs such as gated communities. These studies did not investigate the effects of control variables on residential satisfaction. Rather, they examined sense of community (and its elements) in walled or gated communities (Sanchez et al., 2005; Smith, 2011; Wilson-Doenges, 2000). Using the 2001 American Housing Survey data, Sanchez et al. (2005) explained through the discriminant analysis the differences between gated homeowners, non-gated homeowners, gated renters, and non-gated renters due to the dichotomy between gated communities inhabited by mostly White homeowners with high income and minority renters with moderate incomes (i.e., the former based on status versus the latter motivated by concern for security). One counterintuitive finding was that gated communities were more prevalent among downscale (racial minority) renter than upscale owner markets. This indicated that there also existed renters' demand for CID communities.

Furthermore, Wilson-Doenges (2000) found that between public housing and high-income suburban communities (a total of four), high-income gated community residents reported a significantly lower sense of community, significantly higher perceived personal safety and comparative community safety (i.e., lower fear of crime), and no significant difference in actual crime rate compared to their non-gated counterparts. In the low-income communities, there were no significant differences between the gated and non-gated communities on any of the measures. It revealed

that even by income groups, gated communities did not seem to promote (or enhance) the sense of community, and thus they led to question residential satisfaction in such communities. Smith (2011) broadened the analysis of sense of community (as well as sense of belonging and sense of place) on residential satisfaction in the urban planned community of Ellenbrook, Western Australia. Using the Kruskal-Wallis analysis, the findings of the study suggested that sense of community, sense of belonging, and sense of place contributed to the development of residential satisfaction as did previous research studies. The social and physical factors such as feelings of belongingness, community attachment, community participation, minimal fear of crime, community layout and design, and housing density significantly contributed to the experience of high levels of residential satisfaction, sense of community, sense of belonging, and sense of place. However, it was rather surprising that the study found some of personal factors such as age, ethnicity, homeownership, length of residence, and educational level did not contribute to the development of residential satisfaction, sense of community, sense of belonging, and sense of place. While the study provided the interesting, and unexpected, insights of the interrelation, its empirical analysis from only one community with a sample of 300 residents was not self-evidently strong.

In more recent empirical studies, the relationship between RCAs and property values was examined – the quest for finding the price premium on property values in CIDs (Agan & Tabarrok, 2005; Angjellari-Dajci et al., 2015; Clarke & Freedman, 2019; Do & Sirmans, 1994; Goodwin et al., 2020; Grace & Hall, 2019; Groves, 2008; Hopkins, 2016; Meltzer & Cheung, 2014; Scheller, 2014). Of these findings that showed there existed the HOA price premium, two results were worth mentioning. Using the data from 2002 through 2013 in Duval County, Northeast Florida, Angjellari-Dajci et al. (2015) found that the real prices of single-family homes were negatively affected by property taxes but positively affected by homeowner's association membership. It might be

plausibly argued for high residential satisfaction in RCA-governed communities. By contrast, Goodwin et al. (2020) and Groves (2008) suggested that after controlling for key characteristics, the HOA price premium vanished, implying that there was some indication that residents did not universally prefer HOA communities in all market segments. Potential buyers might shy away from HOA-governed communities, at least within the highest price segment of the market (Goodwin et al., 2020). Thus, high residential satisfaction in such communities remained in question. The most relevant study of CID (or RCA) and residential satisfaction was Chapman and Lombard (2006), who conducted a cross-sectional study on the determinants of neighborhood satisfaction between fee-based gated and non-gated communities [= neighborhoods in their study]. Using the revised 2003 AHS data with a sample size of 3,700 unweighted households, their ordinal regression analysis showed that residents' age and the lack of knowledge of crime had the largest positive impact on how the residents rated their neighborhoods, which was measured in five ordered categories: ≤ 6, 7, 8, 9, and 10. With additionally available information in the national samples of the redesigned American Housing Survey (i.e., post-2013 surveys), this study was able to investigate the effects of CID and other control variables on individuals' satisfaction with housing and with neighborhood at one point in time and over time.

5. Conclusion

Measurement approaches, theoretical frameworks, and methodological techniques preclude a direct comparison of empirical results. Specific groups of residents also evaluate similar residential conditions differently due to their unique housing needs and neighborhood preferences. The actual-aspirational gap approach built the conceptual foundation of residential satisfaction. With the notion of housing deficit, this study, as did the previous studies, attempted to identify the housing, neighborhood and individual attributes that facilitated a satisfied or dissatisfied response

at one point in time and over time. Empirical studies in the literature investigated the effects of the relevant socio-demographic, housing and neighborhood characteristics that were considered as important in shaping residential satisfaction. Given the unique national data of the redesigned AHS, this study was able to incorporate the effects of FTHBs and CIDs in the quantitative analysis of residential satisfaction. It was hoped that this study's empirical findings could offer additional insights regarding individuals' experience with housing and neighborhood and further our understanding of the formation of residential satisfaction at one point in time and over time.

CHAPTER 3

RESEARCH METHOD

By investigating the cross-sectional and longitudinal effects of the socio-demographic, housing, and neighborhood characteristics on residential satisfaction, this study addressed the following questions:

1) How satisfied are first-time homeowners with their housing and neighborhood in comparison with renters or repeat homeowners?
2) How satisfied are individuals with their housing and neighborhood if their places of residence are in CIDs in comparison with those in standard subdivisions?
3) What are the significant effects of these relevant factors on housing satisfaction and neighborhood satisfaction over time?

Accordingly, this study hypothesized that:

1) First-time homeowners are more likely to express high levels of satisfaction with their housing and neighborhood than those householders who are renters or repeat homeowners, given cultural and/or family norms such as *in pursuit of the American Dream.*
2) Householders whose residences are in CIDs are more likely to express high levels of satisfaction with their housing and neighborhood than those in standard subdivisions, given all attractive amenities and services CIDs have to offer their residents.
3) Changes in the characteristics of households, housing, and neighborhood affect individuals' satisfaction with housing and neighborhood over time.

Using the secondary data of the 2015, 2017, and 2019 AHS national samples, this study relied on ordinal regression models to analyze the relationship between satisfaction, which was an ordinal variable, and its explanatory variables. The justification for ordered choice regressions was that McKelvey and Zavoina (1975) demonstrated that the assumptions for multiple regression models were violated when these linear regression models were used for the dependent variables that were the ordinal responses such as *Housing satisfaction* and *Neighborhood satisfaction* in this study. The multiple regression technique essentially failed to predict the true nonlinear relationship in the data, and consequently it underestimated the relative effects of explanatory variables on the ordinal dependent variables. For an ordinal level dependent variable, the ordered choice model such as the ordered logit or probit model was appropriate because such the model took not only the ceiling and floor effects into account but also avoided the use of a subjectively chosen scores assigned to the categories (Hanushek & Jackson, 1977). Moreover, even if the outcome variable was discrete, the multinomial choice model such as the multinomial logit or probit model was not appropriate because it still failed to account for the ordinal nature of this outcome variable (Greene, 1997, 2017; Greene & Hensher, 2010).

This chapter discussed the data analysis, the derivation of ordered choice models, the analysis strategy, and the selection of explanatory variables for the empirical analysis.

1. Data and Measures of Residential Satisfaction

1.1. About American Housing Survey (AHS)

The sample data used in this study were drawn from the public use file (PUF) microdata of the AHS national samples of 2015, 2017, and 2019 (U.S. Census Bureau, 2021e). The redesigned AHS samples (i.e., the post-2013 AHS samples) offered several advantages. First, the AHS was the most comprehensive national housing survey, sponsored by the U.S. Department of Hous-

ing and Urban Development (HUD) and conducted by the U.S. Census Bureau (U.S. Census Bureau, 2020a). Since its inception in 1973, the AHS biennially collected in odd-numbered years the sample data on housing units from throughout the U.S. housing stock, with samples redrawn in 1985 and 2015. The purpose of the survey was to gather information on individual housing units and the households that occupied them in order to measure changes in the size, composition, and quality of the nation's housing stock as it aged. The amount of information on the characteristics of housing units, neighborhoods, and households as well as on households' assessments of their housing and neighborhoods, was available in the survey for the analysis of this study.

The redesigned AHS selected not only the entirely new housing unit samples of national and metropolitan areas in 2015 but also improved the quality of the survey variables (U.S. Census Bureau, 2020b). Variable definitions in the redesigned AHS survey were consistent with the 2000 Census and forwards (U.S. Census Bureau, 2020d). For example, the definition of being a first-time homeowner was precise in the post-2013 AHS samples. In the Yes-or-No question, each respondent was asked "Is this the first home you have ever owned?", instead of "First time home buyer or owned a home previously" in the prior-2013 AHS surveys. The difference was that the latter question allowed to include "repeat" first-time homeowners in those samples, given that qualified individuals were permitted to become first-time homebuyers more than one time in their lifetime (U.S. HUD, 2012). Furthermore, the post-2013 AHS samples contained additional variables. For example, information about residential community associations and subdivisions provided this study the grand opportunity to examine individuals' satisfaction with CIDs at the national level. Another example of the AHS survey improvements was that race and ethnicity were defined separately, and "Asian" and "Native Hawaiian and Other Pacific Islander" also became two racial identity categories (U.S. Census Bureau, 2020c). As a result, the "true" effects of such

variables could be useful to evaluate the effectiveness of housing programs and to aid in the planning of new programs.

Another advantage of the redesigned AHS was that the AHS was considered a longitudinal housing unit survey. Although the AHS followed individual housing units and not individual householders over time, same householders could be identified if they were participating in the previous survey years. The control number (CONTROL) could be used to link the records over the survey years to generate a panel data. Each control number represented the unique identification number of each housing unit. Beginning with the 2015 AHS survey, the first three digits of the control number were 110 for the national sample records and 210 for the metropolitan sample records, whereas the last five digits beginning with 00001 were sequentially assigned to identify individual housing units and thus individual households (U.S. Census Bureau, 2021b). The interview month (INTMONTH) normally took place in any calendar month of the survey year (e.g., 01 = January). Therefore, the AHS panel data was used for the longitudinal analysis of this study.

1.2. Sample Description

The AHS PUF microdata had more than 420 variables in national and metropolitan sample records. The 2015 and later AHS questionnaires administered by HUD and Census Bureau were organized into two types of question modules – core and rotating topical. In the core modules that were administered in every survey, questions related to the variables of core topics were always included, but they might be edited, removed, or added for the intent of permanent changes. In the rotating topical modules that appeared in one survey year, not in the next survey year, specific questions related to the variables of topical modules were administered in two respondent groups indicated by the primary sampling unit (SPLITSAMP) – some topical modules to Group 1 and some other topical modules to Group 2 for the maximum number of the rotating topical modules

(U.S. Census Bureau, 2021b). The AHS PUF samples thus included various topics and over-samples of each of the top 15 groups of metropolitan areas, commonly known as the 15 largest metropolitan areas, by population as of 2013 (U.S. Census Bureau, 2021d). In this regard, the sampling weights or probability weights (WEIGHT), as well as the sample stratification or cluster (OMB13CBSA), might be applied to adjust calculations of the point estimates and the standard errors when necessary.

1.3. Satisfaction Measures

Housing satisfaction and *Neighborhood satisfaction* were considered two observed indicators of residential satisfaction. For this study, housing satisfaction was measured by a respondent's overall opinion to the question: "On a scale of 1 to 10, how would you rate your unit as a place to live? 10 is the best, 1 is the worst". Similarly, neighborhood satisfaction was measured by a respondent's answer to the question: "How would you rate your neighborhood on a scale of 1-10? 10 is the best, 1 is the worst". The AHS did not define the term "neighborhood" to the respondents (U.S. Census Bureau, 2015, 2017, 2019, p. A-29). One's personal interpretation of what area might be included in his or her neighborhood was more relevant and meaningful than a pre-defined concept often used in the previous work. This also proved advantageous for this study.

The literature shows that the way residential satisfaction is measured is important in empirical analysis because it directly influences the findings (Lu, 1999). An additive index, or a composite indicator, is often used to measure one's satisfaction with housing and neighborhood. Researchers, such as sociologists or psychologists, first determine a list of attributes that are considered important to individuals and ask respondents to rate the attributes on a Likert-type scale. For example, on a scale of 1 (strongly disagree) to 5 (strongly agree), respondents are asked to express the extent of their agreement or disagreement with statements that reflect positive or negative at-

titudes toward these attributes. Next, researchers generate an aggregate measure by summing all these ratings. However, such arbitrarily created additive measures of satisfaction may be less appropriate than comprehensive measures of satisfaction (Galster, 1987; Morris et al., 1976). The reason is that the expressed satisfaction represents integrated participant perceptions that embrace the wide-ranging external conditions (Golant, 1982). Since a reacting individual is likely to attach to different levels of importance to various attributes of housing and neighborhood and their assigned weights may not be well understood, it can become difficult to construct externally calculated reliable measures of residential satisfaction (Moore, 1986). Therefore, a comprehensive measure of satisfaction with dwelling or neighborhood based on a single question, such as those used in this study, may avoid this complication (Lu, 1999).

The preliminary data analysis indicated that only householders with the occupied-interview status remained in the sample. The unbalanced panel sample contained 149,370 observations, or equivalently 58,111 unique housing units, and at least 58,111 individual respondents because different householders and household members from the same units participated in the AHS between the survey years. For the empirical analysis of this study, however, a *same-unit, same-person* sample was required. By the process of elimination that was set based on differences in individuals' age, sex, ethnicity, citizenship, education, housing tenure, and previous participation between the survey years, the final cross-sectional, time-series sample contained 87,500 observations (*N*), or equivalently 35,229 unique housing units (*n*), and 35,229 same individuals (*n*), depicted in Table 1. Given these three survey years, Table 1 also shows that 48.4% of the householders were participating in all three periods, the panel variable was a control ID (or an individual ID), and the time variable was Delta of 2 units with the time span of 3 years. Furthermore, the data examination showed that the respondents favorably rated their dwelling and neighborhood, with a rating of 5

or above. Upward bias in self-reported residential satisfaction has been documented in the literature because of the tendency that individuals have to conform or adapt to their residential environment over time and consequently report a reasonably high level of their satisfaction (Amérigo & Aragonés, 1990). The differences in individuals' evaluations reflect the gap between their perceived residential quality and their aspirations, insofar as they inflate their residential satisfaction to the similar extent (Lu, 1999).

The measures of housing satisfaction and neighborhood satisfaction were regrouped into four ordered categories: least satisfied (original levels 1-4), moderately satisfied (levels 5-6), very satisfied (levels 7-8), and most satisfied (levels 9-10). The regrouping was necessary due to the small number of observations in the original satisfaction levels of 1 through 4 and the need for a relatively easy interpretation of the results. Some previous studies took a similar approach (Basolo & Strong, 2002; Jagun et al., 1990; Lu, 1999). The four categories of housing satisfaction overall accounted for 2.02, 8.24, 37.92, and 51.83 percent, respectively. The four categories for neighborhood satisfaction overall consisted of 2.89, 9.51, 37.96, and 49.65 percent, respectively. Figures 5 and 6 show the overall numbers of observations in 4 categories of each satisfaction type by tenure. Each category's aggregate to the total observations (*N*) represented those above percentages. The total observations of renters, FTHBs, and repeat homeowners were 23,033 (26.32%), 32,797 (37.48%), and 31,670 (36.19%), respectively, whereas the counts of renters, FTHBs, and repeat homeowners were 9,779, 12,936, and 12,514, respectively, as later shown in Tables 7 and 8.

Table 1: Descriptive statistics of the unbalanced panel data

Variables	**Freq**	**Pattern**				**Delta**	**Span (T)**	**Survey Year**
Observations (*N*)	87,500	111	.11	11.	1.1	2	3	2015
Control ID (*n*)	35,229	17,042	9,891	6,758	1,538			2017
(%)	(100.00)	(48.37)	(28.08)	(19.18)	(4.37)			2019

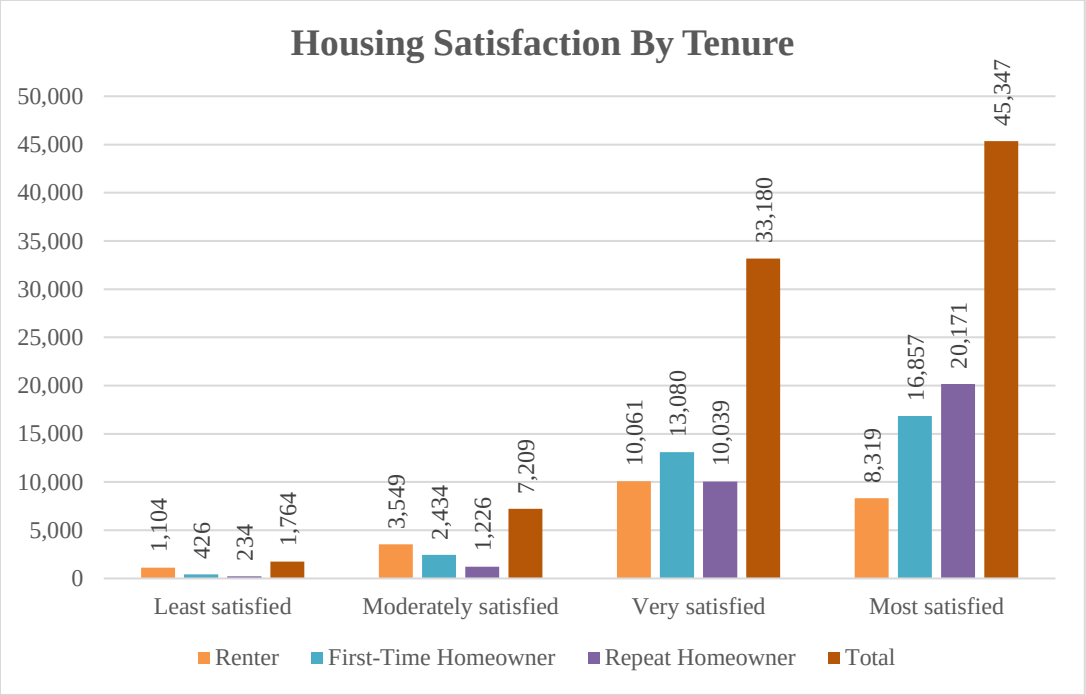


Figure 5: Overall numbers of observations in each category of housing satisfaction by tenure

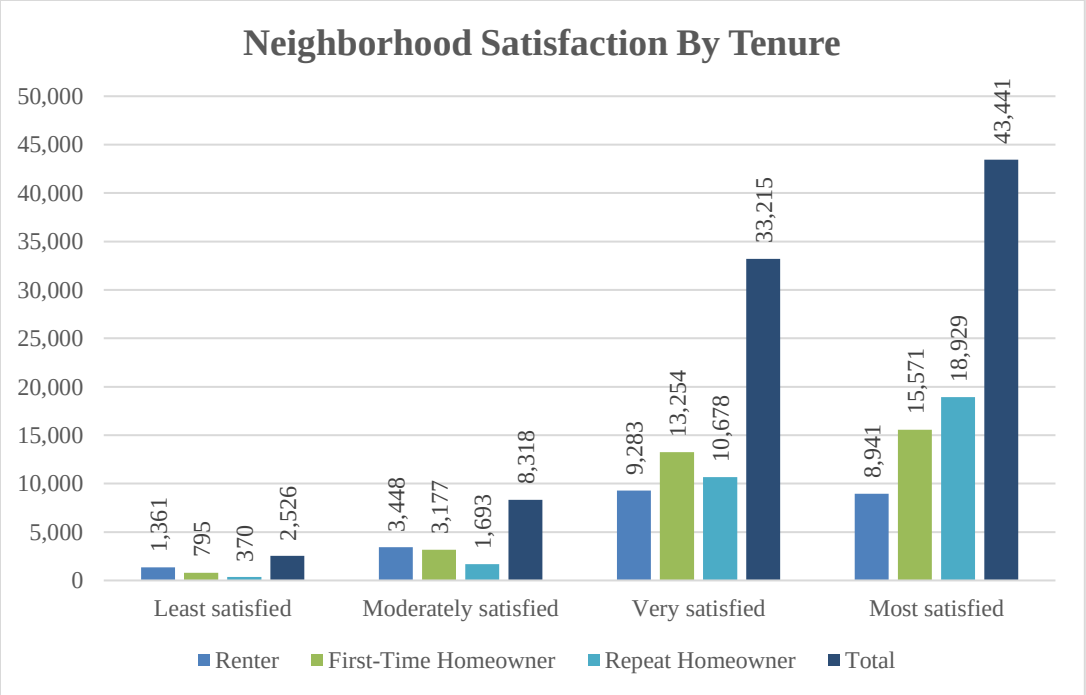


Figure 6: Overall numbers of observations in each category of neighborhood satisfaction by tenure

2. Econometric Treatment of Residential Satisfaction

Given the ordinal nature of each dependent variable, this study assumed that the underlying variable (utility as a latent variable) depended in a linear way on the set of regressors and error term. The appropriate model for ordinal dependent variables was the ordered logit or probit model, which took the ceiling and floor effects into account and avoided the use of a subjectively chosen scores assigned to the ordered categories (Hanushek & Jackson, 1977). Furthermore, this study assumed the error term to follow a logistic distribution with a zero mean and a variance of $\pi^2/3$ (i.e., producing the ordered logit model). For simplicity, mathematical derivations of ordered logit model and fixed-effects ordered logit model were demonstrated in this study.

2.1. Cross-Sectional Analysis Model

Suppose there are n observations and k independent variables $x_1, x_2, \ldots, x_k$. In the ordered logit model (also called the proportional odds model), the ordinal outcome variable, denoted by the variable $\boldsymbol{y}$, is considered the discrete realizations of an unobservable (latent) continuous random variable, $\boldsymbol{y}^*$. The categories are envisaged as contiguous intervals on the continuous scale. The latent variable $\boldsymbol{y}^*$ would satisfy a linear regression model of $\boldsymbol{y}^* = \boldsymbol{\beta x} + \boldsymbol{u}$, where $\boldsymbol{x}$ is a covariate vector, $\boldsymbol{\beta}$ is a vector of regression coefficients, and $\boldsymbol{u}$ is the random error term. The observable categorical variable $\boldsymbol{y}$ belonging to the j^{th} category is assumed to arise from the unobserved variable $\boldsymbol{y}^*$ as follows: $y_i = j$ if $\mu_{j-1} \leq y_i^* \leq \mu_j$, for j = 1, 2, … J, where μ's are unknown cut-points (i.e., category boundaries μ_{j-1} and μ_{j+1} are the lower and upper boundaries of the j^{th} category) in the distribution of $\boldsymbol{y}^*$, with $\mu_0 = -\infty$, $\mu_j = +\infty$, and $\mu_{j-1} \leq \mu_j$, $\forall\, j$. In this study, there are four cut-points (i.e., J = 4) because *Housing satisfaction* and *Neighborhood satisfaction* are the ordinal variables with four ordered categories: least satisfied (level 1), moderately satisfied (level 2), very satisfied (level 3), and most satisfied (level 4).

Suppose the probability that an individual reports a certain level of housing satisfaction or neighborhood satisfaction is

$$P_i = P\left(y = \frac{i}{\boldsymbol{x}}\right)$$

Hence, under the proportional odds assumption (or the parallel regression assumption) the proportional odds model, which is commonly used to analyze the ordinal responses, involves fitting a set of equations for cumulative distribution probabilities of the response categories as follows:

$$\frac{P\left(y \leq \frac{j}{\boldsymbol{x}}\right)}{P\left(y > \frac{j}{\boldsymbol{x}}\right)} = \exp(\mu_i - \boldsymbol{\beta}'\boldsymbol{x}) \text{ , for } j = 1, 2, 3, 4$$

where the conditional probability of having at most *j* level of satisfaction, given a vector of covariates $\boldsymbol{x}$, is denoted by

$$P\left(y \leq \frac{j}{\boldsymbol{x}}\right)$$

and the probability of being satisfied above the level of *j* is denoted by

$$P\left(y > \frac{j}{\boldsymbol{x}}\right)$$

and $\boldsymbol{\beta}'$ is a column vector of coefficients, $\boldsymbol{x}$ is a covariate vector, and the unknow parameters μ would satisfy $-\infty \leq \mu_1 < \mu_2 < \mu_3 < \mu_4 \leq +\infty$.

In this model, the regression coefficient β_k for the k^{th} explanatory variable, x_k, is the log-odd ratio for the association of y by x_k, *ceteris paribus*. The model assumes the relationship between the dichotomized variable y and explanatory variables $\boldsymbol{x}$ does not depend on the category *j*, the point at which the dichotomization in this model is made. This implies that the regression coefficient β_k for the k^{th} explanatory variable, x_k, does not depend on the cut-point *j*. This regression model is called the proportional odds model because of the assumption of identical odds ratios

across the categories (McCullagh, 1980). With this proportional odds assumption, the three cumulative odds ratios that are calculated from the four-level ordinal measure of *Housing satisfaction* and *Neighborhood satisfaction* are essentially identical. These three odds ratios are recorded between least satisfied and at least moderately satisfied, between at most moderately satisfied and more than moderately satisfied, and between less than most satisfied and most satisfied. The assumption of odds ratios can be tested using the score test (e.g., a Brant test), and the maximum likelihood method is required to estimate the models of proportional odds because they are nonlinear. It is worth mentioning that the proportional odds model becomes a binary logistic regression model if *y* is a dichotomous dependent variable that takes only two values.

The proportional odds model certainly avoids the problems related to OLS regression techniques (Lu, 1999). The reason is that the difference between corresponding cumulative logits is independent of the categories involved; however, the common slope assumption (also called the parallel-lines assumption) in the proportional odds model is not always reasonable. If this slope assumption is violated based on the score test, alternative models should be necessarily applied to allow the odds ratio to change with respect to the outcome categories. One alternative model is the generalized ordered logistic model (e.g., the generalized ordered logit/partial proportional odds model [gologit/ppo]) since it models the log ratio of probabilities for the base category and any other category (Lu, 1999; Williams, 2006, 2016). In this study, the log ratios are given in the model with four-ordered levels of residential satisfaction as follows:

$$log\left(\frac{P_4}{P_1}\right) = \mu_1 + \beta_1 \boldsymbol{x}$$

$$log\left(\frac{P_3}{P_1}\right) = \mu_2 + \beta_2 \boldsymbol{x}$$

$$log\left(\frac{P_2}{P_1}\right) = \mu_3 + \beta_3 \boldsymbol{x}$$

where $P_1, P_2, P_3,$ and P_4 are the probabilities that one would feel least satisfied (level 1), moderately satisfied (level 2), very satisfied (level 3), and most satisfied (level 4) with his or her housing and neighborhood, respectively. In this model derivation, the reference group of satisfaction is the least satisfaction category. Hence, the main interest is to analyze what factors might make individuals more or less likely to express high levels of satisfaction. By contrast, the signs for the estimated parameters would reverse if the highest satisfaction were used as the reference group. The magnitude of the parameters would also be different, as a result. The interpretation then would focus on under what circumstances individuals feel more or less dissatisfied; therefore, the conclusion drawn with different choices of the comparator should remain consistent (Lu, 1999). Cameron and Trivedi (2005), StataCorp (2019a), and Williams and Quiroz (2020) have additional discussions of the ordered logistic model.

2.2. Longitudinal Analysis Model

A common criticism of the cross-sectional analysis is its inability to capture the effect of heterogeneity across individuals. However, longitudinal studies of residential satisfaction are rare due to limitations such as available or reliable data (Diaz-Serrano, 2006; Kabisch et al., 2021). Furthermore, although a structural equation model (SEM) is capable to analyze the causal relationship for residential satisfaction, it often ignores the effects of individuals' residential aspirations (perceptions) and unobservable heterogeneity across individual preferences (Diaz-Serrano, 2006; Oh, 2003; Molin & Timmermans, 2003; Ren & Folmer, 2016). For the panel-data analysis of this study, the fixed-effects ordered logit models were used to investigate the effect of heterogeneity across individuals on their levels of residential satisfaction. The fixed-effects (FE) model is used for the interest of analyzing the impact of variables that vary over time, and the random-effects model is used for the interest of assuming the variation across entities to be random and

uncorrelated with the model predictor variables (Torres-Reyna, 2007). The estimated coefficient of an independent variable in the fixed-effects regression indicates how much the dependent variable changes when that independent variable changes by one unit over time, whereas the estimated coefficient of an independent variable in the random-effects regression indicates the average effect of that independent variable over the dependent variable when that independent variable changes by one unit across time and between the panel variable (i.e., *timevar* and *panelvar* in Stata represent the time and panel variables, respectively). Two additional points are worth noting. First, one of the important assumptions in the FE model is that time-invariant characteristics are unique to the individual and not correlated with other individual characteristics. Second, the FE model does not work well with the data for which within-cluster variation is minimal or for slowly changing variables over time. StataCorp (2019b) and Torres-Reyna (2007) provide the additional details.

This study adopted the work of Baetschmann et al. (2015, 2020) for the deviation of fixed-effects ordered logit models and used the built-in command *feologit* in the statistical software Stata for the empirical analysis. In the fixed-effects ordered logit model, the latent variable $\boldsymbol{y}^*$ is presumedly realized through the observable ordered level dependent variable $\boldsymbol{y}$, which takes values 1, ..., J (i.e., J = 4 in this study). The latent variable y_{it}^* for individual i at time t depends on observable characteristics $\boldsymbol{x}_{it}$ and the remaining unobservable characteristics α_i and u_{it} to satisfy a regression model of $y_{it}^* = \boldsymbol{\beta}'\boldsymbol{x}_{it} + \alpha_i + u_{it}$ for $i = 1, \ldots, N$ and $t = 1, \ldots, T$, where $\boldsymbol{x}_{it}$ is a covariate vector that does not include an intercept because α_i represents individual-specific intercepts, $\boldsymbol{\beta}$ is a vector of regression coefficients, and u_{it} is the random error term. For simplicity of notation, the derivation uses a balanced panel; however, one easily extends the model to any unbalanced panel where $t = 1, \ldots, T_i$ (Baetschmann et al., 2020, pp. 265-273). The fixed effect is the time-invariant, individual-specific part of the unobservable α_i, which may or may not statistically depend on $\boldsymbol{x}_{it}$.

The relationship between the latent variable y_{it}^{*} and the observable ordered level variable y_{it} through the thresholds μ_{ij} is expressed as follows: $y_{it} = j$ if $\mu_{ij} \leq y_{it}^{*} \leq \mu_{ij+1}$, for j = 1, … J, where unknown individual-specific thresholds μ_{ij} are assumed to be increasing for each person such that $\mu_{ij} \leq \mu_{ij+1}\ \forall\ j$, $\mu_{i1} = -\infty$, and $\mu_{ij+1} = +\infty$, $\forall\ j$ = 2, …, J–1. Moreover, the model assumes the time-varying unobservable terms u_{it} are independent and identically distributed with the standard logistic cumulative density function of

$$F(u_{it}|\boldsymbol{x}_{it}, \alpha_i) = F(u_{it}) = \frac{1}{1 + \exp(-u_{it})} \equiv \Lambda(u_{it})$$

Thus, the probability of observing outcome *j* for individual *i* at time *t* is:

$$Prob(y_{it} = j|\boldsymbol{x}_{it}, \alpha_i) = \Lambda\left(\mu_{ij+1} - \boldsymbol{\beta}'\boldsymbol{x}_{it} - \alpha_i\right) - \Lambda\left(\mu_{ij} - \boldsymbol{\beta}'\boldsymbol{x}_{it} - \alpha_i\right) > 0$$

This shows that the probability depends not only on $\boldsymbol{x}_{it}$ and $\boldsymbol{\beta}$ (the parameter of interest) but also on α_i, μ_{ij}, and μ_{ij+1}. From this probability, it is obvious that $\mu_{ij} - \alpha_i \equiv \alpha_{ik}$ is identified without further assumptions on the thresholds because the model defines $\tilde{\mu}_{ij} = \mu_{ij} + \xi$ and $\tilde{\alpha_i} = \alpha_i - \xi$ for any $\xi \in \mathbb{R}$ (Baetschmann et al., 2020). Few pointers are worth mentioning for the fixed-effects ordered logit model (Baetschmann et al., 2020). First, direct estimation of α_{ik} is difficult because of the commonly known "incidental parameter problem" (Neyman & Scott, 1948; Lancaster, 2000). Second, the resulting bias in $\widehat{\boldsymbol{\beta}}$ can be large in short panels (Abrevaya, 1997; Greene, 2004). Hence, a consistent estimator of $\boldsymbol{\beta}$ can be obtained by collapsing y_{it} into a binary variable and applying the conditional maximum likelihood (CML) estimator (Andersen, 1971; Chamberlain, 1980; Muris, 2017). Baetschmann et al. (2020) has a full discussion on the blowup and cluster (BUC) estimators of the *feologit* model, the estimators of conditional maximum likelihood (CML), and the BUC estimators with the thresholds BUC-τ.

2.3. Analysis Strategy

The analysis strategy used in this study was to estimate cross-sectional and longitudinal regression models in Stata 16. The reason behind this was that the cross-sectional regressions were estimated to answer the research questions 1) and 2) and to test the hypotheses 1) and 2) in combination with the examination of interaction effects, whereas the regressions in the longitudinal analysis addressed the third research question and the third hypothesis.

In the cross-sectional analysis, this study first estimated the proportional odds models using the cross-sectional data (i.e., the sample size of 35,229 individual householders who were randomly selected from the final panel dataset without replacement). If the common slope assumption was rejected, the generalized ordered logit/partial proportional odds models would be used with the same cross-sectional data and the same set of the control variables. In the cross-sectional analysis, this study also tested the interaction effects of housing tenure with CIDs and of household crowding with householders' ethnicity and nativity status. Given that the former interaction effects seemed intuitive, the latter interaction effects examined overcrowding on residential satisfaction of Hispanic and foreign-born householders because these population subgroups experienced relatively high levels of household crowding in their households (Blake et al., 2007).

In the longitudinal analysis, this study estimated the fixed-effects ordered logit regression models with the community-contributed command *feologit* in Stata 16, using the final cross-sectional, time-series data containing 87,500 observations and 35,229 individual householders. The fixed-effects ordered logit regression models were chosen over the random-effects models based on the interest of this study and the Hausman test, and the fixed-effects models were also known to be consistent (but inefficient).

3. Selection of Explanatory Variables

The past studies on residential satisfaction guided the selection of explanatory variables for this study. Three groups of variables were considered in the analysis to control for possible differences in the assessment of same residential conditions by individuals with different household background. The first group consisted of variables that represented individuals' perceptions of residential conditions. *Housing satisfaction* and *Neighborhood satisfaction* were the variables of interest. Given that the relationship between one's satisfaction with housing and with neighborhood was closely related, one type of satisfaction was used to predict the other satisfaction. Another variable in this group pertained to whether individuals perceived something bothersome about their neighborhood. The rationale was that such problems as crime, litter, and poor public services in individuals' neighborhoods would adversely affect their residential satisfaction. The general appearance of the neighborhood was closely associated with neighborhood dissatisfaction (Parkes et al., 2002). In this study, the indicator variable *Bothersome* represented this attribute. Using the available information in the AHS PUF microdata, this binary variable took a value of 1 if individuals perceived at least one bothersome feature in their neighborhood (and 0 otherwise). These features were related to whether within the ½ block of the residents' housing units there were 1) abandoned buildings, 2) buildings with bars on windows, and 3) amount of trash, litter, or junk in streets, lots, or properties, as well as to whether the neighborhood had 4) a lot of petty crime, 5) a lot of serious crime, 6) no good public transportation (bus, subway, or commuter train service), 7) no good schools, and 8) was at high risk for floods or other disasters.

The second group of variables comprised individual and household attributes. Age of householders (measured in years) was included in the analysis to control for possible differences in the assessment of same housing and neighborhood conditions by individuals with various ages.

Residential satisfaction might be positively related to householders' age. The rationale was that older adults might have had more time to select a favorable environment and build better living conditions (Campbell et al., 1976; Galster & Hesser, 1981; Lu, 1999; Morris & Winter, 1978; Rogers & Nikkel, 1979). Another variable was householders' gender – female and male (reference category). The analysis included householders' gender to compare men's satisfaction with housing and neighborhood with women's housing and neighborhood satisfaction. On average, women were more likely to be satisfied with community conditions than men, i.e., their community satisfaction on average was higher (Filkins et al., 2000). It was plausible that residential satisfaction might be positively related to female householders. Besides, female householders might be quite selective in their residential choices, given all neighborhood and housing activities of average households. Race, ethnicity, and nativity were also included in the analysis to control for possible differences in the assessment of same residential conditions by individuals with different racial, ethnic, and nativity groups. "Race" in this study referred to the racial classification that householders self-identified themselves as either 1) White or Caucasian (reference category), 2) African American or Black, 3) American Indian and Alaska Native, 4) Asian, 5) Naive Hawaiian and Other Pacific Islander, or 6) Multiracial or "two or more races" category (U.S. Census Bureau, 2015, 2017, 2019, p. A-34). "Ethnicity" referred to the ethnic origin of a householder, rather than a racial classification (U.S. Census Bureau, 2015, 2017, 2019, p. A-34). In this study, householders self-identified their ethnicity as whether they were the Hispanic/Spanish origin (reference category) or not. "Nativity" referred to whether a householder was a native-born person (reference category) or a foreign-born person at birth (U.S. Census Bureau, 2015, 2017, 2019, p. A-3). Given that cultural and family norms do not always coincide, individuals' satisfaction with housing and neighborhood might be affected differently by their shared cultural background or heritage.

Another variable in this group was householders' education attainment. This variable was categorized into three groups: 1) less than high school education (reference category), 2) high school and less than bachelor's degree education, and 3) at least bachelor's degree education. The theoretical rationale behind it was less clear. However, its effect on housing satisfaction was argued to be negative because higher educated individuals seemed more critical of their housing conditions or had higher expectations that could be met (Vera-Toscano & Ateca-Amestoy, 2008). Neighborhood satisfaction, on the other hand, was argued to be positively related to education because of possible cultural capital effects that came with higher education (Bourdieu, 1984) and might make a neighborhood more desirable (Hipp, 2009). The tenure status was also included in the analysis to control for possible differences in the assessment of same housing and neighborhood conditions by individuals with different housing tenure choices. It was suggested that residential satisfaction might be positively related to homeowners because homeownership was viewed to provide not only security, stability, and a symbol of social status but also to signalize considerable personal achievements such as pride of ownership (Elsinga & Hoekstra, 2005; Lu, 1999; Rohe & Basolo, 1997; Rohe & Stegman, 1994; Vera-Toscano & Ateca-Amestoy, 2008). In this study, the tenure status had three categories: 1) renter, 2) first-time homeowner (reference category), and 3) repeat homeowner. As it was previously mentioned in the assumptions and limitations section, this study only considered householders' non-transitional housing tenure. This meant that there was no switching tenure for renters and repeat homeowners within their same housing units between the survey years, given that first-time homeowners were being ever first-time homebuyers. This assumption was reasonable because a dissatisfied householder would be more likely to relocate rather than to change the tenure choices within the same housing unit across the survey years. Furthermore, a renter householder who was satisfied with his or her residential

situation could become a homeowner in the same unit; therefore, he or she would be considered as a homeowner in this study. Another variable in this group was income, which was hypothesized to be positively associated with residential satisfaction (Campbell et al., 1976; Galster & Hesser, 1981; Morris & Winter, 1978; Rogers & Nikkel, 1979). The rationale was that households with more financial resources were able to select the most desirable homes and neighborhoods. This study considered only non-negative household income in the analysis.

Household type was also included in the analysis. Residential satisfaction might be related to the household type because individuals' different household background would affect their satisfaction with housing and neighborhood. Having a smaller family had been found to be related to more housing satisfaction (Campbell et al., 1976; Galster & Hesser, 1981; Morris & Winter, 1978; Rogers & Nikkel, 1979) and to less neighborhood satisfaction (Hipp, 2009; Lu, 1999). Based on the presence or absence of spouse and children, householders were categorized into five groups: 1) never-married/single-person, 2) single-parent, 3) married couple without children (reference category), 4) married couple with children, and 5) other households without children (widowed, divorced, and separated). Individuals' duration of residence, recent mobility experience, and same-household status were also included in the analysis. Duration of residence referred to the length of time that individuals had spent in their current place of residence. Residence duration might be positively related to residential satisfaction because longer duration might lead to better integration into the local milieu, resulting higher residential satisfaction (Speare, 1974). Conversely, high levels of residential satisfaction might produce individuals' longer duration of residence. The effect of residence duration was found to be mixed. With the panel data, this study was able to estimate the longitudinal effect of duration of residence on residential satisfaction. In addition, this study included individuals' recent mobility experience, which referred to whether they moved to their

current residence within the last 12 months. People moved for various reasons, but relocation might likely reflect individuals' housing adjustment which brought their housing into conformity with their housing needs. Thus, the moving experience might result in high levels of residential satisfaction. The last variable in this second group was the same-household status of householders in their units. This categorical variable had 3 groups: 1) a householder's household remained the same, i.e., the same household composition (reference category), 2) a householder with his or her household composition changes, and 3) a householder who was completely new in his or her current residence. The rationale for it was to capture the difference in the assessment of same housing and neighborhood conditions by individuals who were the same households and new households. Usually, recent movers who relocated in the past 12 months were the newcomers in their neighborhoods. Most of them would most likely be renters, given that it typically took a longer time for homeowners to move. Some recent movers, however, might not be completely different householders based on the year they initially moved into their units, e.g., the returned owners of the units. Likewise, some of those newcomers in their current units might not be the recent movers who recently relocated in the past 12 months because of the interview time of their taken survey.

The third group of variables in the analysis included housing and neighborhood conditions and locational variables. One of the variables in this group was property values. It was argued that property values might be positively related to residential satisfaction because units with high property values were likely to be in better residential areas, where they had ideally attractive amenities to offer residents (Lu, 1999). In the AHS microdata, there were no actual market values of housing units reporting. Each owner's property value was self-assessed based on the respondent's answer to the question in the AHS: "What is the sales price asked for that property?". Renters were assumed to have no property values of their units as they lived in rental units that were commercially

owned and residentially located in comparable neighborhoods. The next variable was the housing cost ratio, which was simply a percentage of total housing costs to total household income. The rationale was that unaffordable housing costs implied high housing cost burdens, resulting in making some form of housing adjustment to reduce dissatisfaction (Lu, 1999). In the U.S., households who were paying at least 30 percent or at least 50 percent of their household incomes on housing costs were considered "housing-cost burdened" or "severely cost-burdened" households. Total housing costs consisted of mortgages/rents, utilities, property taxes, insurances, association membership fees, land lot rent, and routine maintenance amounts. Another variable in this group was the status of subsidized housing or housing assistance, which referred to whether householders were the recipients of housing subsidies. This variable could be used as a proxy for the public housing measure or the affordability measure since traditional forms or services of public housing programs might have changed over time. For example, housing assistance programs in the U.S. provided eligible families the affordable housing not only in the publicly owned units but also in the commercially owned units. Eligible individuals were also qualified for homeownership opportunities through these programs (U.S. HUD, n.d.-c). In this study, the variable *Subsidized housing status* took a value of 1 (reference category) if a householder's unit was identified as a HUD-assisted unit, including the unit of public housing, privately-owned multifamily, or housing choice voucher programs (and 0 otherwise).

Previous studies showed that housing quality problems had significant effects on residential satisfaction. However, there were many variables that might be incorporated to relate to housing quality, and the variables in the AHS were no exception. If all variables in the AHS that related to housing quality were to be included, the model would become very cumbersome. As it was previously discussed in the assumptions and limitations section in Chapter 1, this study considered

a composite measure of housing adequacy that was compiled by the AHS as an indicator of housing quality. This variable took into account housing conditions relating to plumbing, heating, electric, upkeep, and hallways (U.S. HUD, 2013). Although this composite measure had its limitations, it could indicate the overall quality of housing, which assessed the extent to which the housing stock in the U.S. met the standard of "a decent home and a suitable living environment," established by the Housing Act of 1949 (U.S. HUD, 2014). This measure included three levels of severe housing problems: adequate, moderately inadequate, and severely inadequate (U.S. HUD, 2013). In this study, the categorical variable *Housing adequacy* took the value of 1 if a housing unit was identified as "adequate" (reference category), 2 if it was "moderately inadequate", and 3 if it was "severely inadequate" (U.S. Census Bureau, 2015, 2017, 2019, pp. A-12 - A-13). Furthermore, structural unit type was also included in the analysis to control for functional differences between housing units and not specifically for the differences in the morphological configuration or typologies of units. Appendix B has discussions on these differences. In this regard, structural types might be related to residential satisfaction. The rationale was that a structural type that had all desirable functionalities might satisfy individuals' housing needs; as a result, there was no need of housing adjustment. Mobile-home dwellers, for example, were found to be the least likely to be satisfied with their homes (Lane & Kinsey, 1980). In this study, the categorical variable *Type of housing unit* had five categories: 1 if a housing unit was a mobile home or trailer, 2 if it was a single-family detached house (reference category), 3 if it was a single-family attached house, 4 if it was an apartment (i.e., a multiunit residential building with 2 or more apartment units), and 5 if it was other structures including boat homes, vans, recreational vehicles (RVs).

Another variable in this group was the room stress index. Previous studies showed available unit space or unit size had the significant effect on residential satisfaction (Davies & Crouchley,

1984; Lévy-Leboyer & Ratiu, 1993; Lu, 1999; Rossi, 1955, 1980; Vera-Toscano & Ateca-Amestoy, 2008; Weidemann & Anderson, 1985). In this study, the variable *Household crowding* referred to the condition of crowded housing when the number of occupants exceeded the capacity of available space in the unit. Household crowding might be negatively related to individuals' satisfaction with housing and neighborhood because a crowded-housing condition, or an over-crowded unit, is generally undesirable and thus adversely affects individuals' assessment of residential conditions (e.g., it affects occupants as well as neighbors or neighborhood). In lieu of a conventional measure that was commonly used in previous studies, a room stress index was created for this variable to measure household crowding, given the American housing (cultural) norms. This type of index was frequently used to measure the relative abundance or scarcity of housing space (Davies & Crouchley, 1984; Lévy-Leboyer & Ratiu, 1993; Lu, 1999). Because the limited information on household members in the redesigned AHS (e.g., gender of householders' children was unavailable), such the index that was used in Lu (1999) and other similar studies could not be produced in this study. Consequently, this study defined the room stress index as the ratio between the number of people and the actual number of total room available (excluding bathrooms) less one room if total rooms were more than 1. If a unit was identified as a one-room unit, there was no subtraction of one room from the total rooms. A one-room unit did not always imply a small-sized unit. Therefore, one-room units presumably sufficed for householders' housing needs, regardless their actual unit sizes. In a sense, this room stress index in this study might be considered a "modified" measure of persons-per-room (PPR), and its small values indicated more available space for households. This "modified" PPR measure might be also considered a more conservative measure than the standard PPR because it took into account the housing space norms in the U.S., which typically required two rooms for a prime adult or a couple in a household. For example,

suppose a housing unit had two persons and five rooms. The calculated ratio of this room stress index would be 0.50 (= 2/(5-1)) compared to the standard PPR of 0.40 (=2/5). Using the same PPR scale, this household was not considered overcrowding because the index value was less than 1 (Blake et al., 2007).

The remaining variables in this group were locational variables. In addition to the control variables of regional and metropolitan locations, residential subdivision type was included in the analysis to control for possible differences in the assessment by individuals who lived in standard subdivisions and CIDs. The type of place in which one lives matters. Given all attractive amenities and services CIDs had to offer their residents, it was plausible that residents who lived in CIDs were likely to express higher satisfaction with their housing and neighborhood than those who lived in standard subdivisions. The binary variable *CID status* was coded as 1 (reference category) if a housing unit was identified as either being a condominium with its condominium association membership or being part of a subdivision or housing development with its membership of residential community association such as HOA (and 0 otherwise). It was worth noting that some HOA-governed communities were standalone HOAs and not part of CIDs. In the AHS, three primary variables (*CONDO, SUBDIV, HOA*) were used to determine whether a housing unit was part of a CID. In other words, the respondents were asked to answer three Yes-and-No questions: "Is this unit part of a condominium?" for the variable *CONDO*; "Is your home part of a subdivision or housing development?" for the variable *SUBDIV*; and "Is this unit part of a homeowner's association?" for the variable *HOA*. The variable *HOA* in the AHS referred to homeowner' associations, condominium associations, or other associations (U.S. Census Bureau, 2015, 2017, 2019, p. A-25). Table 2 summarizes the variables used in the empirical analysis of this study and their reference categories.

Table 2: Summary of the variables

Variable Label	**Description** (The reference category is denoted by (*****) next to that category.)
1. Perceptual Variables	
Housing satisfaction (used neighborhood models only)	1 if least satisfied*****, 2 if moderately satisfied, 3 if very satisfied, 4 if most satisfied
Neighborhood satisfaction (used in housing models only)	1 if least satisfied*****, 2 if moderately satisfied, 3 if very satisfied, 4 if most satisfied
Bothersome	1 if there are bothersome features of residents' neighborhood*****, 0 otherwise
2. Socio-Demographic Characteristics	
Age	Age of the person (in years)
Gender	1 if male*****, 0 if female
Race	1 if White/Caucasian*****, 2 if Black/African-American, 3 if Native Indian, 4 if Asian, 5 if Naive Hawaiian and Pacific Islander, 6 if Multiracial
Ethnicity status	1 if the Hispanic/Spanish origin* (including all other Hispanic or Latino groups), 0 otherwise
Nativity status	1 if a native-born person*****, 0 if a foreign-born person
Education attainment	1 if less than high school education*****, 2 if high school and less than bachelor's education, 3 if bachelor's degree or higher
Housing Tenure	1 if renter, 2 if first-time homeowner*****; 3 if repeat homeowner
Household income	in logarithmic form
Household type	1 if a never-married/single-person, 2 if a single-parent, 3 if a married couple without children*****, 4 if a married couple with children, 5 if other households without children (widowed, divorced, and separated)
Duration of residence	in years

Variable Label	Description (The reference category is denoted by (*) next to that category.)
Moved in last 12 months	1 if the household moved into the current residence within the past 12 month*, 0 otherwise
Same-household status	1 if the same householder without household composition changes*, 2 if the same householder with household composition changes, 3 if the completely new householder residing in the unit
3. Housing, Neighborhood and Locational Variables	
Property value ($)	U.S. dollar amount (in thousands)
Housing cost to income (%)	The monthly housing expense ratio as a percentage of household income, where monthly total housing costs are the sum of mortgages/rents, utilities, property taxes, insurances, association membership fees, land lot rent, and routine maintenance amounts; and monthly income equals to yearly household income that is divided by 12
Subsidized housing status	1 if the HUD assisted unit* (public housing, privately-owned multifamily, and choice voucher program), 0 otherwise
Housing adequacy	1 if adequate*, 2 if moderately inadequate, 3 if severely inadequate Indicator of overall housing quality that is created in the AHS to take into account the conditions of each housing unit relating to plumbing, heating, electric, upkeep, and hallways (U.S. HUD, 2013).
Type of housing unit	1 if the unit is a mobile home or trailer, 2 if a single-family house, detached*, 3 if a single-family house, attached, 4 if an apartment (regardless its unit size), 5 if others (boat, van, RV, etc.)
Household crowding (room stress index)	An index reflecting housing space, i.e., smaller values = more available space for people Ratio of the number of people to the number of total rooms less one room if total rooms are greater than 1. One-room units remain the same.
Census division	1: New England*, 2: Middle Atlantic, 3: East North Central, 4: West North Central, 5: South Atlantic, 6: East South Central, 7: West South Central, 8: Mountain, 9: Pacific
Metropolitan status	1 if the unit is in a metropolitan area*, 0 if in a non-metropolitan area
CID status	1 if the unit is in common interest developments (CIDs)*, 0 if in a standard subdivision

4. Summary of Descriptive Statistics

4.1. Correlation

Table 3 presents the correlation matrix of the variables. The values in each column represented the Pearson correlation coefficients. Most correlations between the variables were statistically significant at the 10% significance level. The insignificant correlations between the variables were omitted (e.g., the coefficients were less than 0.07). Column 1 shows that housing satisfaction was highly correlated with neighborhood satisfaction (0.60), and it was negatively correlated with bothersome neighborhood features (-0.08). Housing satisfaction was also relatively correlated with age (0.15), education (0.09), housing tenure (0.25), household income (0.15), household type (0.08), duration of residence (0.09), property values (0.17), housing cost (0.08), HUD housing subsidy (-0.11), housing adequacy (-0.18), unit type (-0.14), room stress (-0.15), and CIDs (0.11). The relationships between housing satisfaction and the remaining variables were trivial (i.e., the coefficients were less than |0.07|). Column 2 shows that neighborhood satisfaction was correlated with bothersome neighborhood features (-0.13), age (0.13), education (0.10), housing tenure (0.20), household income (0.14), household type (0.08), duration (0.07), property values (0.15), housing costs (0.08), housing subsidy (-0.12), housing adequacy (-0.10), unit type (-0.13), room stress (-0.11), and CIDs (0.10). It was worth noting that both housing and neighborhood satisfaction appeared to be positively but weakly correlated with housing costs. In column 3, bothersome neighborhood features were also correlated with nativity (0.08), unit type (-0.12), and metropolitan areas (-0.13).

In column 4, age was relatively correlated with race (-0.08), Hispanic (-0.14), nativity (0.08), education (-0.09), housing tenure (0.25), household income (-0.18), household type (0.24), moving experience (-0.22), the same household status (-0.15), housing costs (-0.10), and room

stress (-0.35). The correlation between age and residence duration was positive and quite strong (0.52). Column 5 shows that householders' gender was correlated with housing tenure (0.12), household income (0.19), housing subsidy (-0.17), and unit type (-0.10). Column 6 shows that householders' race was relatively correlated with Hispanic (-0.11), nativity (-0.27), housing tenure (-0.12), duration (-0.08), housing subsidy (0.10), and unit type (0.11). Householders' ethnicity (Hispanic) in column 7 was relatively correlated with nativity (-0.41), education (-0.20), housing tenure (-0.16), duration (-0.10), the same household status (0.08), property values (-0.08), unit type (0.08), room stress (0.27), regional divisions (0.18), and metropolitan areas (0.10). In column 8, householders' nativity was relatively correlated with housing tenure (0.12), duration (0.11), unit type (0.11), room stress (-0.27), regional divisions (-0.13), and metropolitan areas (-0.13). In columns 9, householders' education was also quite correlated with housing tenure (0.24), household income (0.38) (it seems reasonable), property values (0.27), housing costs (0.22), housing subsidy (-0.21), room stress (-0.16), metropolitan areas (0.12), and CIDs (0.22).

Column 10 shows that householders' housing tenure was also relatively correlated with household income (0.35), household type (0.16), duration (0.20), moving experience (-0.12), the same household status (-0.08), property values (0.37) (anticipated), housing costs (0.16), housing subsidy (-0.41), housing adequacy (-0.10), unit type (-0.53) (strongly negative), room stress (-0.28), and CIDs (0.20). In column 11, household income was also highly correlated with property values (0.34) (anticipated), housing costs (0.30) (anticipated), housing subsidy (-0.40) (anticipated), housing adequacy (-0.10), unit type (-0.26), metropolitan areas (0.10), and CIDs (0.17). Column 12 shows that household type was also somewhat correlated with unit type (-0.12). In column 13, householders' duration of residence was also correlated with moving experience (-0.31), the same household status (-0.15), property values (0.10), housing costs (0.10), housing

subsidy (-0.13), unit type (-0.22), room stress (-0.23), regional divisions (-0.09), and CIDs (-0.13). Column 14 indicates that the recent moving experience was also relatively correlated with the same household status (0.30) and unit type (0.11). As column 15 shows that the same household status was positively correlated with room stress (0.10), column 16 indicates that property values were also highly and positively correlated with housing costs (0.37), which was quite intuitive. Property values were also negatively correlated with housing subsidy (-0.18), housing adequacy (-0.06), unit type (-0.18), and room stress (-0.13), but they were also positively correlated with regional divisions (0.11), metropolitan areas (0.09), and CIDs (0.11).

Column 17 shows that housing costs had little relationships with housing subsidy, adequacy, unit type, room stress, and locational variables. In column 18, the HUD housing subsidy status was also shown to be relatively correlated with unit type (0.39) and weakly correlated with room stress (0.08) and CIDs (-0.11). Column 19 shows that housing adequacy was positively and weakly correlated with unit type (0.05) and room stress (0.07), and it was negatively correlated with all locational variables. In column 20, householders' unit type was also positively correlated with room stress (0.17), metropolitan areas (0.13), and CIDs (0.07), but it was negatively correlated with regional divisions (-0.05). The room stress index in column 21 was positively correlated with regional divisions and metropolitan areas but negatively correlated with CIDs (-0.08). In Column 22, regional divisions were also positively correlated with metropolitan areas (0.10) and CIDs (0.10). Lastly, metropolitan areas were positively correlated with CIDs (0.16) in column 23.

After this subsection of the correlation discussion, the next subsections are to discuss the descriptive statistics of satisfaction type and housing tenure by types of residential subdivision and the summary statistics of the sample.

Table 3: Correlation matrix between the variables

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) Housing Satisfaction	1.000											
(2) Neighborhood Satisfaction	0.604*	1.000										
(3) Bothersome	-0.082*	-0.130*	1.000									
(4) Age	0.150*	0.133*	-0.017*	1.000								
(5) Gender	0.025*	0.036*	-0.005	-0.015*	1.000							
(6) Race	-0.052*	-0.053*	-0.030*	-0.079*	-0.015*	1.000						
(7) Hispanic Status	-0.018*	-0.037*	-0.024*	-0.136*	-0.005	-0.107*	1.000					
(8) Nativity Status	0.007*	0.001	0.075*	0.077*	-0.048*	-0.272*	-0.410*	1.000				
(9) Education	0.091*	0.095*	-0.045*	-0.085*	0.040*	0.029*	-0.195*	0.064*	1.000			
(10) Tenure	0.251*	0.204*	0.044*	0.254*	0.118*	-0.124*	-0.160*	0.120*	0.240*	1.000		
(11) HSHLD Income	0.150*	0.138*	-0.029*	-0.178*	0.184*	-0.032*	-0.071*	0.003	0.383*	0.354*	1.000	
(12) HSHLD Type	0.082*	0.081*	-0.003	0.235*	0.013*	-0.038*	-0.009*	-0.046*	-0.014*	0.162*	0.026*	1.000
(13) Duration of Residence	0.091*	0.065*	0.023*	0.522*	0.002	-0.083*	-0.098*	0.106*	-0.061*	0.203*	-0.023*	0.058*
(14) Move in Last 12 Months	-0.022*	-0.028*	-0.027*	-0.222*	-0.006	0.026*	0.035*	-0.014*	0.013*	-0.123*	-0.028*	-0.064*
(15) Same HSHLD Status	-0.033*	-0.028*	-0.004	-0.150*	-0.009*	0.023*	0.078*	-0.037*	-0.017*	-0.075*	0.020*	-0.023*
(16) Property Value	0.174*	0.151*	-0.056*	0.074*	0.072*	0.012*	-0.079*	-0.016*	0.274*	0.366*	0.337*	0.067*
(17) Housing Cost ($)	0.079*	0.078*	-0.045*	-0.104*	0.062*	0.028*	-0.021*	-0.048*	0.215*	0.156*	0.296*	0.031*
(18) HUD Subsidy	-0.112*	-0.124*	-0.014*	0.013*	-0.167*	0.103*	0.028*	0.011*	-0.206*	-0.409*	-0.400*	-0.062*
(19) Housing Adequacy	-0.175*	-0.104*	0.046*	-0.023*	-0.030*	0.015*	0.033*	-0.006	-0.067*	-0.095*	-0.103*	-0.030*
(20) Unit Type	-0.144*	-0.131*	-0.118*	-0.072*	-0.104*	0.114*	0.079*	-0.111*	-0.050*	-0.529*	-0.255*	-0.120*
(21) Room Stress Index	-0.154*	-0.113*	-0.001	-0.348*	0.022*	0.077*	0.272*	-0.265*	-0.160*	-0.278*	0.020*	-0.014*
(22) Division	-0.016*	-0.039*	-0.002	-0.038*	0.019*	0.080*	0.178*	-0.127*	0.007*	-0.014*	0.035*	0.010*
(23) Metro Area	-0.010*	-0.037*	-0.134*	-0.048*	-0.008*	0.065*	0.098*	-0.131*	0.120*	-0.028*	0.094*	-0.023*
(24) CID Status	0.107*	0.096*	-0.008*	-0.017*	0.035*	0.049*	-0.033*	-0.058*	0.217*	0.200*	0.173*	0.026*

**** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$*

Table 3: Correlation matrix between the variables (Cont.)

Variables	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
(13) Duration of Residence	1.000											
(14) Move in Last 12 Months	-0.310*	1.000										
(15) Same HSHLD Status	-0.145*	0.304*	1.000									
(16) Property Value	0.097*	-0.061*	-0.021*	1.000								
(17) Housing Cost ($)	-0.096*	0.008*	0.024*	0.366*	1.000							
(18) HUD Subsidy	-0.129*	0.022*	-0.011*	-0.177*	0.005	1.000						
(19) Housing Adequacy	0.000	-0.003	0.015*	-0.063*	0.003	0.053*	1.000					
(20) Unit Type	-0.221*	0.107*	0.029*	-0.182*	0.009*	0.393*	0.049*	1.000				
(21) Room Stress Index	-0.225*	0.054*	0.099*	-0.131*	-0.009*	0.079*	0.070*	0.169*	1.000			
(22) Division	-0.086*	0.021*	0.035*	0.108*	0.004	-0.046*	-0.013*	-0.052*	0.082*	1.000		
(23) Metro Area	-0.055*	0.019*	0.016*	0.087*	-0.003	0.007*	-0.022*	0.128*	0.027*	0.101*	1.000	
(24) CID Status	-0.133*	0.017*	0.001	0.106*	0.005	-0.106*	-0.060*	0.068*	-0.078*	0.096*	0.158*	1.000

**** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$*

4.2. Descriptive Statistics of Satisfaction Type and Housing Tenure

4.2.1. Satisfaction by Residential Subdivision Type

Table 4 breaks down housing satisfaction and neighborhood satisfaction by types of residential subdivisions – standard subdivision and CIDs. In contrast to standard subdivisions, CIDs could be further classified by the type of ownership interest – planned developments, condominiums, cooperatives, or community apartments. Due to the restricted access to the information on cooperatives and community apartments in the AHS, this study was only able to categorize all CIDs into two main groups: 1) condominiums and 2) planned developments and others. Table 4 indicates that by the total observations, 75.1% of householders lived in the standard subdivisions, and 24.9% of them lived in CIDs. These figures reflected the information in the Community Association Institute report in 2020 regarding approximately 25-27 percent of the U.S. population who was living in CIDs (Treese, 2020). By the residential subdivision type, householders still rated their dwellings and neighborhoods favorably, with a rating of 5 or higher.

4.2.2. Housing Tenure by Residential Subdivision Type

Table 5 describes housing tenure by types of residential subdivision. By the total observations, householders' housing tenure comprised of renters (26.32%), first-time homeowners (37.48%), and repeat homeowners (36.19%). One interesting result in Table 5 showed that there was less than 15% of the renter householders living in CIDs. This figure was unsurprising because most CIDs had rental restrictions in their communities. In California, for example, an association had a rental cap of 25 percent of the total units in its development as of 2021 (Adams Stirling PLC, n.d.). First-time homeowners in CIDs overall accounted for about 22.1% compared to 77.9% of FHTBs who purchased their homes in standard subdivisions. About 35.6% of repeat homeowners overall lived in CIDs, whereas 64.4% of them lived in standard subdivisions.

Table 4: Descriptive statistics of satisfaction type by residential subdivision type

Variables	Freq.	%	Type of Residential Subdivision		
			Standard	Common Interest Developments	
			Standard	Planned Developments & Others	Condo-miniums
Housing Satisfaction					
1. Least satisfied (1-4)	1,764	2.02	1,569	80	115
2. Moderately satisfied (5-6)	7,209	8.24	6,209	478	522
3. Very satisfied (7-8)	33,180	37.92	25,559	4,748	2,873
4. Most satisfied (9-10)	45,347	51.83	32,418	9,492	3,437
Neighborhood Satisfaction					
1. Least satisfied (1-4)	2,526	2.89	2,229	125	172
2. Moderately satisfied (5-6)	8,318	9.51	6,993	670	655
3. Very satisfied (7-8)	33,215	37.96	25,276	5,145	2,794
4. Most satisfied (9-10)	43,441	49.65	31,257	8,858	3,326
Total	87,500	100.00	65,755	14,798	6,947
%		100.00	75.15	16.91	7.94
Grand Total	87,500		65,755	21,745	

Table 5: Descriptive statistics of housing tenure by residential subdivision type

Variables	Freq.	%	Type of Residential Subdivision		
			Standard	Common Interest Developments	
			Standard	Planned Developments & Others	Condo-miniums
1. Renter	23,033	26.32	19,825	738	2,470
%	100		86.07	3.20	10.73
2. First-Time Homeowner	32,797	37.48	25,541	4,996	2,260
%	100		77.88	15.23	6.89
3. Repeat Homeowner	31,670	36.19	20,389	9,064	2,217
%	100		64.38	28.62	7.00
Total	87,500	100.00	65,755	14,798	6,947
%		100.00	75.15	16.91	7.49
Grand Total	87,500		65,755	21,745	

Note: By individual IDs, the actual counts of renters, FTHBs, and repeat homeowners were 9,779 (27.76%), 12,936 (36.72%), and 12,514 (35.52%), respectively, depicted in Table 8 Item #10.

4.3. Summary Statistics of the Sample

Because this study conducted the cross-sectional and longitudinal analyses, it was useful to examine the data overall and across time, i.e., to decompose counts into the overall, between, and within components of the panel data. It is worth noting that this study included all variables in statistic tables although the summary statistics for categorical variables in some tables might not have their particularly meaningful interpretations. Therefore, this study incorporated Tables 6, 7, and 8 to provide the meaningful summary of the descriptive statistics for this panel data. In other words, Table 6 provides the narrative of the descriptive statistics for the continuous variables in the overall component of this same-unit, same-person sample, whereas Tables 7 and 8 describe the descriptive statistics for the categorical variables. For convenience, Tables 7 and 8 list the corresponding number of the descriptive items, i.e., 24 variables in total.

The first two variables in Table 6 were the survey variables. INTSTATUS referred to the type of interview status in the AHS. The empirical analysis of this study considered only the occupied-interview status. The variable OMB13CBSA referred to the 2013 OMB CBSA codes in the AHS, whose values represented the metropolitan areas. This variable had 17 categories of OMB13CBSA IDs, which were used in clustered-errors models. Next, housing satisfaction and neighborhood satisfaction were ordinal variables. In addition to the information in Table 4 on householders' satisfaction by subdivision types, Table 7 describes the satisfaction variables by housing tenure, depicted in Figures 5 and 6 previously. Table 7 shows that renters and homeowners rated their residential setting and neighborhood favorably, with a rating of 5 or above. The overall component in Table 8 showed the same results in terms of person-years, e.g., the four categories of housing satisfaction overall accounted for 2.02, 8.24, 37.92, and 51.83 percent, respectively. However, the between and within components in Table 8 had the additional results. The between

component repeated the breakdown in terms of householders in each category of satisfaction rather than person-years. For example, 4.27, 16.28, 60.32, and 70.12 percent of the observations were ever least satisfied, moderately satisfied, very satisfied, and most satisfied with their housing situation, respectively, for the grand total of 150.99 percent ever having any category, which exceeded 100 percent, i.e., the total number of their frequencies was more than the total number of individual householders (n = 35,229) in the data. This meant that there were householders who sometimes expressed one category of housing satisfaction and at other times expressed its other categories. Furthermore, the within component in Table 8 described the fraction of the time a householder had the specified value of each category of satisfaction. For housing satisfaction, for example, conditional on a householder observation was ever least satisfied (moderately satisfied, very satisfied, or most satisfied with housing), 48.76% (52.17%, 63.20%, or 73.17%) of that householder's observations were in the least satisfied category (the moderately satisfied, very satisfied, or most satisfied category). The total within percent was a measure of the overall stability of the four-category values of satisfaction. The total within of 66.23% for housing satisfaction, for example, indicated that there were variations in housing satisfaction over time. If all the within percent(s) showed 100% for a variable, that variable must be a time-invariant variable such as race.

For bothersome features of residents' neighborhood, Table 6 shows that 71.11% of householders indicated the bothersome status in their neighborhoods. Of 71.11%, Table 7 shows that the number of the renter householders who had the bothersome status was much less than the owner householders. Table 8 shows that the number of householders who never had bothersome neighborhood features was 16,200 compared to 30,354 of them who ever had the features. The bothersome status also had the total between percent of 132.70 and the total within percent of 75.36%, implying this variable had variations between years. Householders' age ranged from 15 to 85 years

old, shown in Table 6. Previous studies typically considered individuals who were at least 18 years of age, considering the individuals' maturity. This study, however, included individuals who were at least 15 years old, given that some of them were living independently. Table 6 also shows that the overall average age was 54.5 years old in the sample. Age of householders certainly varied over the periods because age was a non-decreasing variable. Table 7 or 8 indicates that about 52.09% of the householders were at the age of 55 and older. This figure also reflected the recent data in the 2018 housing report. The report showed that more than half of the nation's households were headed by householders with at least 50 years of age (Joint Center for Housing Studies of Harvard University, 2018). Regarding householders' gender, Table 8 shows that about 52.14% of all householders were (ever) males. Table 7 shows that among the renters, female renters were greater than male renters. For first-time homeownership, female first-time homeowners were less than male first-time homeowners. For repeat homeowners, female repeat homeowners were even less than male repeat homeowners.

By householders' race, Table 8 shows that 78.06% of them were (ever) White, and 14.12, 0.88, 5.44, 0.29, and 1.22 percent were African American/Black, Native Indian, Asian, Pacific Islander, and multiracial, respectively. For White householders, Table 7 shows that the majority was homeowners, and the number of White FTHBs was lower than the number of White repeat homeowners. For Black householders, Black renters and homeowners were about the same, but the number of Black FTHBs was significantly higher than the number of Black repeat homeowners. This was unexpected. For Asian householders, Asian FTHBs was relatively higher than both Asian renters and repeat homeowners. The numbers of renters and homeowners for other races were similar. Furthermore, Table 8 shows that about 14.70% of householders self-identified as ever having the Hispanic/Spanish origin. Table 7 also shows that about 60.56% of these Hispanic

householders were homeowners. By the nativity status, Table 8 shows that 82.57% of householders were (ever) native-born. Table 7 shows that 75.21% of these native-born householders were homeowners, i.e., 26,309 FTHBs and 28,245 repeat homeowners of total 72,535. For foreign-born householders, the number of foreign-born repeat homeowners was less than the numbers of foreign-born renters and foreign-born FTHBs, respectively. By the tenure comparison, Table 7 also shows that the numbers of native-born renters, FTHBs, and repeat homeowners were significantly larger than the foreign-born householders' numbers, e.g., at least a 3-to-1 ratio. This might be expected, given that the number of foreign-born households was about 16.2 million of total 115.0 million U.S. households in 2011 (Trevelyan et al., 2013). It should be noted that the variables of gender, race, ethnicity, and nativity had the total within of 100% because they were time-invariant variables, shown in Table 8.

For householders' education attainment, Table 8 shows that 35.52 percent of them were ever below high school education compared to 29.79% of them with at least high-school education but less than 4-year degree education and 36.64% of them with at least bachelor's degree. Table 7 further shows that by the education category the number of FHTBs was relatively high – more than one-third of each education category's total. For the below-high-school category, for example, first-time homeowners were 38.46% of that category total (11,617/30,209). By the FHTBs' educational levels, there were more highly educated FHTBs (9,527+11,653). Individual householders appeared to have various levels of education between the survey years as the total between percent and the total within percent indicated in Table 8. Regarding householders' housing tenure, Item 10 in Table 8 indicates that renters accounted for 26.32% compared to 37.48% of FTHBs and 36.19% of repeat homeowners. By individual IDs, however, Table 8 shows that the counts (or shares) of householders who were ever renters, FTHBs, and repeat homeowners were 9,779

(27.76%), 12,936 (36.72%), and 12,514 (35.52%), respectively. This panel data had a good sample size. Surprisingly, the number of FTHBs appeared to be slightly larger than repeat homeowners. It would be interesting to see if this could influence the empirical results. Furthermore, Table 6 shows that the overall average of annual household income was about $89,069. Changes in household income over time were observed by changes in the total between percent and the total within percent in Table 8. Additionally, Table 7 shows the status of household income. It referred to whether a householder's household income was at least 80% of the median family income level of his or her area. The indicator variable showed that 44.2% of them were below 80% of the median family income level of their areas. Among the householders in this below-80% group, renters appeared to be relatively smaller than homeowners. By contrast, among the householders being above 80% of the median family income level of their areas, the majority was homeowners, and the number of repeat homeowners was larger than the number of FTHBs. Appendix B shows how 80% of the median family income level of householders' areas was calculated for these three years.

By household type (Item 12 in Table 7 or 8), single householders, single-parent householders, married couples with no children, married couples with children, and other householders (with no children) accounted for about 13.17, 13.19, 25.95, 27.91, and 19.78 percent, respectively. By the single-householder group or the single-parent group, the number of renters was largest, followed by FTHBs (2^{nd}) and repeat homeowners (3^{rd}). By the group of married couples without children, renters were significantly less than FTHBs (2^{nd}) and repeat homeowners (1^{st}). By the group of married couples with children, renters were also less than FTHBs (1^{st}) and repeat homeowners (2^{nd}). It was interesting that FTHBs of this group were slightly greater than repeat homeowners. For the group of other household heads, the numbers of renters, FTHBs, and repeat homeowners were approximately the same. Furthermore, Table 8 indicates that 15.33, 16.67, 29.90,

31.93, and 22.87 percent were householders who were ever being single, single parent, married without children, married with children, and others, respectively. Hence, the total between percent of 116.70 and the total within percent of 85.69 in Table 8 implied that householders' family structure changed between the years. It was worth noting that the number of married couples without children was almost the same as the number of married couples with children. If the trend for married couples without children continues upward, planners and policymakers may face some challenges in regard to the nation's population growth. In Table 6, the overall average duration of residence for householders was about 14.0 years (Item 13 in Table 7 or 8). Yet some householders lived in their homes for a long period of time, e.g., some of them stayed in place for 81 years. In fact, the raw data also showed that some householders actually lived in their homes up to 85 years, which was the maximum age considered in the AHS. This result reflected about 67% of householders (renters and homeowners) who stayed in place more than 5 years, depicted in Table 7. Of the 67% householders, about 26.02% (7,432/28,558) and 8.32% (2,559/30,755) of them were the renters who lived in place for 6-15 years and at least 16 years, respectively. It was surprising to observe these results in the data. This implied that some householders might prefer being a renter to being a homeowner. Duration of residence certainly had variations over time.

Item 14 in Table 7 shows that 7.86% of householders (or 6,878 observations) recently moved into their units in the last 12 months, and about 50% of them were renters (compared to 23.92% of FTHBs and 26.50% of repeat homeowners). By the between percent in Table 8, about 19.44% of householders, or 6,847 householders, were ever being the recent movers. This figure of the actual counts was almost the same as the total observations of this variable, implying that there were not many householders who sometimes experienced the recent move and at other times did not experience it. For the same-household status (Item 15), Table 8 shows that 96.71% of house-

holders were ever the same householders with no household composition changes, 27.43% of them were ever the same householders with their household composition changes, and 10.30% of them were ever the new householders in their neighborhood. Since the between percent of this variable was more than 100%, the variations would come from its latter two categories because its first category remained the same, i.e., householders with the same household composition. By housing tenure for this variable, Table 7 shows that the majority of all same householders was homeowners, and the majority of all newcomers was renters (about 50 percent). By far, the number of householders without household composition changes was significantly greater than the other two categories. In this particular group, Table 7 indicates that the number of repeat homeowners (27,056 observations) was almost the same as the number of FTHBs (27,146 observations).

In this study, property values were considered for homeowners (i.e., renters had $0 property values). Table 6 shows that the overall average property values were U.S. $238,000. By the categorical property values (Item 16), Table 7 shows that less than 15% of householders had their property values over a half million dollars, and the number of FTHBs was largest for property values that were less than or equal to $250,000. It was worth noting that the AHS capped property values at $10 million dollars. Moreover, Table 6 reveals that the overall average monthly housing costs were about U.S. $1,451. Because it helped little to decompose counts of housing costs into the between and within components in the panel data (i.e., too many values), Tables 6 and 7 (or 8) show housing costs by categories instead. In Table 6, the overall average monthly housing cost expense ratio was 158.5%. This figure was very high, but it was not completely unexpected. In the sample, even in the raw data, there were some householders self-reporting very low values of their household incomes including zero and negative values and high housing costs due to their privacy concern. By the cost-burden measure, Item 17 in Table 7 shows that about 33.90% of observations

(or 34.41% if excluding missing values in Table 8) had the cost-burden ratio of more than 30 percent of their household income. This implied that about 65.0% of them had the housing expense ratio under 30 percent of their household income. This study also examined whether the inflated values of the expense ratio might affect the empirical results in the regression analysis.

Regarding the status of subsidized housing, Table 6 shows that about 8.09% of householders self-identified as the recipients of HUD housing subsidy. Item 18 in Table 8 indicates that about 8.63% of householders were ever the recipients of HUD housing subsidy. This implied a small variation over the years. Most of these householders were typically renters although HUD housing assistance programs also promoted homeownership in HUD-assisted units (U.S. HUD, n.d.-c). Item 18 in Table 7 also shows that a very small number of FTHBs and repeat homeowners lived in HUD-assisted units. Nevertheless, the precise details of the mentioned HUD programs were not identified in the AHS and therefore in the study. For housing adequacy (Item 19 in Table 7 or 8), the majority of householders reported that their units were in adequate conditions (95.55%) compared to moderately inadequate and severely inadequate categories. Although this subjective measure of housing quality had its limitations, this result was rather unsurprising because the national and regional standards of building code were enforced across the U.S. to meet the standard of the Housing Act of 1949 (U.S. HUD, 2014). Housing adequacy had variations over time. Another variable from this group was unit types (Item 20 in Table 7 or 8). Of five structural types of housing units, Table 8 shows that many householders ever lived in single-family detached homes, about 67.23%, whereas mobile homes, single-family attached homes, apartments, and other types accounted for 5.41, 4.28, 23.07, and 0.01 percent, respectively. The results reflected the housing norms in the U.S., i.e., single-family detached housing units surrounded by a green lawn were the most preferred structure. Perhaps, the unexpected result for this variable shown in Table 7 was that

the number of FTHBs (26,653 observations) who lived in single-family detached homes was almost the same as the number of repeat homeowners (27,228 observations) who lived in single-family detached homes.

Available space in units was important for householders' housing needs. By the standard measure of persons-per-room (PPR), households were considered overcrowded if the PPR index was more than one point (Blake et al., 2007). Table 6 shows that the overall average room stress index was about 0.55. This implied that on average householders experienced more available space than they needed in their units. By a similar measure, the overcrowding status in Table 6 (as well as Item 21 in Tables 7 and 8) indicated that overall, about 5.1% of householders experienced household crowding or overcrowding. The total between percent of 104.1 and total within percent of 96.1 in Table 8 implied that there were householders who sometimes experienced overcrowding and at other times did not experience it. By census divisions, Item 22 in Table 8 shows that 5.60, 10.40, 15.09, 4.70, 20.69, 4.29, 12.43, 6.78, and 20.01 percent of householders ever lived in the New England division (Division 1), the Middle Atlantic division (Division 2), the East North Central division (Division 3), the West North Central division (Division 4), the South Atlantic division (Division 5), the East South Central division (Division 6), the West South Central division (Division 7), the Mountain division (Division 8), and the Pacific division (Division 9), respectively. Of the nine census divisions, Divisions 3, 5, and 9 had larger numbers of householders. By householders' tenure, each census division appeared to have more homeowners than renters.

Table 6 also shows that about 89.5% of householders were living in the metropolitan areas (also Item 23 in Table 7 or 8). This figure was expected because the AHS was interested in city and urban areas and oversampled the top 15 metropolitan areas. By housing tenure for this variable, Table 7 shows that the numbers of FTHBs and repeat homeowners in the metropolitan areas were

larger than the number of renters. By residential subdivision types (Item 24), Table 8 shows, again, that 24.9% of householders lived in CIDs compared to 75.1% of them who lived in standard subdivisions, implying that there were ever 8,758 CIDs compared to 26,471 standard subdivisions. Table 7 indicates that of these 24.9% householders in CIDs, repeat homeowners (11,281 observations) accounted for the majority of them, followed by the numbers of FTHBs (7,256 observations) and renters (3,208 observations). These figures somewhat were anticipated, given CC&Rs of CIDs. The remaining variables in Table 6, 7, or 8 were supplements and used for the illustrative purpose. For example, regarding types of CIDs, Table 6 shows that condominiums and planned developments and others overall accounted for 7.94% and 16.91% of the total CIDs, respectively. About 55% of householders reported that they lived in subdivisions or housing developments (excluded the missing data). With the overall average monthly membership fees of U.S. $40.5, about 27.4% of householders self-reported their membership of residential community associations (RCAs) such as HOAs. Interestingly, the number of renters (3,522 observations) in RCAs was relatively smaller than the numbers of FTHBs (8,204 observations) and repeat homeowners (12,138 observations).

5. Conclusion

Chapter 3 discussed the research design procedure, the data analysis, the analysis strategy, and the selection of explanatory variables used in this study. For the measures of the dependent variables, *Housing satisfaction* and *Neighborhood satisfaction* were evaluated by the respondents' overall opinion to the two survey questions: On a scale of 1 to 10, how would you rate: 1) your unit as a place to live? and 2) your neighborhood? 10 is the best, 1 is the worst. Due to a small number of observations in the original satisfaction levels of 1 through 4 and the need for a relatively easy interpretation of the results, the regrouping was necessary. The four ordered categories

of each dependent variable therefore were least satisfied (original levels 1-4), moderately satisfied (levels 5-6), very satisfied (levels 7-8), and most satisfied (levels 9-10). For the empirical analysis of this study, a same-unit, same-person sample was required and obtained from the cross-sectional, time-series dataset containing 149,370 observations, or equivalently 58,111 unique housing units. After the process of elimination that was set based on the inconsistent information about individuals' age, sex, ethnicity, citizenship, education, housing tenure, and previous participation between the survey years, the final panel data of 87,500 observations and 35,229 householders was obtained and used to estimate the ordered choice regression models for *Housing satisfaction* and *Neighborhood satisfaction* with the selection of the explanatory variables described in Table 2.

Using Stata 16, the analysis strategy of this study estimated these cross-sectional and longitudinal regressions of *Housing satisfaction* and *Neighborhood satisfaction*. The cross-sectional regressions were estimated to answer the research questions 1) and 2) and to test the hypotheses 1) and 2) in combination with the examination of interaction effects. The longitudinal regressions were estimated to address the third research question and the third hypothesis. In the cross-sectional analysis, the proportional odds regressions were estimated first, using the sample size of 35,229 individual householders who were randomly selected from the final panel dataset without replacement. If the parallel lines assumption (or the proportional odds assumption) was violated, generalized ordered logit/partial proportional odds regressions (i.e., *gologit2* in Stata) would then be used with the same cross-sectional data and the same set of control variables. In the longitudinal analysis, this study estimated the fixed-effects ordered logit regressions (i.e., *feologit* in Stata) based on the interest of this study and the Hausman test, using the same-unit, same-person sample size of the final panel data containing 87,500 observations and 35,229 individual householders. Chapter 4 is to present the empirical results of this study.

Table 6: Descriptive statistics of the variables: overall

Variables	*N*	Mean	Std.Dev.	Min	Max
INTSTATUS**	87,500	1	0	1	1
OMB13CBSA**	87,500	11.78	5.188	1	17
HOUSING SATISFACTION	87,500	3.396	0.724	1	4
NEIGHBORHOOD SATISFACTION	87,500	3.344	0.767	1	4
BOTHERSOME	87,488	0.711	0.453	0	1
AGE	87,500	54.48	14.46	15	85
GENDER	87,500	0.525	0.499	0	1
RACE	87,500	1.387	0.921	1	6
HISPANIC/SPANISH ORIGIN	87,500	0.142	0.349	0	1
NATIVITY STATUS	87,500	0.829	0.377	0	1
EDUCATION	87,500	2.020	0.843	1	3
HOUSING TENURE	87,500	2.099	0.785	1	3
HOUSEHOLD INCOME (LOGARITHMIC)	86,301	10.87	1.192	1.386	15.53
HOUSEHOLD INCOME ($)	87,500	89,069	119,553	0	5.567e+06
HOUSEHOLD INCOME STATUS**	87,500	0.558	0.497	0	1
HOUSEHOLD TYPE	87,500	3.279	1.285	1	5
DURATION OF RESIDENCE	87,500	13.97	12.57	0.100	81
DURATION OF RESIDENCE STATUS**	87,500	2.886	1.044	1	4
MOVED IN LAST 12 MONTHS	87,500	0.079	0.269	0	1
SAME HOUSEHOLD STATUS	87,500	1.210	0.499	1	3
PROPERTY VALUES ($1,000s)	87,500	237.9	398.9	0	10,000
PROPERTY VALUE STATUS**	87,500	1.480	0.775	1	4
HOUSING COSTS ($)**	87,500	1,451	1,890	0	110,698
HOUSING COSTS TO INCOME (%)	86,301	1.585	48.69	0	5,793
SUBSIDIZED HOUSING STATUS	87,500	0.081	0.273	0	1
HOUSING ADEQUACY	87,500	1.054	0.267	1	3
TYPE OF HOUSING UNIT	87,500	2.431	0.893	1	5
HOUSEHOLD CROWDING INDEX	87,500	0.549	0.320	0.0833	7
OVERCROWDING STATUS**	87,500	0.051	0.219	0	1
CENSUS DIVISION	87,500	5.408	2.582	1	9
METROPOLITAN STATUS	87,500	0.895	0.307	0	1
CID STATUS	87,500	0.249	0.432	0	1
PLANNED DEVELOPMENTS & OTHERS**	87,500	0.1691	0.375	0	1
CONDOMINIUMS**	87,500	0.0794	0.270	0	1
SUBDIVISION/HOU. DEVELOPMENT**	66,489	0.552	0.497	0	1
HOA STATUS**	87,154	0.274	0.446	0	1
HOA AMOUNT**	63,690	40.50	209.5	0	10,287

*** denotes additional variables used to provide meaningful descriptive interpretations where applicable.*

Table 7: Descriptive statistics of the variables by housing tenure

Variables	Freq. (*N*)	%	Renters	First-Time Homeowners	Repeat Homeowners
1. Housing Satisfaction (ordinal variable)					
1 = Least satisfied (1-4)	1,764	2.02	1,104	426	234
2 = Moderately satisfied (5-6)	7,209	8.24	3,549	2,434	1,226
3 = Very satisfied (7-8)	33,180	37.92	10,061	13,080	10,039
4 = Most satisfied (9-10)	45,347	51.83	8,319	16,857	20,171
2. Neighborhood Satisfaction (ordinal variable)					
1 = Least satisfied (1-4)	2,526	2.89	1,361	795	370
2 = Moderately satisfied (5-6)	8,318	9.51	3,448	3,177	1,693
3 = Very satisfied (7-8)	33,215	37.96	9,283	13,254	10,678
4 = Most satisfied (9-10)	43,441	49.65	8,941	15,571	18,929
3. Bothersome Indicator					
No (=0)	25,264	28.87	7,495	9,152	8,617
Yes (=1)	62,224	71.11	15,535	23,641	23,048
Not report/missing	12	0.01	3	4	5
4. Age of Householder (continuous variable; categories are for the illustrative purpose)					
Age 15-24	826	0.94	568	219	39
Age 25-34	8,533	9.75	4,031	3,786	716
Age 35-44	14,156	16.18	4,418	6,199	3,539
Age 45-54	18,410	21.04	4,566	7,303	6,541
Age 55-64	20,990	23.99	4,554	7,509	8,927
Age 65-85	24,585	28.10	4,896	7,781	11,908
5. Gender of Householder					
Female (=0)	41,588	47.53	13,326	14,893	13,369
Male (=1)	45,912	52.47	9,707	17,904	18,301
6. Race of Householder (6 Categories)					
1 = White/Caucasian	68,692	78.51	15,110	25,580	28,002
2 = African American/Black	12,074	13.80	6,000	4,298	1,776
3 = Native Indian	754	0.86	286	295	173
4 = Asian	4,687	5.36	1,122	2,192	1,373
5 = Pacific Islander	244	0.28	116	76	52
6 = Multiracial	1,049	1.20	399	356	294

Variables	Freq. (*N*)	%	Renters	First-Time Homeowners	Repeat Homeowners
7. Ethnicity of Householder					
Non-Hispanic origin (=0)	75,056	85.78	18,125	27,557	29,374
Hispanic/Spanish origin (=1)	12,444	14.22	4,908	5,240	2,296
8. Nativity Status of Householder (U.S. Residentship)					
Foreign-born (=0)	14,965	17.10	5,052	6,488	3,426
Native-born (=1)	72,535	82.90	17,981	26,309	28,245
9. Education Attainment of Householder (3 Categories)					
1 = Below high school	30,209	34.52	11,117	11,617	7,475
2 = Above high school	25,331	28.95	6,976	9,527	8,828
3 = At least Bachelor's	31,960	36.53	4,940	11,653	15,367
10. Housing Tenure (3 Categories)					
1 = Renter	23,033	26.32	23,033	-	-
2 = First-Time Homeowner	32,797	37.48	-	32,797	-
3 = Repeat Homeowner	31,670	36.19	-	-	31,670
11. Household Income Status, i.e., ≥ 80% of the median family income level for the area (continuous variable; categories are for the illustrative purpose)					
No (=0)	38,690	44.22	16,835	12,466	9,389
Yes (=1)	48,810	55.78	6,198	20,331	22,281
12. Household Type/Family Structure (5 Categories)					
1 = Single or never married	11,528	13.17	5,488	4,586	1,454
2 = Single parent	11,540	13.19	5,256	3,863	2,421
3 = Married couple without children	22,703	25.95	2,381	8,214	12,108
4 = Married couple with children	24,418	27.91	3,762	11,137	9,519
5 = Others with no children	17,311	19.78	6,146	4,997	6,168
13. Duration of Residence (continuous variable; categories are for the illustrative purpose)					
2 years ≤	12,518	14.31	6,163	2,977	3,378
3-5 years	15,669	17.91	6,879	4,210	4,580
6-15 years	28,558	32.64	7,432	9,610	11,516
≥ 16 years	30,755	35.15	2,559	16,000	12,196

Variables	Freq. (*N*)	%	Renters	First-Time Homeowners	Repeat Homeowners
14. Recent Mover Status (i.e., moved into the current unit within last 12 months)					
No (=0)	80,662	92.14	19,623	31,152	29,847
Yes (=1)	6,878	7.86	3,410	1,645	1,823
15. Same Household Status in Current Unit (3 Categories)					
1 = Same householders	72,769	83.16	18,567	27,146	27,056
2 = Same HH with changes	11,101	12.69	2,668	4,725	3,708
3 = New householders	3,630	4.15	1,798	926	906
16. Property Values (continuous variable; categories are for the illustrative purpose)					
$250,000 ≤	58,450	66.80	23,033	21,146	14,271
$250k+-500k	18,500	21.14	-	7,852	10,648
$500k+-1000k	8,161	9.33	-	2,985	5,176
> $1,000,000	2,389	2.73	-	814	1,575
Note: All renters are assumed to have no property values of their rental units.					
17. Housing Costs (continuous variable; categories are for the illustrative purpose)					
Affordable (21%<)	37,724	43.11	5,028	16,201	16,495
Less affordable (21-30%)	18,821	21.51	5,224	7,036	6,561
Cost-burdened (31-50%)	16,022	18.31	6,111	5,233	4,678
Severe cost-burdened (>50%)	13,645	15.59	6,037	3,929	3,679
Not report/missing	1,288	1.47	633	398	257
18. Subsidized Housing Status					
No (=0)	80,423	91.91	16,041	32,754	31,628
Yes (=1)	7,077	8.09	6,992	43	42
19. Housing Adequacy (3 Categories)					
1 = Adequate	83,608	95.55	21,317	31,363	30,928
2 = Moderately inadequate	3,023	3.45	1,294	1,116	613
3 = Severely inadequate	869	0.99	422	318	129
20. Type of Housing Unit (5 Categories)					
1 = Mobile home or trailer	4,732	5.41	623	2,399	1,710
2 = SF house, detached	59,755	68.29	5,874	26,653	27,228
3 = SF house, attached	3,626	4.14	1,052	1,513	1,061
4 = Apartment (all sizes)	19,381	22.15	15,484	2,230	1,667
5 = Others (boat, van, etc.)	6	0.01	0	2	4

Variables	Freq. (*N*)	%	Renters	First-Time Homeowners	Repeat Homeowners
21. Household Crowding (continuous variable; categories are for the illustrative purpose)					
No (=0)	83,070	94.94	20,738	31,214	31,118
Yes (=1)	4,430	5.06	2,295	1,583	552
22. U.S. Census Division (9 Categories)					
1: New England	4,879	5.58	1,401	1,898	1,580
2: Middle Atlantic	9,056	10.35	2,720	3,674	2,662
3: East North Central	13,307	15.21	2,900	4,986	5,421
4: West North Central	4,199	4.80	931	1,575	1,693
5: South Atlantic	18,046	20.62	4,398	6,857	6,791
6: East South Central	3,776	4.32	1,057	1,527	1,192
7: West South Central	10,815	12.36	2,660	4,466	3,689
8: Mountain	5,855	6.69	1,273	1,818	2,764
9: Pacific	17,567	20.08	5,693	5,996	5,878
23. Metropolitan Status					
No (=0)	9,209	10.52	1,945	3,811	3,453
Yes (=1)	78,291	89.48	21,088	28,986	28,217
24. Type of Residential Subdivision					
Standard Subdivisions (=0)	67,755	75.15	19,825	25,541	20,389
CIDs (=1)	21,745	24.85	3,208	7,256	11,281
Supplementary variables (for the illustrative purpose)					
Subdivisions					
No (=0)	29,799	34.06	4,627	14,649	10,523
Yes (=1)	36,690	41.93	3,947	14,329	18,414
Not report/missing	21,011	24.01	14,459	3,819	2,733
HOA Status					
No (=0)	63,290	72.33	19,213	24,561	19,516
Yes (=1)	23,864	27.27	3,522	8,204	12,138
Not report/missing	346	0.40	298	32	16
Total	87,500	100	23,033	32,797	31,670

Table 8: Descriptive statistics of the variables in panel data: overall, between, within

	Overall		Between		Within
Variables	**Freq.**	**%**	**Freq.**	**%**	**%**
1. Housing Satisfaction (ordinal variable)					
1 = Least satisfied (1-4)	1,764	2.02	1,505	4.27	48.76
2 = Moderately satisfied (5-6)	7,209	8.24	5,734	16.28	52.17
3 = Very satisfied (7-8)	33,180	37.92	21,249	60.32	63.20
4 = Most satisfied (9-10)	45,347	51.83	24,703	70.12	73.17
Total	87,500	100.00	53,191	150.99	66.23
	(*n* = 35,229)				
2. Neighborhood Satisfaction (ordinal variable)					
1 = Least satisfied (1-4)	2,526	2.89	2,036	5.78	52.03
2 = Moderately satisfied (5-6)	8,318	9.51	6,551	18.60	52.35
3 = Very satisfied (7-8)	33,215	37.96	21,386	60.71	62.52
4 = Most satisfied (9-10)	43,441	49.65	23,996	68.11	72.39
Total	87,500	100.00	53,969	153.19	65.28
	(*n* = 35,229)				
3. Bothersome Indicator					
No (=0)	25,264	28.88	16,200	45.98	63.09
Yes (=1)	62,224	71.12	30,548	86.71	81.87
Not report/missing	-	-	-	-	-
Total	87,488	100.00	46,748	132.70	75.36
	(*n* = 35,229)				
4. Age of Householder (continuous variable; categories are for the illustrative purpose)					
Age 15-24	826	0.94	565	1.60	68.82
Age 25-34	8,533	9.75	4,676	13.27	79.80
Age 35-44	14,156	16.18	7,586	21.53	77.23
Age 45-54	18,410	21.04	9,614	27.29	76.65
Age 55-64	20,990	23.99	10,843	30.78	76.38
Age 65-85	24,585	28.10	10,852	30.80	88.45
Total	87,500	100.00	44,136	125.28	79.82
	(*n* = 35,229)				

	Overall		Between		Within
Variables	**Freq.**	**%**	**Freq.**	**%**	**%**
5. Gender of Householder					
Female (=0)	41,588	47.53	16,859	47.86	100.00
Male (=1)	45,912	52.47	18,370	52.14	100.00
Total	87,500	100.00	35,229	100.00	100.00
	(*n* = 35,229)				
6. Race of Householder (6 Categories)					
1 = White/Caucasian	68,692	78.51	27,499	78.06	100.00
2 = African American/Black	12,074	13.80	4,973	14.12	100.00
3 = Native Indian	754	0.86	310	0.88	100.00
4 = Asian	4,687	5.36	1,915	5.44	100.00
5 = Pacific Islander	244	0.28	103	0.29	100.00
6 = Multiracial	1,049	1.20	429	1.22	100.00
Total	87,500	100.00	35,229	100.00	100.00
	(*n* = 35,229)				
7. Ethnicity of Householder					
Non-Hispanic origin (=0)	75,056	85.78	30,050	85.30	100.00
Hispanic/Spanish origin (=1)	12,444	14.22	5,179	14.70	100.00
Total	87,500	100.00	35,229	100.00	100.00
	(*n* = 35,229)				
8. Nativity Status of Householder (U.S. Residentship)					
Foreign-born (=0)	14,965	17.10	6,139	17.43	100.00
Native-born (=1)	72,535	82.90	29,090	82.57	100.00
Total	87,500	100.00	35,229	100.00	100.00
	(*n* = 35,229)				
9. Education Attainment of Householder (3 Categories)					
1 = Below high school	30,209	34.52	12,512	35.52	98.05
2 = Above high school	25,331	28.95	10,494	29.79	97.23
3 = At least Bachelor's	31,960	36.53	12,909	36.64	98.83
Total	87,500	100.00	35,915	101.95	98.09
	(*n* = 35,229)				

	Overall		Between		Within
Variables	**Freq.**	**%**	**Freq.**	**%**	**%**
10. Housing Tenure (3 Categories)					
1 = Renter	23,033	26.32	9,779	27.76	100.00
2 = First-Time Homeowner	32,797	37.48	12,936	36.72	100.00
3 = Repeat Homeowner	31,670	36.19	12,514	35.52	100.00
Total	87,500	100.00	35,229	100.00	100.00
	(n = 35,229)				
11. Household Income Status, i.e., ≥ 80% of the median family income level for the area (continuous variable; categories are for the illustrative purpose)					
No (=0)	38,690	44.22	20,361	57.80	77.39
Yes (=1)	48,810	55.78	23,871	67.76	81.57
Total	87,500	100.00	44,232	125.56	79.65
	(n = 35,229)				
12. Household Type/Family Structure (5 Categories)					
1 = Single or never married	11,528	13.17	5,401	15.33	88.91
2 = Single parent	11,540	13.19	5,873	16.67	80.98
3 = Married couple without children	22,703	25.95	10,534	29.90	84.81
4 = Married couple with children	24,418	27.91	11,250	31.93	86.88
5 = Others with no children	17,311	19.78	8,056	22.87	86.43
Total	87,500	100.00	41,114	116.70	85.69
	(n = 35,229)				
13. Duration of Residence (continuous variable; categories are for the illustrative purpose)					
2 years ≤	12,518	14.31	9,858	27.98	57.78
3-5 years	15,669	17.91	12,538	35.59	52.73
6-15 years	28,558	32.64	15,231	43.23	73.09
≥ 16 years	30,755	35.15	13,303	37.76	88.62
Total	87,500	100.00	50,930	144.57	69.17
	(n = 35,229)				
14. Recent Mover Status (i.e., moved into the current unit within last 12 months)					
No (=0)	80,662	92.14	35,198	99.91	91.17
Yes (=1)	6,878	7.86	6,847	19.44	45.85
Total	87,500	100.00	42,045	119.35	83.79
	(n = 35,229)				

	Overall		Between		Within
Variables	**Freq.**	**%**	**Freq.**	**%**	**%**
15. Same Household Status of Current Unit (3 Categories)					
1 = Same householders	72,769	83.16	34,069	96.71	84.95
2 = Same HH with changes	11,101	12.69	9,663	27.43	46.28
3 = New householders	3,630	4.15	3,630	10.30	50.00
Total	87,500	100.00	47,362	134.44	74.38
	(*n* = 35,229)				
16. Property Values (continuous variable; categories are for the illustrative purpose)					
$250,000 ≤	58,450	66.80	26,378	74.88	90.05
$250k+-500k	18,500	21.14	10,414	29.56	70.02
$500k+-1000k	8,161	9.33	4,712	13.38	68.65
> $1,000,000	2,389	2.73	1,382	3.92	68.63
Total	87,500	100.00	42,886	121.73	82.15
	(*n* = 35,229)				
Note: All renters are assumed to have no property values of their rental units.					
17. Housing Costs (continuous variable; categories are for the illustrative purpose)					
Affordable (21%<)	37,724	43.76	21,723	61.81	69.42
Less affordable (21-30%)	18,821	21.83	14,512	41.29	53.04
Cost-burdened (31-50%)	16,022	18.58	12,448	35.42	53.30
Severe cost-burdened (>50%)	13,645	15.83	10,291	29.28	55.71
Not report/missing	-	-	-	-	-
Total	86,212	100.00	58,974	167.80	59.60
	(*n* = 35,146)				
18. Subsidized Housing Status					
No (=0)	80,423	91.91	32,484	92.21	99.53
Yes (=1)	7,077	8.09	3,040	8.63	95.30
Total	87,500	100.00	35,524	100.84	99.17
	(*n* = 35,229)				
19. Housing Adequacy (3 Categories)					
1 = Adequate	83,608	95.55	34,862	98.96	96.50
2 = Moderately inadequate	3,023	3.45	2,524	7.16	48.75
3 = Severely inadequate	869	0.99	760	2.16	47.08
Total	87,500	100.00	38,146	108.28	92.35

	Overall		Between		Within
Variables	**Freq.**	**%**	**Freq.**	**%**	**%**
	(*n* = 35,229)				
20. Type of Housing Unit (5 Categories)					
1 = Mobile home or trailer	4,732	5.41	1,905	5.41	100.00
2 = SF house, detached	59,755	68.29	23,683	67.23	100.00
3 = SF house, attached	3,626	4.14	1,509	4.28	100.00
4 = Apartment (all sizes)	19,381	22.15	8,129	23.07	100.00
5 = Others (boat, van, etc.)	6	0.01	3	0.01	100.00
Total	87,500	100.00	35,229	100.00	100.00
	(*n* = 35,229)				
21. Household Crowding (continuous variable; categories are for the illustrative purpose)					
No (=0)	83,070	94.94	34,089	96.76	97.95
Yes (=1)	4,430	5.06	2,584	7.33	71.19
Total	87,500	100.00	36,673	104.10	96.06
	(*n* = 35,229)				
22. U.S. Census Division (9 Categories)					
1: New England	4,879	5.58	1,974	5.60	100.00
2: Middle Atlantic	9,056	10.35	3,663	10.40	100.00
3: East North Central	13,307	15.21	5,316	15.09	100.00
4: West North Central	4,199	4.80	1,656	4.70	100.00
5: South Atlantic	18,046	20.62	7,289	20.69	100.00
6: East South Central	3,776	4.32	1,511	4.29	100.00
7: West South Central	10,815	12.36	4,380	12.43	100.00
8: Mountain	5,855	6.69	2,389	6.78	100.00
9: Pacific	17,567	20.08	7,051	20.01	100.00
Total	87,500	100.00	35,229	100.00	100.00
	(*n* = 35,229)				
23. Metropolitan Status					
No (=0)	9,209	10.52	3,653	10.37	100.00
Yes (=1)	78,291	89.48	31,576	89.63	100.00
Total	87,500	100.00	35,229	100.00	100.00
	(*n* = 35,229)				

	Overall		Between		Within
Variables	**Freq.**	**%**	**Freq.**	**%**	**%**
24. Type of Residential Subdivision					
Standard Subdivisions (=0)	67,755	75.15	26,471	75.14	100.00
CIDs (=1)	21,745	24.85	8,758	24.86	100.00
Total	87,500	100.00	35,229	100.00	100.00
	(*n* = 35,229)				
Supplementary variables (for the illustrative purpose)					
Subdivisions					
No (=0)	29,799	44.82	12,625	46.48	100.00
Yes (=1)	36,690	55.18	14,537	53.52	100.00
Not report/missing	-	-	-	-	-
Total	66,489	100.00	27,162	100.00	100.00
	(*n* = 27,162)				
HOA Status					
No (=0)	63,290	72.62	25,531	72.62	100.00
Yes (=1)	23,864	27.38	9,628	27.38	100.00
Not report/missing	-	-	-	-	-
Total	87,154	100.00	35,159	100.00	100.00
	(*n* = 35,159)				

Note: For the component decomposition, there are three parts – overall, between, and within. The overall part of the table summarizes results in terms of person-years. Take the bothersome indicator as an example, there are 35,229 householder-years of the data (=*n*) in which 25,264 of them is 0 and 62,224 in which it is 1, which implies that in 71.1% of the data, the householders express bothersome features of their neighborhood. The between part repeats the breakdown in terms of householders rather than person-years. For example, 16,200 of the householders ever have no bothersome status (=0) and 30,548 ever have the bothersome status (=1), for a grand total of 46,748 ever having either the status. However, the data has only 35,229 unique householders. This means that there are householders who sometimes have the bothersome status 0 and at other times have the status 1. In addition, the within part tells the fraction of the time a householder who has the specified value of the bothersome status. For example, conditional on a householder ever having the status of 0, 63.09% of that householder's observations have the bothersome status of 0. Similarly, 81.87% for the status of 1. These two numbers are a measure of the stability of this variable's values – closer to 100%, more stable it becomes. The status (=1) is more stable than the status (=0), which means that householders tend to be more of expressed bothersome neighborhood features than they are not. Hence, the total within of 75.36% (i.e., 16200×63.09 + 30548×81.87)/46748) is the normalized value between weighted average of these within percents, or a measure of the overall stability of this variable.

CHAPTER 4

RESULTS

With the notion of housing deficit, this study attempted to identify the housing, neighborhood and individual attributes that facilitated a satisfied or dissatisfied response. Given the unique national data of the redesigned AHS, this study incorporated the effects of FTHBs and CIDs in the cross-sectional and longitudinal analyses in an attempt to further the understanding of the determinants of housing satisfaction and neighborhood satisfaction at one point in time and over time. This study hoped that the empirical findings on these relevant socio-demographic, housing and neighborhood characteristics could offer additional insights regarding individuals' experience with housing and neighborhood and further our understanding of the formation of residential satisfaction at one point in time and through the temporal dimension.

Using Stata 16 and the same-unit, same-person sample, this study reported the results from generalized ordered logit/partial proportional odds models (i.e., *gologit2*) for the cross-sectional analysis and from fixed-effects ordered logit models (i.e., *feologit*) for the longitudinal analysis. Tables 9 and 10 present the empirical findings from *gologit2* regressions of *Housing satisfaction* and *Neighborhood satisfaction*, whereas Tables 11 and 12 present the empirical findings from *feologit* regressions of *Housing satisfaction* and *Neighborhood satisfaction*. The results were reported in odds ratios. The odds ratio below or above 1 corresponds to a negative or positive value of the coefficient scale in log odds because of their direct relationship (i.e., the log odds defined as the log base **e**(**log**) of the odds can be expressed in odds by taking **e** to the power to get rid of the **log**). For example, the odds ratio for gender is defined as the odds of being satisfied with housing

or neighborhood for males over the odds of being satisfied for females. If the odds ratio of being satisfied with housing or neighborhood for males is greater 1, it is said that the odds of being satisfied with housing or neighborhood for males are more than one time as large as the odds for females, *ceteris paribus.* Alternatively, as it is a common practice, one may use the percentage change in the odds of the dependent variable having a value of 1 by subtracting 1 from the odds ratio and multiplying by 100. For example, if the odds ratio for age is 0.931, then the percentage change will be 6.9%. The odds ratio for age indicates that every unit increase in age is associated with a 6.9% decrease in the odds of being satisfied with housing or neighborhood.

1. Reporting of Findings

1.1. Cross-Sectional Regression Results

In the cross-sectional analysis, this study incorporated the effects of FHTBs and CIDs into the models of housing satisfaction and neighborhood satisfaction, which addressed the first two research questions and hypotheses. The interest of this analysis was to compare the housing and neighborhood satisfaction of householders 1) who were FTHBs to the satisfaction of householders who were renters or repeat homeowners, and 2) who lived in CIDs to the satisfaction of householders who lived in traditional standard subdivisions. In this analysis, the effect of householders' housing tenure was considered "precise" compared to those reported in some of the previous studies. The reason was that besides how FTHBs were defined, this study considered only non-transitional housing tenure of same individual householders, meaning renters as renters, FTHBs as FTHBs, and repeat homeowners as repeat homeowners through all the periods under investigation.

The cross-sectional regression results were of the generalized ordered logit/partial proportional odds models (*gologit/ppo*), given that the parallel-lines assumption of the ordered logit model (i.e., *ologit* in Stata) was rejected. The *gologit/ppo* models for ordinal dependent variables

can offer asymmetrical effects in a partial proportional odds (PPO) model, where the parallel-lines constraint is relaxed only for those variables that it is not justified (Williams, 2006). The gologit/ gologit2 results are similar to those results of the series of binary logistic regressions and can be interpreted in the same way. Because each ordinal dependent variable in this study has four ordered categories, each gologit/ppo model will produce the results of the estimated coefficients in three separate panels. For example, the first panel is considered the results of a logistic regression where category 1 = 0 and categories 2, 3, 4 = 1, or simply the first panel contrasts category 1 with categories 2, 3, and 4. Furthermore, if the assumption of the ordered logit model holds, all the estimated coefficients shall be the same values in all panels, except for the intercepts. Thus, only differences in the parameter estimates across all panels need to be closely examined. In terms of interpreting the results of generalized ordered logit models, again, positive coefficients indicate that higher values on the explanatory variable make it more likely that the householder is in a higher category of *Housing or Neighborhood satisfaction* than the current category, whereas negative coefficients indicate that higher values of the explanatory variable increase the likelihood of being in the current or lower category of *Housing or Neighborhood Satisfaction*. Williams (2006, 2016) provides the full details for understanding and interpreting the generalized ordered logit models.

1.1.1. Factors Shaping Housing Satisfaction at One Point in Time

Table 9 reports the results of the generalized ordered logit models for *Housing satisfaction*. In Table 9, the coefficients of the *gologit2* regressions were the odds ratios. There were three specifications – the baseline model, the model with CIDs, and the model with interactions and OMB13CBSA cluster standard errors. The results showed that most variables had their significant effects on housing satisfaction, and they were in line with expectations and findings reported in the previous studies. The analysis suggested that neighborhood satisfaction was a significant de-

terminant of housing satisfaction in three regressions. The positive effect of neighborhood satisfaction on housing satisfaction suggests that the higher the levels of neighborhood satisfaction, the more likely one is to be satisfied with housing. The effect of bothersome neighborhood features on householders' assessment of their housing was inconclusive because two of the three coefficients were statistically significant and had the opposite signs. A similar finding was reported in the previous studies (Lu, 1999). This may imply that householders' assessment of housing takes into consideration the desirability of their neighborhood as a whole, but the role of specific aspects of their neighborhood in such assessments come into play uncertainly.

Among the individual and household socio-demographic characteristics, the effect of householders' age on housing satisfaction was inconclusive because the coefficients of age had the opposite signs. This may imply that householders with different age groups take their housing assessment differently. Previous studies found a positive effect of age, i.e., older persons were more likely to be satisfied with their dwelling than were younger persons, *ceteris paribus*. The positive effect of age was generally an indication of individuals' conformism or acceptance of their housing status over time (Amérigo & Aragonés, 1990; Dahmann, 1985; Dekker et al., 2011; Lu, 1999). The gender effect on housing satisfaction was statistically significant and negative. For males, the odds of being satisfied with housing were about 0.91 times as large as those for females, *ceteris paribus*. To put it differently, being male was associated with a 9% decrease in the odds of being satisfied with housing, *ceteris paribus*. Hence, the results imply that males are less likely to be satisfied with their housing than are females. This is in line with findings reported in the previous studies. For race, the results suggest that Black householders are more likely to be satisfied with housing than White householders, given that the odds ratios of 1.13 were statistically significant. This contrasts with findings reported in the previous studies that found White householders

were more likely to be satisfied with dwelling than Blacks and other races (Lu, 1999). Compared to White householders, the effect of Asian race on housing satisfaction was inconclusive because the coefficients of Asian race had the opposite signs. This may imply that different ethnic groups of the Asian population take their housing assessment somewhat differently. By the Asian population in the United States, Chinese, Indian, Filipino, Vietnamese, Korean and Japanese Americans were six origin groups that accounted for 85% of all Asian Americans as of 2019 (Budiman & Ruiz, 2021). The effects of other races on housing satisfaction were not statistically significant but conclusive – the negative coefficients for Native Indians and Pacific Islanders and the positive coefficients for multiracial householders.

The analysis further showed that having the Hispanic/Spanish origin was associated with a 46% increase in the odds of being satisfied with housing, *ceteris paribus*. However, its significant effect was slightly smaller in the model with the interactions and cluster standard errors. The results suggest that Hispanics are more likely to be satisfied with their housing than are non-Hispanics. This finding is somewhat expected because Hispanic families have been known for their extended kinship ties (Landale et al., 2006). The effect of householders' nativity status on housing satisfaction was not found to be statistically significant, but it was positive. This implies that there is no difference in the assessment of housing between native-born householders and foreign-born householders. For the Hispanic origin and the nativity status, this study also investigated their interaction effects with household crowding, which is to be shortly discussed. Moreover, education attainment showed an inconclusive effect on housing satisfaction. The results suggest that there is no difference in the assessment of housing between the three categories of householders' education. This finding may support the argument that the relationship between education and residential satisfaction remains less clear (Hipp, 2009).

Regarding householders' housing tenure, the coefficients were statistically significant. *Ceteris paribus,* being a renter was associated with a 40% decrease in the odds of being satisfied with housing, whereas being a repeat homeowner was associated with a 16% increase in the odds of being satisfied with housing. Thus, the results suggest that first-time homeowners (FTHBs) are more likely to be satisfied with their housing than are renters, but they are less likely to be satisfied with their housing than are repeat homeowners. The findings partially support the hypotheses, given the generally accepted views on the new-house-smell experience and *in pursuit of the American Dream*. This study also investigated the interaction effects of housing tenure and CIDs. To shortly discuss the results of the interaction effects, the attempt was to examine whether renters, FTHBs, and repeat homeowners were more or less likely to be satisfied with their housing, given the CIDs status. The analysis further showed that household income had an inconclusive effect on housing satisfaction because it had two positive coefficients and one negative coefficient. The results may imply that households with higher incomes take their housing assessment differently. This finding of the inconclusive effect of income contrasts with findings reported in the previous studies that found a positive effect of income on housing satisfaction (Lu, 1999).

For household types, the effects were statistically significant and negative. Being a single householder was associated with a 25% decrease in the odds of being satisfied with housing, *ceteris paribus*. Similarly, being a single parent was associated with a 26% decrease in the odds of being satisfied with housing, *ceteris paribus*. For married couples with children, the negative effect on housing satisfaction became less negative in higher categories of comparison (i.e., the odds ratios approached to 1). Being a head of other households was associated with a 27% decrease in the odds of being satisfied with housing, *ceteris paribus*. The results imply that married couples without children are more likely to be satisfied with their housing than all other household types.

This is in line with findings reported in the previous studies (Campbell et al., 1976; Galster & Hesser, 1981; Lu, 1999; Morris & Winter, 1978; Rogers & Nikkel, 1979). In addition, the analysis showed that the effect of duration of residence was inconclusive. Therefore, the duration of residence does not seem to make much difference in individuals' assessment of their housing. Previous studies reported the mixed findings of the duration of residence on residential satisfaction (Lu, 1999; Smith, 2011). On the other hand, the analysis found the effect of recent moving experience on housing satisfaction was statistically significant and positive. Hence, the recent moving experience is associated with an increase in the odds of being satisfied with housing, *ceteris paribus*. This finding is somewhat expected because recent movers would reasonably choose more desirable places than their previous ones, resulting in high levels of residential satisfaction. This finding contrasts with insignificant findings reported in some previous studies (Clark, 1986; Lu, 1999).

By the same-household status, the analysis found the effects were statistically significant. Being a householder with his or her household composition changes was associated with about a 14% decrease in the odds of being satisfied with housing, *ceteris paribus*. Similarly, being a new householder was associated with about a 11% decrease in the odds of being satisfied with housing, *ceteris paribus*. The results thus suggest that householders with the same household composition are more likely to be satisfied with their housing than are new householders and are householders with their household composition changes. The analysis also showed that the effect of property values on housing satisfaction was statistically significant and (marginally) positive. Having higher property values was associated with a (small) increase in the odds of being satisfied with housing, *ceteris paribus*. This is in line with findings reported in the previous studies (Lu, 1999). However, the effect of housing costs on housing satisfaction was not found to be statistically significant, but it was marginally positive. The results imply that housing costs do not seem to make

much difference in individuals' assessment of their housing. As it was previously mentioned, one might suspect that this finding could be biased as a result of highly inflated values of householders' housing-costs-to-income. By imposing the housing expense ratio under 110% (i.e., it was done in separate regressions with the remaining large sample), the effect of housing costs on housing satisfaction remained statistically insignificant. However, the odds ratios became positively larger, suggesting that high housing costs in general were associated with better housing, rather implying that individuals prefer to spend more on housing (Lu, 1999).

The analysis further showed that the effect of subsidized housing on housing satisfaction was statistically significant and positive. Having a HUD housing assistance was associated with a large increase in the odds of being satisfied with housing, *ceteris paribus*. The results imply that the recipients of HUD subsidized housing are more likely to be satisfied with their housing than are their counterparts. This finding is somewhat expected because these householders have not only less housing costs but also receive all available benefits the market-rate units have to offer them. For the effect of housing adequacy on housing satisfaction, the coefficients were statistically significant and negative (i.e., the odds ratios ranged from 0.25 to 0.50). Having a moderately or severely inadequate housing unit was associated with a large decrease in the odds of being satisfied with housing, *ceteris paribus*. The results imply that householders in adequate housing units are more likely to be satisfied with their housing than are householders in moderately or severely inadequate housing units. This finding is in line with the literature and intuitive because adequate units would satisfactorily accommodate individuals' housing needs.

Additionally, the analysis showed that unit types had different effects on housing satisfaction. The effect of living in mobile home structures or other structures on housing satisfaction were negative, but only the effect of living in mobile homes was statistically significant. The effect of

living in single-family attached structures was not statistically significant, and its effect became negative in the model with the interactions and cluster standard errors, i.e., the odds changed from 1.04 to 0.99. The effect of living in apartment structures was not statistically significant, and it was marginally positive. The results suggest that living in single-family detached structures is associated with the increased satisfaction with housing. The findings also reflect the American housing norms that indicate that single-family detached housing units are the most preferred structural type. Moreover, the analysis found the effect of household crowding on housing satisfaction was statistically significant and negative. Overcrowding was associated with a 39% decrease in the odds of being satisfied with housing, *ceteris paribus*. This study also examined the interaction effects of overcrowding, Hispanic, and nativity, which is to be shortly discussed. In that model with the interactions and cluster standard errors, the effect of overcrowding itself remained statistically significant but slightly changed (i.e., the odds increased to 0.665 from 0.605). Therefore, the results suggest that overcrowding is associated with the decreased satisfaction with housing.

In terms of geographic differences in individuals' assessment of their housing, only East South Central, West South Central, and Mountain divisions were statistically significant and positive. *Ceteris paribus*, householders in these divisions are more likely to be satisfied with their housing than those in the New England division. The analysis further showed that the effect of metropolitan areas on housing satisfaction was not statistically significant, and its effect was negative in the model with the interactions and cluster standard errors, i.e., the odds reduced to 0.97. The results suggest that living in the metropolitan areas does not seem to make much difference in individuals' assessment of their housing. It is worth noting that the negative effect of metropolitan areas may indicate that living in the metropolitan areas is likely associated with the decreased satisfaction with housing (compared to living in the non-metropolitan areas), *ceteris paribus*. Also,

such modulating role of geographic settings in individuals' housing assessment was reported by Lévy-Leboyer and Ratiu (1993). Of the significant findings, the effect of CIDs on housing satisfaction was statistically significant and positive. Living in CIDs was associated with a 13% increase in the odds of being satisfied with housing, *ceteris paribus*. The results suggest that householders in CIDs are more likely to be satisfied with their housing than are householders in standard subdivisions. This interesting finding supports the hypothesis of this study.

The final discussion focused on the results from the model with the interactions and the OMB13CBSA cluster standard errors. The results in the last three columns of Table 9 indicated that the positive effect of CIDs remained statistically significant and was slightly larger, i.e., the odds increased to 1.15. All the interaction effects, however, were not statistically significant, and yet they told interesting stories. The coefficients of renters and repeat homeowners in this model were about the same as those estimates in the models with no interactions, and they remained statistically significant. The coefficients of the interaction of renters and CIDs were negative, and the coefficients of the interaction of repeat homeowners and CIDs were also negative. Because of their interaction, the effect of renters on housing satisfaction became more negative, i.e., a 2.5% increase in its negative magnitude. Thus, renters are still less likely to be satisfied with housing than are FTHBs, given the CIDs status, *ceteris paribus*. Similarly, because of their interaction, the effect of repeat homeowners on housing satisfaction became slightly less positive, i.e., a 3.1% decrease in its positive magnitude. Hence, repeat homeowners are still more likely to be satisfied with housing than are FTHBs, given the CIDs status, *ceteris paribus*.

Another interesting finding was about the interaction effects for overcrowding. In this model, the coefficients of overcrowding remained statistically significant and became slightly larger, i.e., the odds ratios increased to 0.665. The interaction effect of overcrowding and Hispanic

Table 9: Housing satisfaction: odds ratio of generalized ordered logit regression

Housing Satisfaction		**Baseline**		**Common Interest Development**			**Interaction Effects**		
Variables	**1 vs 2,3,4**	**1,2 vs 3,4**	**1,2,3 vs 4**	**1 vs 2,3,4**	**1,2 vs 3,4**	**1,2,3 vs 4**	**1 vs 2,3,4**	**1,2 vs 3,4**	**1,2,3 vs 4**
2.Moderately Satisfied with Neighborhood	7.369***	1.398***	0.934	7.347***	1.392***	0.930	7.360***	1.391***	0.926
	(0.891)	(0.105)	(0.0936)	(0.888)	(0.104)	(0.0933)	(1.058)	(0.0701)	(0.107)
3.Very Satisfied with Neighborhood	20.06***	10.89***	1.479***	19.94***	10.80***	1.467***	19.84***	10.77***	1.462***
	(2.377)	(0.814)	(0.135)	(2.363)	(0.807)	(0.134)	(2.579)	(0.638)	(0.123)
4.Most Satisfied with Neighborhood	29.59***	30.65***	21.18***	29.34***	30.33***	20.94***	29.10***	30.18***	20.90***
	(3.699)	(2.521)	(1.930)	(3.668)	(2.495)	(1.909)	(3.916)	(2.402)	(1.775)
1.Bothersome	0.631***	0.817***	1.032	0.631***	0.816***	1.030	0.628***	0.814***	1.030
	(0.0809)	(0.0420)	(0.0320)	(0.0809)	(0.0420)	(0.0319)	(0.0812)	(0.0377)	(0.0244)
Age	0.993**	0.998	1.011***	0.993**	0.998	1.010***	0.992***	0.998	1.010***
	(0.00342)	(0.00174)	(0.00133)	(0.00342)	(0.00174)	(0.00133)	(0.00299)	(0.00193)	(0.00169)
1.Male	0.906***	0.906***	0.906***	0.906***	0.906***	0.906***	0.905***	0.905***	0.905***
	(0.0240)	(0.0240)	(0.0240)	(0.0240)	(0.0240)	(0.0240)	(0.0182)	(0.0182)	(0.0182)
2.African American/Black	1.125***	1.125***	1.125***	1.127***	1.127***	1.127***	1.127***	1.127***	1.127***
	(0.0439)	(0.0439)	(0.0439)	(0.0440)	(0.0440)	(0.0440)	(0.0418)	(0.0418)	(0.0418)
3.Native Indian	0.956	0.956	0.956	0.955	0.955	0.955	0.961	0.961	0.961
	(0.124)	(0.124)	(0.124)	(0.124)	(0.124)	(0.124)	(0.133)	(0.133)	(0.133)
4.Asian	1.635*	0.831*	0.932	1.630*	0.827*	0.924	1.579**	0.834	0.948
	(0.416)	(0.0813)	(0.0647)	(0.415)	(0.0810)	(0.0643)	(0.299)	(0.101)	(0.0678)
5.Pacific Islander	0.813	0.813	0.813	0.805	0.805	0.805	0.815	0.815	0.815
	(0.178)	(0.178)	(0.178)	(0.176)	(0.176)	(0.176)	(0.140)	(0.140)	(0.140)
6.Multiracial	1.089	1.089	1.089	1.090	1.090	1.090	1.100	1.100	1.100
	(0.120)	(0.120)	(0.120)	(0.120)	(0.120)	(0.120)	(0.0810)	(0.0810)	(0.0810)
1.Hispanic/Spanish Origin	1.456***	1.456***	1.456***	1.461***	1.461***	1.461***	1.061	1.228**	1.373***
	(0.0629)	(0.0629)	(0.0629)	(0.0631)	(0.0631)	(0.0631)	(0.118)	(0.112)	(0.124)
1.Native-Born	1.004	1.004	1.004	1.009	1.009	1.009	1.183	1.183	1.183
	(0.0425)	(0.0425)	(0.0425)	(0.0428)	(0.0428)	(0.0428)	(0.132)	(0.132)	(0.132)
2.Above High School	0.977	1.051	0.864***	0.973	1.047	0.860***	0.950	1.043	0.865***

Housing Satisfaction		Baseline			Common Interest Development			Interaction Effects	
Variables	**1 vs 2,3,4**	**1,2 vs 3,4**	**1,2,3 vs 4**	**1 vs 2,3,4**	**1,2 vs 3,4**	**1,2,3 vs 4**	**1 vs 2,3,4**	**1,2 vs 3,4**	**1,2,3 vs 4**
	(0.0932)	(0.0506)	(0.0306)	(0.0928)	(0.0504)	(0.0305)	(0.0757)	(0.0555)	(0.0320)
3.At Least Bachelor's	1.279**	1.173***	0.845***	1.269*	1.164***	0.836***	1.226**	1.151**	0.840***
	(0.159)	(0.0665)	(0.0318)	(0.158)	(0.0660)	(0.0316)	(0.125)	(0.0640)	(0.0209)
1.Renter	0.590***	0.590***	0.590***	0.604***	0.604***	0.604***	0.605***	0.605***	0.605***
	(0.0262)	(0.0262)	(0.0262)	(0.0271)	(0.0271)	(0.0271)	(0.0337)	(0.0337)	(0.0337)
3.Repeat Owner	1.169***	1.169***	1.169***	1.159***	1.159***	1.159***	1.164***	1.164***	1.164***
	(0.0387)	(0.0387)	(0.0387)	(0.0385)	(0.0385)	(0.0385)	(0.0419)	(0.0419)	(0.0419)
Income	1.140***	1.115***	0.996	1.137***	1.113***	0.994	1.140***	1.115***	0.995
	(0.0457)	(0.0225)	(0.0154)	(0.0456)	(0.0224)	(0.0154)	(0.0445)	(0.0224)	(0.0145)
1.Single or Never Married	0.746***	0.746***	0.746***	0.747***	0.747***	0.747***	0.740***	0.740***	0.740***
	(0.0345)	(0.0345)	(0.0345)	(0.0345)	(0.0345)	(0.0345)	(0.0473)	(0.0473)	(0.0473)
2.Single Parent	0.734***	0.734***	0.734***	0.732***	0.732***	0.732***	0.741***	0.741***	0.741***
	(0.0346)	(0.0346)	(0.0346)	(0.0345)	(0.0345)	(0.0345)	(0.0266)	(0.0266)	(0.0266)
4.Married Couple w/ Children	0.744***	0.980	0.959	0.740***	0.975	0.954	0.761**	0.992	0.964
	(0.0834)	(0.0587)	(0.0407)	(0.0830)	(0.0584)	(0.0405)	(0.0983)	(0.0461)	(0.0415)
5.Others w/o Children	0.732***	0.732***	0.732***	0.734***	0.734***	0.734***	0.725***	0.725***	0.725***
	(0.0306)	(0.0306)	(0.0306)	(0.0306)	(0.0306)	(0.0306)	(0.0360)	(0.0360)	(0.0360)
Duration of Residence	1.000	0.994***	1.000	1.001	0.995**	1.001	1.000	0.995*	1.000
	(0.00428)	(0.00205)	(0.00147)	(0.00429)	(0.00206)	(0.00148)	(0.00485)	(0.00295)	(0.00137)
1.Moved in Last 12 Months	1.206***	1.206***	1.206***	1.209***	1.209***	1.209***	1.211***	1.211***	1.211***
	(0.0458)	(0.0458)	(0.0458)	(0.0460)	(0.0460)	(0.0460)	(0.0277)	(0.0277)	(0.0277)
2.Same HH with Changes	0.867*	0.867*	0.867*	0.866*	0.866*	0.866*	0.863***	0.863***	0.863***
	(0.0715)	(0.0715)	(0.0715)	(0.0714)	(0.0714)	(0.0714)	(0.0489)	(0.0489)	(0.0489)
3.New Householder	0.895**	0.895**	0.895**	0.893**	0.893**	0.893**	0.894***	0.894***	0.894***
	(0.0397)	(0.0397)	(0.0397)	(0.0397)	(0.0397)	(0.0397)	(0.0297)	(0.0297)	(0.0297)
Property Value	1.000***	1.001***	1.000***	1.000***	1.001***	1.000***	1.000	1.001*	1.000***
	(0.000148)	(0.000137)	(6.09e-05)	(0.000148)	(0.000137)	(6.08e-05)	(0.000395)	(0.000387)	(0.000122)
Housing Cost (%)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	(0.000247)	(0.000247)	(0.000247)	(0.000247)	(0.000247)	(0.000247)	(0.000121)	(0.000121)	(0.000121)

Housing Satisfaction	Baseline			Common Interest Development			Interaction Effects		
Variables	**1 vs 2,3,4**	**1,2 vs 3,4**	**1,2,3 vs 4**	**1 vs 2,3,4**	**1,2 vs 3,4**	**1,2,3 vs 4**	**1 vs 2,3,4**	**1,2 vs 3,4**	**1,2,3 vs 4**
1.HUD-Subsidized Unit	1.131	1.327***	1.582***	1.134	1.330***	1.589***	1.148	1.341***	1.606***
	(0.135)	(0.0926)	(0.0963)	(0.136)	(0.0929)	(0.0967)	(0.126)	(0.0827)	(0.0940)
2.Moderately Inadequate	0.315***	0.379***	0.491***	0.315***	0.380***	0.493***	0.321***	0.384***	0.495***
	(0.0381)	(0.0292)	(0.0372)	(0.0381)	(0.0293)	(0.0374)	(0.0302)	(0.0386)	(0.0293)
3.Severely Inadequate	0.257***	0.255***	0.420***	0.256***	0.254***	0.419***	0.258***	0.257***	0.417***
	(0.0461)	(0.0335)	(0.0621)	(0.0460)	(0.0334)	(0.0619)	(0.0558)	(0.0265)	(0.0530)
1.Mobile Home/Trailer	0.602***	0.562***	0.693***	0.610***	0.570***	0.706***	0.609***	0.570***	0.709***
	(0.0857)	(0.0427)	(0.0437)	(0.0868)	(0.0434)	(0.0447)	(0.0731)	(0.0324)	(0.0308)
3.SF House, Attached	1.041	1.041	1.041	0.992	0.992	0.992	0.990	0.990	0.990
	(0.0656)	(0.0656)	(0.0656)	(0.0640)	(0.0640)	(0.0640)	(0.0763)	(0.0763)	(0.0763)
4.Apartment	1.045	1.045	1.045	1.018	1.018	1.018	1.022	1.022	1.022
	(0.0432)	(0.0432)	(0.0432)	(0.0427)	(0.0427)	(0.0427)	(0.0462)	(0.0462)	(0.0462)
5.Others	0.470	0.470	0.470	0.482	0.482	0.482	0.490	0.490	0.490
	(0.503)	(0.503)	(0.503)	(0.516)	(0.516)	(0.516)	(0.371)	(0.371)	(0.371)
Overcrowding Index	0.605***	0.605***	0.605***	0.612***	0.612***	0.612***	0.665**	0.665**	0.665**
	(0.0311)	(0.0311)	(0.0311)	(0.0314)	(0.0314)	(0.0314)	(0.114)	(0.114)	(0.114)
2.Middle Atlantic	1.045	1.045	1.045	1.049	1.049	1.049	1.048	1.048	1.048
	(0.0686)	(0.0686)	(0.0686)	(0.0689)	(0.0689)	(0.0689)	(0.0672)	(0.0672)	(0.0672)
3.East North Central	1.045	1.045	1.045	1.035	1.035	1.035	1.031	1.031	1.031
	(0.0655)	(0.0655)	(0.0655)	(0.0649)	(0.0649)	(0.0649)	(0.0711)	(0.0711)	(0.0711)
4.West North Central	0.954	0.954	0.954	0.946	0.946	0.946	0.940	0.940	0.940
	(0.0755)	(0.0755)	(0.0755)	(0.0749)	(0.0749)	(0.0749)	(0.0637)	(0.0637)	(0.0637)
5.South Atlantic	1.083	1.083	1.083	1.054	1.054	1.054	0.913	1.123	1.033
	(0.0657)	(0.0657)	(0.0657)	(0.0645)	(0.0645)	(0.0645)	(0.106)	(0.0916)	(0.0834)
6.East South Central	1.143	1.143	1.143	1.130	1.130	1.130	1.123*	1.123*	1.123*
	(0.0936)	(0.0936)	(0.0936)	(0.0926)	(0.0926)	(0.0926)	(0.0769)	(0.0769)	(0.0769)
7.West South Central	1.129*	1.129*	1.129*	1.101	1.101	1.101	1.097	1.097	1.097
	(0.0735)	(0.0735)	(0.0735)	(0.0720)	(0.0720)	(0.0720)	(0.0732)	(0.0732)	(0.0732)

Housing Satisfaction		Baseline			Common Interest Development			Interaction Effects	
Variables	**1 vs 2,3,4**	**1,2 vs 3,4**	**1,2,3 vs 4**	**1 vs 2,3,4**	**1,2 vs 3,4**	**1,2,3 vs 4**	**1 vs 2,3,4**	**1,2 vs 3,4**	**1,2,3 vs 4**
8.Mountain	1.150*	1.150*	1.150*	1.116	1.116	1.116	1.114	1.114	1.114
	(0.0832)	(0.0832)	(0.0832)	(0.0813)	(0.0813)	(0.0813)	(0.0998)	(0.0998)	(0.0998)
9.Pacific	0.987	0.987	0.987	0.977	0.977	0.977	0.973	0.973	0.973
	(0.0597)	(0.0597)	(0.0597)	(0.0592)	(0.0592)	(0.0592)	(0.0769)	(0.0769)	(0.0769)
1.Metropolitan Area	1.000	1.000	1.000	0.986	0.986	0.986	0.982	0.982	0.982
	(0.0441)	(0.0441)	(0.0441)	(0.0437)	(0.0437)	(0.0437)	(0.0152)	(0.0152)	(0.0152)
1.CID Status				1.126***	1.126***	1.126***	1.148***	1.148***	1.148***
				(0.0375)	(0.0375)	(0.0375)	(0.0554)	(0.0554)	(0.0554)
1.CID#1.Renter							0.975	0.975	0.975
							(0.0735)	(0.0735)	(0.0735)
1.CID#3.Repeat Owner							0.969	0.969	0.969
							(0.0652)	(0.0652)	(0.0652)
1.Hispanic#C.Crowding							1.146	1.146	1.146
							(0.129)	(0.129)	(0.129)
1.Native-Born#C.Crowding							0.802	0.802	0.802
							(0.147)	(0.147)	(0.147)
Constant	4.296***	0.705	0.190***	4.402***	0.725	0.198***	4.540***	0.672	0.179***
	(2.108)	(0.187)	(0.0428)	(2.161)	(0.192)	(0.0446)	(2.068)	(0.192)	(0.0514)
Observations	34,560	34,560	34,560	34,560	34,560	34,560	34,560	34,560	34,560
OMB13CBSA Cluster	No	No	No	No	No	No	Yes	Yes	Yes
Pseudo R^2	0.2804	0.2804	0.2804	0.2806	0.2806	0.2806	0.2810	0.2810	0.2810

Standard errors in parentheses

**** p < 0.01, ** p < 0.05, * p < 0.10*

on housing satisfaction was not statistically significant, but it was positive, i.e., the odds ratios were 1.15. Because of their interaction, the effect of overcrowding on housing satisfaction become less negative, i.e., a 15% decrease in its negative magnitude. *Ceteris paribus,* overcrowding was associated with a 18.9% decrease, instead of a 33.5% decrease, in the odds of being satisfied with housing, given having the Hispanic/Spanish origin. The analysis also showed that the interaction effect of overcrowding and the nativity status on housing satisfaction was not statistically significant, but it was negative, i.e., the odds ratios were 0.802. Because of their interaction, the effect of overcrowding on housing satisfaction become more negative, i.e., a 19.8% increase in its negative magnitude. *Ceteris paribus*, having overcrowding was associated with a 53.3% decrease, instead of a 33.5% decrease, in the odds of being satisfied with housing, given being native-born persons. To put it differently, the results may suggest that overcrowding in the Hispanic or foreign-born households does not necessarily make them be less likely to express high levels of housing satisfaction than are non-Hispanic or native-born householders, given the fact that overcrowding in the U.S is likely found in Hispanic and foreign-born households (Blake et al., 2007). Lastly, the constant represented the baseline odds.

1.1.2. Factors Shaping Neighborhood Satisfaction at One Point in Time

Table 10 reports the parameter estimates of the generalized ordered logit models for *Neighborhood satisfaction*. In Table 10, the coefficients of the *gologit2* regressions were the odds ratios. There were three specifications – the baseline model, the model with CIDs, and the model with interactions and OMB13CBSA cluster standard errors. The variables included in the regressions were important correlates of individuals' neighborhood satisfaction. The analysis showed that housing satisfaction had a significant effect on neighborhood satisfaction. The positive effect of housing satisfaction implies that high housing satisfaction is associated with the increased satis-

faction with neighborhood. The effect of bothersome neighborhood features on neighborhood satisfaction was negative and statistically significant. Thus, individuals are less likely to express high levels of satisfaction with their neighborhood when they perceive something bothersome about their neighborhood, *ceteris paribus*. This finding is in line with the literature (Lu, 1999), but it contrasts with the insignificant role of the bothersome factors in the assessment of housing.

The effect of age on neighborhood satisfaction was statistically significant and positive. Being older is associated with the increased satisfaction with neighborhood. This is in line with findings reported in the previous studies (Chapman & Lombard, 2006; Lu, 1999). The effect of gender on neighborhood satisfaction was inconclusive because the coefficients of gender had the opposite signs. Previous studies also reported that gender was not a significant factor in the formation of neighborhood satisfaction (Lu, 1999). This finding may imply that individuals' assessment of neighborhood takes into consideration all aspects of the neighborhood as a whole, but the role of males and females in such assessments is not certain. For race, only Black and multiracial householders were statistically significant and had negative effects on neighborhood satisfaction. Being a Black or multiracial householder was associated with a decrease in the odds of being satisfied with neighborhood, *ceteris paribus*. The effects of other races on neighborhood satisfaction were not statistically significant, but they were conclusive – the negative effects of Native Indians and Asians and the positive effect of Pacific Islanders. Therefore, the results suggest that *ceteris paribus*, White householders are more likely to be satisfied with their neighborhood than are Black and multiracial householders, while there is no difference in the assessment of neighborhood between Whites and Native Indians, Asians, or Pacific Islanders.

The effect of the Hispanic/Spanish origin on neighborhood satisfaction was statistically significant and negative. Thus, having the Hispanic/Spanish origin is associated with the decreased

satisfaction with neighborhood. The effect of the nativity status on neighborhood satisfaction was also statistically significant and negative. Being a native-born householder is associated with the decreased satisfaction with neighborhood. Note that the negative effect of nativity seemed not to be statistically significant in the model with the interactions and cluster standard errors. For education, only the effect of at least bachelor's degrees was statistically significant and positive. The results imply that *ceteris paribus*, householders with at least bachelor's degrees are more likely to be satisfied with their neighborhood than are householders with below high school degrees, while there is no difference in the assessment of neighborhood between householders with below high school degrees and householders with above high school degrees and below bachelor's degrees.

The effect of housing tenure on neighborhood satisfaction appeared to be statistically significant and positive for renters and repeat homeowners. Being a renter or repeat homeowner was associated with an increase in the odds of being satisfied with neighborhood, *ceteris paribus*. The results suggest that *ceteris paribus*, FTHBs are less likely to be satisfied with their neighborhood than are renters and repeat homeowners. It is worth noting that in the model with the interactions and cluster standard errors, the positive coefficients of renters became slightly larger, and the positive coefficients of repeat homeowners became smaller. In addition, household income showed a positive effect on neighborhood satisfaction, and it was statistically significant. The results imply that having higher income is associated with the increased satisfaction with neighborhood, *ceteris paribus*. This reflects the fact that high-income individuals tend to live in high-income neighborhoods that have ample neighborhood features; as a result, they obtain high residential satisfaction.

For household types, the effect of married couples with children on neighborhood satisfaction was statistically significant and positive. The effects of being single persons, single parents, and other heads on neighborhood satisfaction were not statistically significant and all negative.

The results suggest that *ceteris paribus*, married couples with children are more likely to be satisfied with neighborhood than are married couples without children, while there seems to be no difference in the assessment of neighborhood between married couples without children and single persons, single parents, or other heads. These findings are in line with the findings reported in the previous studies (Hipp, 2009; Lu, 1999). Furthermore, the finding for the effect of married couples with children is not that surprising because in general households with children tend to be active in their neighborhoods (e.g., social capital formation). Duration of residence was statistically significant and had a marginally negative effect on neighborhood satisfaction, with the odds ratios of 0.995. The duration of residence is associated with the decreased satisfaction with neighborhood, *ceteris paribus*. This finding is in line with Onibokun (1976), but it contrasts with the notion that individuals' attachment to their neighborhood might grow over time and thus their levels of satisfaction with neighborhood would increase too. This study re-examined the duration of residence in the longitudinal analysis. It is worth mentioning again that Hipp (2009), as well as Smith (2011), found that longer-term residents did not report more neighborhood satisfaction. The recent moving experience was found to be statistically significant and had a negative effect on neighborhood satisfaction, i.e., the odds ratios of 0.94. The results imply that the recent moving experience is associated with the decreased satisfaction with neighborhood, *ceteris paribus*. This finding contrasts with those findings reported in the previous studies (Lu, 1999).

By the same-household status, the effect of householders with household composition changes and the effect of new householders on neighborhood satisfaction were not statistically significant, but they were all positive. Therefore, there is no difference in the assessment of neighborhood between householders with the same household composition and householders with household composition changes or new householders. The findings contrast with their significant,

negative roles in the assessment of housing, shown previously in Table 9. Property values were statistically significant and had a (marginally) positive effect on neighborhood satisfaction. Having higher property values is associated with the increased satisfaction with neighborhood. This finding corresponds with the significant role of property values in the assessment of housing. This finding may also reflect the fact that high-value homes are likely located in good neighborhoods.

The effect of subsidized housing on neighborhood satisfaction was statistically significant and negative. The results suggest that householders in HUD-assisted units are less likely to be satisfied with their neighborhood than are those in non-HUD-assisted units. This finding contrasts with the significant, positive role of subsidized housing in the assessment of housing. In addition, by structural types of housing units, the effect of living in mobile homes on neighborhood satisfaction was inconclusive. On the other hand, the effects of living in single-family attached homes and in apartments on neighborhood satisfaction were statistically significant and negative. Lastly, the effect of living in other structural types on neighborhood satisfaction was not statistically significant, but it was positive and relatively large. The results suggest that *ceteris paribus*, householders who live in single-family detached homes are more likely to be satisfied with their neighborhood than are those who live in single-family attached homes and apartments, while there is no difference in the assessment of neighborhood between householders in single-family detached homes and householder in mobile homes or other structural types. Furthermore, the results seem to reflect single-family detached homes in the American housing norms, although other structural types, such as non-fixed structures, may offer attractively "open-space" neighborhoods.

Regarding locational variables, the analysis showed that only Mountain and Pacific divisions were statistically significant and had the negative effects on neighborhood satisfaction. The results suggest that *ceteris paribus*, householders who live in the Mountain or Pacific division are

less likely to be satisfied with their neighborhood than those householders who live in the New England division, while there is no difference in the assessment of neighborhood between the New England division and the remaining divisions. Additionally, the effect of metropolitan areas was statistically significant and negative. The results imply that *ceteris paribus*, householders who live in the metropolitan areas are less likely to be satisfied with their neighborhood than are their counterparts who live in the non-metropolitan areas. This finding contrasts with the insignificant, negative role of metropolitan areas in the assessment of housing. Of the significant findings, all regression specifications showed that CIDs were statistically significant and had a positive effect on neighborhood satisfaction. Therefore, living in CIDs is associated with the increased satisfaction with neighborhood, *ceteris paribus*. This finding supports the study's hypothesis.

Moreover, in the model with the interactions and cluster standard errors, all the interaction effects of housing tenure and CIDs were not statistically significant, but they told interesting stories. Because of the interaction of renters and CIDs, the effect of renters on neighborhood satisfaction became less positive, i.e., a 4.7% decrease in its positive magnitude. Similarly, because of the interaction of repeat homeowners and CIDs, the effect of repeat homeowners on neighborhood satisfaction increased in its positive magnitude, i.e., at least a 13% increase in its positive magnitude. In sum, renters or repeat homeowners are more likely to express high levels of neighborhood satisfaction than are FTHBs, with or without CIDs. The constant represented the baseline odds. On a final note for the cross-sectional analysis, this study also estimated regressions of housing satisfaction and neighborhood satisfaction, using a larger sample size, i.e., a randomly selected 58,111 householders from the pooled AHS data. Those results showed little differences in the coefficient estimates compared to the ones presented in Tables 9 and 10, except some coefficients became statistically significant.

Table 10: Neighborhood satisfaction: odds ratio of generalized ordered logit regression

Neighborhood satisfaction		**Baseline**		**Common Interest Development**			**Interaction Effects**		
Variables	**1 vs 2,3,4**	**1,2 vs 3,4**	**1,2,3 vs 4**	**1 vs 2,3,4**	**1,2 vs 3,4**	**1,2,3 vs 4**	**1 vs 2,3,4**	**1,2 vs 3,4**	**1,2,3 vs 4**
2.Moderately Satisfied with Housing	5.095***	1.011	0.625***	5.105***	1.014	0.624***	5.097***	1.014	0.623***
	(0.528)	(0.0938)	(0.0745)	(0.530)	(0.0942)	(0.0745)	(0.758)	(0.107)	(0.0543)
3.Very Satisfied with Housing	20.40***	7.780***	1.020	20.27***	7.720***	1.014	20.17***	7.743***	1.014
	(2.110)	(0.690)	(0.110)	(2.101)	(0.686)	(0.109)	(1.910)	(0.771)	(0.0967)
4.Most Satisfied with Housing	50.85***	27.90***	14.96***	50.45***	27.60***	14.83***	51.05***	27.73***	14.80***
	(5.982)	(2.616)	(1.605)	(5.940)	(2.591)	(1.592)	(7.053)	(2.189)	(1.225)
1.Bothersome	0.221***	0.398***	0.664***	0.223***	0.399***	0.660***	0.220***	0.395***	0.660***
	(0.0292)	(0.0197)	(0.0203)	(0.0294)	(0.0197)	(0.0202)	(0.0315)	(0.0202)	(0.0309)
Age	1.011***	1.011***	1.011***	1.011***	1.011***	1.011***	1.006**	1.009***	1.012***
	(0.00119)	(0.00119)	(0.00119)	(0.00119)	(0.00119)	(0.00119)	(0.00245)	(0.00194)	(0.00102)
1.Male	1.286***	1.103**	0.900***	1.284***	1.102**	0.900***	1.286***	1.104***	0.900***
	(0.0898)	(0.0421)	(0.0255)	(0.0896)	(0.0421)	(0.0256)	(0.0756)	(0.0267)	(0.0240)
2.African American/Black	0.792***	0.792***	0.792***	0.796***	0.796***	0.796***	0.796***	0.796***	0.796***
	(0.0299)	(0.0299)	(0.0299)	(0.0300)	(0.0300)	(0.0300)	(0.0468)	(0.0468)	(0.0468)
3.Native Indian	0.937	0.937	0.937	0.936	0.936	0.936	0.932	0.932	0.932
	(0.120)	(0.120)	(0.120)	(0.119)	(0.119)	(0.119)	(0.128)	(0.128)	(0.128)
4.Asian	0.955	0.955	0.955	0.942	0.942	0.942	0.942	0.942	0.942
	(0.0596)	(0.0596)	(0.0596)	(0.0590)	(0.0590)	(0.0590)	(0.0840)	(0.0840)	(0.0840)
5.Pacific Islander	1.065	1.065	1.065	1.045	1.045	1.045	1.051	1.051	1.051
	(0.228)	(0.228)	(0.228)	(0.225)	(0.225)	(0.225)	(0.188)	(0.188)	(0.188)
6.Multiracial	0.823*	0.823*	0.823*	0.824*	0.824*	0.824*	0.828*	0.828*	0.828*
	(0.0871)	(0.0871)	(0.0871)	(0.0872)	(0.0872)	(0.0872)	(0.0854)	(0.0854)	(0.0854)
1.Hispanic/Spanish Origin	0.861***	0.861***	0.861***	0.869***	0.869***	0.869***	0.869***	0.869***	0.869***
	(0.0352)	(0.0352)	(0.0352)	(0.0356)	(0.0356)	(0.0356)	(0.0457)	(0.0457)	(0.0457)
1.Native-Born	0.920**	0.920**	0.920**	0.929*	0.929*	0.929*	0.924	0.924	0.924
	(0.0373)	(0.0373)	(0.0373)	(0.0377)	(0.0377)	(0.0377)	(0.0485)	(0.0485)	(0.0485)
2.Above High School	1.114	1.079*	0.950	1.090	1.062	0.943*	1.093*	1.064	0.945

Neighborhood satisfaction		Baseline			Common Interest Development			Interaction Effects	
Variables	**1 vs 2,3,4**	**1,2 vs 3,4**	**1,2,3 vs 4**	**1 vs 2,3,4**	**1,2 vs 3,4**	**1,2,3 vs 4**	**1 vs 2,3,4**	**1,2 vs 3,4**	**1,2,3 vs 4**
	(0.0833)	(0.0468)	(0.0331)	(0.0817)	(0.0462)	(0.0329)	(0.0514)	(0.0715)	(0.0385)
3.At Least Bachelor's	1.551***	1.455***	1.054	1.489***	1.402***	1.033	1.480***	1.400***	1.033
	(0.153)	(0.0736)	(0.0387)	(0.147)	(0.0714)	(0.0381)	(0.112)	(0.0867)	(0.0390)
1.Renter	1.509***	1.509***	1.509***	1.592***	1.592***	1.592***	1.595***	1.595***	1.595***
	(0.0649)	(0.0649)	(0.0649)	(0.0695)	(0.0695)	(0.0695)	(0.105)	(0.105)	(0.105)
3.Repeat Owner	1.169***	1.169***	1.169***	1.147***	1.147***	1.147***	1.087***	1.087***	1.087***
	(0.0371)	(0.0371)	(0.0371)	(0.0366)	(0.0366)	(0.0366)	(0.0277)	(0.0277)	(0.0277)
Income	1.157***	1.119***	1.022	1.151***	1.113***	1.017	1.143***	1.109***	1.020
	(0.0338)	(0.0201)	(0.0151)	(0.0337)	(0.0201)	(0.0151)	(0.0407)	(0.0243)	(0.0179)
1.Single or Never Married	0.974	0.974	0.974	0.974	0.974	0.974	0.977	0.977	0.977
	(0.0430)	(0.0430)	(0.0430)	(0.0430)	(0.0430)	(0.0430)	(0.0521)	(0.0521)	(0.0521)
2.Single Parent	0.977	0.977	0.977	0.976	0.976	0.976	0.977	0.977	0.977
	(0.0437)	(0.0437)	(0.0437)	(0.0437)	(0.0437)	(0.0437)	(0.0237)	(0.0237)	(0.0237)
4.Married Couple w/ Children	1.098**	1.098**	1.098**	1.093**	1.093**	1.093**	1.096**	1.096**	1.096**
	(0.0402)	(0.0402)	(0.0402)	(0.0401)	(0.0401)	(0.0401)	(0.0395)	(0.0395)	(0.0395)
5.Others w/o Children	0.969	0.969	0.969	0.972	0.972	0.972	0.974	0.974	0.974
	(0.0384)	(0.0384)	(0.0384)	(0.0386)	(0.0386)	(0.0386)	(0.0333)	(0.0333)	(0.0333)
Duration of Residence	0.995***	0.995***	0.995***	0.996***	0.996***	0.996***	0.996***	0.996***	0.996***
	(0.00133)	(0.00133)	(0.00133)	(0.00135)	(0.00135)	(0.00135)	(0.00163)	(0.00163)	(0.00163)
1.Moved in Last 12 Months	0.938*	0.938*	0.938*	0.946	1.032	0.905**	0.941*	0.941*	0.941*
	(0.0345)	(0.0345)	(0.0345)	(0.0849)	(0.0541)	(0.0371)	(0.0342)	(0.0342)	(0.0342)
2.Same HH with Changes	1.127	1.127	1.127	1.126	1.126	1.126	1.125	1.125	1.125
	(0.0914)	(0.0914)	(0.0914)	(0.0912)	(0.0912)	(0.0912)	(0.0818)	(0.0818)	(0.0818)
3.New Householder	1.007	1.007	1.007	1.022	0.898*	1.053	1.007	1.007	1.007
	(0.0436)	(0.0436)	(0.0436)	(0.114)	(0.0562)	(0.0520)	(0.0450)	(0.0450)	(0.0450)
Property Value	1.001***	1.001***	1.000***	1.001***	1.001***	1.000***	1.001**	1.001***	1.000***
	(0.00024)	(0.00011)	(5.35e-05)	(0.00024)	(0.00011)	(5.32e-05)	(0.00033)	(0.00017)	(6.21e-05)
1.HUD-Subsidized Unit	0.600***	0.694***	0.792***	0.608***	0.701***	0.797***	0.600***	0.696***	0.794***
	(0.0570)	(0.0448)	(0.0476)	(0.0578)	(0.0452)	(0.0479)	(0.0590)	(0.0462)	(0.0427)

Neighborhood satisfaction		Baseline			Common Interest Development			Interaction Effects	
Variables	**1 vs 2,3,4**	**1,2 vs 3,4**	**1,2,3 vs 4**	**1 vs 2,3,4**	**1,2 vs 3,4**	**1,2,3 vs 4**	**1 vs 2,3,4**	**1,2 vs 3,4**	**1,2,3 vs 4**
1.Mobile Home/Trailer	0.746***	1.028	1.239***	0.792**	1.074	1.288***	0.790***	1.079	1.292***
	(0.0849)	(0.0758)	(0.0772)	(0.0905)	(0.0794)	(0.0805)	(0.0615)	(0.0624)	(0.0626)
3.SF House, Attached	0.685***	0.685***	0.685***	0.618***	0.618***	0.618***	0.620***	0.620***	0.620***
	(0.0413)	(0.0413)	(0.0413)	(0.0382)	(0.0382)	(0.0382)	(0.0536)	(0.0536)	(0.0536)
4.Apartment	0.733***	0.733***	0.733***	0.694***	0.694***	0.694***	0.693***	0.693***	0.693***
	(0.0291)	(0.0291)	(0.0291)	(0.0281)	(0.0281)	(0.0281)	(0.0290)	(0.0290)	(0.0290)
5.Others	2.017	2.017	2.017	2.134	2.134	2.134	2.191	2.191	2.191
	(2.070)	(2.070)	(2.070)	(2.198)	(2.198)	(2.198)	(1.320)	(1.320)	(1.320)
2.Middle Atlantic	1.076	1.076	1.076	1.090	1.090	1.090	1.086	1.086	1.086
	(0.0695)	(0.0695)	(0.0695)	(0.0704)	(0.0704)	(0.0704)	(0.0651)	(0.0651)	(0.0651)
3.East North Central	1.042	1.042	1.042	1.023	1.023	1.023	1.019	1.019	1.019
	(0.0642)	(0.0642)	(0.0642)	(0.0631)	(0.0631)	(0.0631)	(0.0503)	(0.0503)	(0.0503)
4.West North Central	1.046	1.046	1.046	1.030	1.030	1.030	1.027	1.027	1.027
	(0.0818)	(0.0818)	(0.0818)	(0.0805)	(0.0805)	(0.0805)	(0.0365)	(0.0365)	(0.0365)
5.South Atlantic	1.060	1.060	1.060	1.003	1.003	1.003	1.000	1.000	1.000
	(0.0633)	(0.0633)	(0.0633)	(0.0603)	(0.0603)	(0.0603)	(0.0441)	(0.0441)	(0.0441)
6.East South Central	1.129	1.129	1.129	1.105	1.105	1.105	1.099	1.099	1.099
	(0.0907)	(0.0907)	(0.0907)	(0.0888)	(0.0888)	(0.0888)	(0.0884)	(0.0884)	(0.0884)
7.West South Central	0.968	0.968	0.968	0.919	0.919	0.919	0.914	0.914	0.914
	(0.0616)	(0.0616)	(0.0616)	(0.0588)	(0.0588)	(0.0588)	(0.0711)	(0.0711)	(0.0711)
8.Mountain	0.851**	0.851**	0.851**	0.800***	0.800***	0.800***	0.795***	0.795***	0.795***
	(0.0599)	(0.0599)	(0.0599)	(0.0567)	(0.0567)	(0.0567)	(0.0329)	(0.0329)	(0.0329)
9.Pacific	0.738***	0.738***	0.738***	0.725***	0.725***	0.725***	0.724***	0.724***	0.724***
	(0.0439)	(0.0439)	(0.0439)	(0.0431)	(0.0431)	(0.0431)	(0.0345)	(0.0345)	(0.0345)
1.Metropolitan Area	0.747**	0.812***	0.666***	0.714***	0.786***	0.647***	0.718***	0.781***	0.644***
	(0.0857)	(0.0509)	(0.0313)	(0.0820)	(0.0493)	(0.0306)	(0.0302)	(0.0297)	(0.0263)
1.CID Status				1.585***	1.388***	1.248***	1.212***	1.212***	1.212***
				(0.166)	(0.0709)	(0.0434)	(0.0780)	(0.0780)	(0.0780)

Neighborhood satisfaction		**Baseline**		**Common Interest Development**			**Interaction Effects**		
Variables	**1 vs 2,3,4**	**1,2 vs 3,4**	**1,2,3 vs 4**	**1 vs 2,3,4**	**1,2 vs 3,4**	**1,2,3 vs 4**	**1 vs 2,3,4**	**1,2 vs 3,4**	**1,2,3 vs 4**
1.CID#1.Renter							0.953	0.953	0.953
							(0.106)	(0.106)	(0.106)
1.CID#3.Repeat Owner							1.882**	1.499***	1.125
							(0.529)	(0.141)	(0.100)
Constant	1.004	0.335***	0.232***	1.061	0.353***	0.251***	1.509	0.415**	0.235***
	(0.365)	(0.0805)	(0.0512)	(0.386)	(0.0852)	(0.0554)	(0.840)	(0.164)	(0.0460)
Observations	34,560	34,560	34,560	34,560	34,560	34,560	34,560	34,560	34,560
OMB13CBSA Cluster	No	No	No	No	No	No	Yes	Yes	Yes
Pseudo R^2	0.2575	0.2575	0.2575	0.2586	0.2586	0.2586	0.2587	0.2587	0.2587

Standard errors in parentheses

**** p < 0.01, ** p < 0.05, * p < 0.10*

1.2. Longitudinal Regression Results

In the longitudinal analysis, this study investigated the temporal effects of the determinants of housing satisfaction and neighborhood satisfaction in order to address the third research question and the third hypothesis. The interest of this longitudinal analysis was to capture the effects of the factors that shaped housing satisfaction and neighborhood satisfaction over time. The results were of the fixed-effects ordered logistic regression models (i.e., *feologit* in Stata). In terms of interpreting the fixed-effects regression results, again, each coefficient indicates how much the dependent variable changes for a given individual when each independent variable changes over time by one unit. StataCorp (2019b) provides the full details of *feologit*. It is worth noting that fixed-effects regressions produce no coefficient estimates for time-invariant variables, such as gender, but the study's analysis included all the relevant variables for the convenience of comparing the coefficients of the longitudinal regressions with those of the cross-sectional regressions.

1.2.1. Factors Shaping Housing Satisfaction Over Time

Table 11 summarizes the results of the fixed-effects ordered logistic regression models for *Housing satisfaction*. The coefficients of the *feologit* regressions in Table 11 were the odds ratios. There were seven specifications – the baseline model, the model with CIDs and with/without a time trend, the models with interactions and with/without OMB13CBSA cluster standard errors, and the model with a balanced panel. The results showed that most variables in the housing satisfaction regressions were statistically significant, given a temporal dimension. The analysis showed that neighborhood satisfaction was a significant determinant of housing satisfaction. All the coefficients of neighborhood satisfaction categories were positive and large. For example, the odds of being satisfied with housing for householders who expressed their moderate satisfaction with neighborhood were about two times as large as those for householders who expressed their least

satisfaction with neighborhood. To put it differently, being moderately satisfied with neighborhood was associated with a 109% increase in the odds of being satisfied with housing over time, *ceteris paribus*. The results suggest that high neighborhood satisfaction is associated with the increased satisfaction with housing over time, *ceteris paribus*. The effect of perceiving something bothersome about the neighborhood on housing satisfaction was statistically significant and negative. The odds ratio for bothersome neighborhood features indicated that every unit increase in perceiving something bothersome about the neighborhood (i.e., the binary variable took a value of 1) was associated with a 9% decrease in the odds of being satisfied with housing over time, *ceteris paribus*. Hence, over time individuals are less likely to be satisfied with their housing when they perceive something bothersome about their neighborhood, *ceteris paribus*. This contrasts the inconclusive effect of bothersome factors on housing satisfaction in this study's cross-sectional analysis.

For the individual and household socio-demographic characteristics, the effect of age was negative and not statistically significant. Age does not seem to be a significant factor in the formation of housing satisfaction over time. This finding corresponds with the insignificant role of age in the housing assessment of the cross-sectional analysis, and it is also in line with findings reported in the previous studies (Kabisch et al., 2021). The effects of educational levels were positive and not statistically significant after controlling for the additional variables. Thus, education is not considered a significant factor in the temporal formation of housing satisfaction. The effect of income was positive and not statistically significant. Income is not considered a significant factor in the temporal formation of housing satisfaction either. For household types, only the effects of being single parents and married couples with children were statistically significant. Being single parents was associated with a 22% increase in the odds of being satisfied with housing over time, *ceteris paribus*. Being married couples with children was associated with a 14% increase in

the odds of being satisfied with housing over time, *ceteris paribus*. The results suggest that over time married couples without children are less likely to be satisfied with their housing than are single parents or married couples with children, while there is no difference in the assessment of housing between married couples without children and single persons or other heads of household. These findings contrast the significant, negative effects of single parents and married couples with children on housing satisfaction in the cross-sectional analysis. It should be noted that the level of statistical significance for these two variables disappeared in the cluster standard errors model.

The effect of duration of residence on housing satisfaction was negative and not statistically significant. Therefore, the duration of residence is not considered a significant factor in the temporal formation of housing satisfaction. This finding corresponds with the insignificant role of duration of residence in the housing assessment of the cross-sectional analysis. Diaz-Serrano (2006) suggested that housing satisfaction was u-shaped in duration of residence in his longitudinal analysis. The effect of recent moving experience on housing satisfaction was statistically significant and positive, and its positive effect became larger in the model with the balanced panel. The recent moving experience is associated with the increased satisfaction with housing over time, *ceteris paribus*. This finding corresponds with the significant, positive role of the recent moving experience in the housing assessment of the cross-sectional analysis. In addition, by the same-household status, the effect of being householders with household composition changes on housing satisfaction was statistically significant and positive, even in the model with the balanced panel. On the other hand, the effect of new householders on housing satisfaction was not statistically significant, and it dropped out in the model with the balanced panel because their observations were only observed for two periods. The results suggest that over time there is no difference in the assessment of housing between householders with the same household composition and new

householders, while householders with household composition changes are more likely to be satisfied with their housing than are householders with the same household composition.

Property values and housing costs appeared not to be statistically significant. Each variable had a marginally positive effect on housing satisfaction, i.e., their odds ratios were slightly greater than 1. The results suggest that property values and housing costs are not considered the significant factors in the temporal formation of housing satisfaction. The findings contrast with only the significant, positive role of property values in the housing assessment of the cross-sectional analysis. The effect of subsidized housing was statistically significant and positive. Living in a HUD-assisted unit was associated with a 72% increase in the odds of being satisfied with housing over time, *ceteris paribus*. This finding seems to be a success for housing assistance programs after all. On the other hand, living in a moderately (or severely) inadequate unit was associated with a 45% (or 59%) decrease in the odds of being satisfied with housing over time, *ceteris paribus*. These effects were large and statistically significant. The results suggest that living in adequate housing units is associated with the increased satisfaction with housing over time. For overcrowding, its effect on housing satisfaction was statistically significant and negative. The odds ratio indicated that every unit increase in the room stress was associated with about a 26% decrease in the odds of being satisfied with housing over time, *ceteris paribus*. This implies that overcrowding is associated with the decreased satisfaction with housing over time. This finding corresponds with the significant, negative role of overcrowding in the housing assessment of the cross-sectional analysis. It should be noted that the negative effect of overcrowding became not statistically significant in the models with the interactions, cluster standard errors, and balanced panel.

The effect of the year variable was positive and not statistically significant in all specifications. Methodologically speaking, the year dummies would capture any variation in the outcome

Table 11: Housing satisfaction: odds ratio of fixed-effects ordered logistic regression model

Housing Satisfaction	**Baseline**	**Common Interest Development and Interaction Effects**					
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
2.Moderately Satisfied with Neighborhood	2.089***	2.089***	2.089***	2.089***	2.088***	2.088***	2.000***
	(0.166)	(0.166)	(0.166)	(0.166)	(0.166)	(0.125)	(0.121)
3.Very Satisfied with Neighborhood	8.048***	8.048***	8.044***	8.044***	8.043***	8.043***	7.541***
	(0.689)	(0.689)	(0.688)	(0.688)	(0.688)	(0.578)	(0.586)
4.Most Satisfied with Neighborhood	77.75***	77.75***	77.68***	77.68***	77.68***	77.68***	72.07***
	(7.367)	(7.367)	(7.359)	(7.359)	(7.360)	(8.079)	(8.824)
1.Bothersome	0.908***	0.908***	0.908***	0.908***	0.908***	0.908**	0.902*
	(0.0319)	(0.0319)	(0.0319)	(0.0319)	(0.0319)	(0.0389)	(0.0514)
Age	0.986	0.986	0.986	0.986	0.986	0.986	0.879
	(0.0510)	(0.0510)	(0.0510)	(0.0510)	(0.0510)	(0.0357)	(0.0952)
1.Male	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
2.African American/Black	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
3.Native Indian	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
4.Asian	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
5.Pacific Islander	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
6.Multiracial	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
1.Hispanic/Spanish Origin	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
1.Native-Born	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
2.Above High School	0.997	0.997	1.005	1.005	1.005	1.005	1.098

Housing Satisfaction	Baseline	Common Interest Development and Interaction Effects					
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
	(0.183)	(0.183)	(0.185)	(0.185)	(0.185)	(0.215)	(0.263)
3.At Least Bachelor's	1.147	1.147	1.153	1.153	1.153	1.153	1.354
	(0.252)	(0.252)	(0.253)	(0.253)	(0.253)	(0.258)	(0.379)
1.Renter	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
3.Repeat Owner	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
Income	1.002	1.002	1.002	1.002	1.002	1.002	0.983
	(0.0185)	(0.0185)	(0.0185)	(0.0185)	(0.0185)	(0.0134)	(0.0154)
1.Single or Never Married	0.982	0.982	0.981	0.981	0.982	0.982	0.924
	(0.116)	(0.116)	(0.116)	(0.116)	(0.117)	(0.187)	(0.211)
2.Single Parent	1.217*	1.217*	1.217*	1.217*	1.216*	1.216	1.218
	(0.129)	(0.129)	(0.129)	(0.129)	(0.129)	(0.192)	(0.250)
4.Married Couple w/ Children	1.145*	1.145*	1.143*	1.143*	1.142	1.142	1.109
	(0.0929)	(0.0929)	(0.0928)	(0.0928)	(0.0934)	(0.106)	(0.109)
5.Others w/o Children	1.033	1.033	1.034	1.034	1.035	1.035	0.989
	(0.106)	(0.106)	(0.106)	(0.106)	(0.107)	(0.0919)	(0.0927)
Duration of Residence	0.992	0.992	0.992	0.992	0.992	0.992	0.988
	(0.00974)	(0.00974)	(0.00974)	(0.00974)	(0.00974)	(0.0144)	(0.0224)
1.Moved in Last 12 Months	1.273***	1.273***	1.276***	1.276***	1.276***	1.276***	1.377***
	(0.0705)	(0.0705)	(0.0706)	(0.0706)	(0.0707)	(0.0774)	(0.112)
2.Same HH with Changes	1.076*	1.076*	1.077*	1.077*	1.077*	1.077**	1.112***
	(0.0445)	(0.0445)	(0.0446)	(0.0446)	(0.0446)	(0.0403)	(0.0399)
3.New Householder	1.075	1.075	1.077	1.077	1.077	1.077	n/a
	(0.0873)	(0.0873)	(0.0874)	(0.0874)	(0.0874)	(0.0866)	n/a
Property Value	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	(7.46e-05)	(7.46e-05)	(7.41e-05)	(7.41e-05)	(7.41e-05)	(9.30e-05)	(0.000101)
Housing Cost (%)	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	(0.000213)	(0.000213)	(0.000215)	(0.000215)	(0.000215)	(0.000209)	(0.000280)

Housing Satisfaction	Baseline	Common Interest Development and Interaction Effects					
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
1.HUD-Subsidized Unit	1.717***	1.717***	1.718***	1.718***	1.717***	1.717**	1.903**
	(0.342)	(0.342)	(0.342)	(0.342)	(0.342)	(0.361)	(0.483)
2.Moderately Inadequate	0.553***	0.553***	0.553***	0.553***	0.553***	0.553***	0.615***
	(0.0419)	(0.0419)	(0.0418)	(0.0418)	(0.0418)	(0.0448)	(0.0608)
3.Severely Inadequate	0.412***	0.412***	0.412***	0.412***	0.412***	0.412***	0.399***
	(0.0551)	(0.0551)	(0.0551)	(0.0551)	(0.0551)	(0.0370)	(0.0392)
1.Mobile Home/Trailer	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
3.SF House, Attached	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
4.Apartment	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
5. Others	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
Overcrowding Index	0.736***	0.736***	0.734***	0.734***	0.739	0.739	0.782
	(0.0719)	(0.0719)	(0.0716)	(0.0716)	(0.165)	(0.168)	(0.264)
2.Middle Atlantic	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
3.East North Central	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
4.West North Central	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
5.South Atlantic	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
6.East South Central	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
7.West South Central	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
8.Mountain	-	-	-	-	-	-	-

Housing Satisfaction	Baseline	Common Interest Development and Interaction Effects					
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
	-	-	-	-	-	-	-
9.Pacific	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
1.Metropolitan Area	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
1.CID Status		-	-	-	-	-	-
		-	-	-	-	-	-
1.CID#1.Renter				-	-	-	-
				-	-	-	-
1.CID#3.Repeat Owner				-	-	-	-
				-	-	-	-
1.Hispanic#C.Crowding					0.976	0.976	0.945
					(0.228)	(0.210)	(0.307)
1.Native-Born#C.Crowding					1.005	1.005	0.952
					(0.232)	(0.160)	(0.255)
CID*(YEAR-2015)			1.042**	1.042**	1.042**	1.042***	1.030**
			(0.0169)	(0.0169)	(0.0169)	(0.0160)	(0.0138)
2017.YEAR	1.021	1.021	1.004	1.004	1.004	1.004	1.347
	(0.111)	(0.111)	(0.109)	(0.109)	(0.109)	(0.0809)	(0.286)
2019.YEAR	1.090	1.090	1.053	1.053	1.052	1.052	1.763
	(0.232)	(0.232)	(0.225)	(0.225)	(0.224)	(0.148)	(0.676)
Balanced Panel	No	No	No	No	No	No	Yes
Observations (inc. copies)	49,734	49,734	49,734	49,734	49,734	49,734	32,678
Observations	42,435	42,435	42,435	42,435	42,435	42,435	27,659
Panel Units	16,680	16,680	16,680	16,680	16,680	16,680	9,292
OMB13CBSA Cluster	No	No	No	No	No	Yes	Yes
Pseudo R^2	0.3121	0.3121	0.3123	0.3123	0.3123	0.3123	0.2921

Standard errors in parentheses

**** p < 0.01, ** p < 0.05, * p < 0.10*

that happened over time (i.e., to control for temporal variation in the dependent variable), but the year itself was not the cause of the changes. Intuitively, the year effect was associated with an increase in the odds of being satisfied with housing over time, *ceteris paribus*. The magnitude of the year effect changed after controlling for the additional explanatory variables and with the balanced panel. Of the important findings, the effect of the interaction of CIDs and the time trend was statistically significant and positive, even in the balanced panel model. *Ceteris paribus*, each unit increase in this interaction term was associated with a 3-4.2% increase in the odds of being satisfied with housing over time, given the status of CIDs. The results imply that *ceteris paribus*, living in CIDs is associated with the increased satisfaction with housing over time. This finding supports the hypothesis of this study.

The analysis further showed that in the models with the interactions, cluster standard errors, and balanced panel, the effect of overcrowding was not statistically significant, and the interaction effect of overcrowding with the Hispanic/Spanish origin or with the nativity status was also not statistically significant. The results suggest that these variables do not make much difference in the temporal formation of individuals' housing satisfaction. However, it could be stated that given the Hispanic/Spanish origin, the effect of overcrowding became negatively larger, whereas given the nativity status, the effect of overcrowding become less negative, *ceteris paribus*. The two findings contrast their roles (opposite effects) in the housing assessment of the cross-sectional analysis. It could mean that Hispanic or foreign-born households might have adapted the American housing norms over time. It is worth noting that for fitting the model parameters, only individuals (panel units) who had variation in their housing satisfaction (dependent variable) were informative. Individuals who were observed only once or had always the same housing satisfaction scores over time were excluded by the program because their likelihood (LL) contribution was zero. This condition

was met by 16,680 individuals, which resulted in 42,435 observations in the unbalanced panel. On average, individuals in the estimation sample were therefore observed about 2.5 times. The ordered dependent variable had 4 categories, so 3 different dichotomizations were possible. Because not all dichotomizations lead to copies with variation in the binary dependent variable, there were 49,734 copies that contributed to the estimation procedure for the unbalanced panel. Because the copies are not independent of each other, *feologit* calculated cluster-adjusted standard errors at the individual level (16,680 individuals) by default.

1.2.2. Factors Shaping Neighborhood Satisfaction Over Time

Table 12 summarizes the results of the fixed-effects ordered logistic regression models for *Neighborhood satisfaction*. The coefficients of the *feologit* regressions in Table 12 were the odds ratios. There were six specifications in Table 12 – the baseline, the model with CIDs and with/without a time trend, the models with interactions and with/without OMB13CBSA cluster standard errors, and the model with a balanced panel. The results showed that several variables in the neighborhood satisfaction regressions were statistically significant, given a temporal dimension. The analysis showed that housing satisfaction was a significant determinant of neighborhood satisfaction. All coefficients of housing satisfaction categories were statistically significant, and their odds ratios were greater than 1. For example, being moderately satisfied with housing was associated with a 91% increase in the odds of being satisfied with neighborhood over time, *ceteris paribus*. The results suggest that high housing satisfaction is associated with the increased satisfaction with neighborhood over time, *ceteris paribus*. The effect of bothersome neighborhood features was negative and statistically significant, even in the model with the balanced panel. Hence, perceiving something bothersome about the neighborhood is associated with a decrease in the odds of being satisfied with neighborhood over time, *ceteris paribus*. This finding is intuitive, and it corresponds

with the significant, negative role of bothersome factors in the neighborhood assessment of the cross-sectional analysis of this study.

The effect of age on neighborhood satisfaction was negative and only statistically significant in the model with the balanced panel. Thus, being older is associated with a decrease in the odds of being satisfied with neighborhood over time, *ceteris paribus*. This finding contrasts the significant, positive role of age in the neighborhood assessment of the cross-sectional analysis. Perhaps, neighborhood satisfaction declines because of older adults' specific needs. For education attainment, only the effect of having education above high school degrees was statistically significant, and it was positive, even in the balanced panel model. Thus, having education above a high school degree and below a bachelor's degree is associated with the increased satisfaction with neighborhood over time, *ceteris paribus*. This contrasts the mixed role of education in the neighborhood assessment of the cross-sectional analysis. The effect of income was negative and only statistically significant in the model with the cluster standard errors. This implies that having high income is associated with the decreased satisfaction with neighborhood over time, *ceteris paribus*. This finding contrasts the significant, positive role of income in the neighborhood assessment of the cross-sectional analysis. Perhaps, falling neighborhood satisfaction may be due to *keeping up with the Joneses*. By household types, the effect of being single heads or other household heads of household on neighborhood satisfaction was only statistically significant and all positive in the model with the cluster standard errors. The results suggest that over time married couples without children are less likely to be satisfied with their neighborhood than are single persons or other household heads, *ceteris paribus*. The findings contrast their insignificant, negative roles in the neighborhood assessment of the cross-sectional analysis. In addition, the results showed that duration of residence, recent moving experience, and the same-household status were not statistically

significant in all regression specifications. They are not considered the significant factors in the temporal formation of individuals' neighborhood satisfaction. Property values and having HUD subsidized housing, on the other hand, appeared to be statistically significant in the balanced panel model. The directions of their coefficients remained consistent. Therefore, having higher property values is associated with an increase in the odds of being satisfied with neighborhood over time, *ceteris paribus*. Having HUD subsidized housing is associated with a decrease in the odds of being satisfied with neighborhood over time, *ceteris paribus*. These two findings correspond with the same significant roles of property values and HUD subsidized housing in the neighborhood assessment of the cross-sectional analysis.

The effect of the year variable showed to have the consistently positive coefficients, but they were only statistically significant in the models with the cluster standard errors and the balanced panel. The positive magnitudes of the year variable became larger in the balanced panel model, given the same set of the explanatory variables. Again, the year dummies would capture any variation in the outcome that happened over time (i.e., to control for temporal variation in the dependent variable), but the year itself was not the cause of the changes. Intuitively, the year effect is associated with an increase in the odds of being satisfied with neighborhood over time, *ceteris paribus*. This finding corresponds with the role of the time effect (i.e., positive but insignificant) in the housing assessment of the longitudinal analysis. Of the important findings, the effect of the interaction of CIDs and the time trend on neighborhood satisfaction seemed not to be statistically significant, but it was positive in all specifications (i.e., the odds of 0.006-0.14). Theoretically speaking, living in CIDs is associated with the increased satisfaction with neighborhood over time, *ceteris paribus*. This finding appeared to be in the direction of this study's hypothesis.

It is worth noting that for fitting the model parameters, only individuals (panel units) who had variation in their neighborhood satisfaction (dependent variable) were informative. Individuals who were observed only once or had always the same neighborhood satisfaction scores over time were excluded by the program because their likelihood (LL) contribution was zero. This condition was met by 17,351 individuals, which resulted in 44,142 observations in the unbalanced panel. On average, individuals in the estimation sample were therefore observed about 2.5 times. The ordered dependent variable had 4 categories, so 3 different dichotomizations were possible. However, because not all dichotomizations lead to copies with variation in the binary dependent variable, there were 52,110 copies that contributed to the estimation procedure for the unbalanced panel. Because the copies are not independent of each other, *feologit* calculated cluster-adjusted standard errors at the individual level (17,351 individuals) by default.

2. Summary

Chapter 4 presented the quantitative results from the cross-sectional and longitudinal regressions of *Housing satisfaction* and *Neighborhood satisfaction*. Using Stata 16 and the same-unit, same-person sample, this study estimated generalized ordered logit/partial proportional odds models (*gologit2*) for the cross-sectional analysis and fixed-effects ordered logit models (*feologit*) for the longitudinal analysis. In the cross-sectional analysis, the results showed most variables were statistically significant in the models of housing satisfaction and neighborhood satisfaction. Of the important findings, the cross-sectional results suggested that the first two hypotheses were mostly supported by the empirical evidence presented in Tables 9 and 10. In other words, the results suggest that first-time homeowners (FTHBs) are more likely to be satisfied with their housing than only renters, but they are less likely to be satisfied with their neighborhood than renters and repeat homeowners, given the general views on the housing norms and the new-house-smell

experience. The results also suggest that *ceteris paribus*, householders who live in CIDs are more likely to express high levels of satisfaction with their housing and neighborhood than those who live in standard subdivisions at one point in time and over time. Furthermore, the results from the cross-sectional regressions with interactions and OMB13CBSA cluster standard errors revealed that given the status of CIDs (i.e., *CID* = 1), the effect of renters or repeat homeowners on housing satisfaction and neighborhood satisfaction remained the same directions, but they had the slight changes in their coefficient estimates. In other words, the results suggest that given the CIDs status, FTHBs remain more likely to be satisfied with their housing than only renters, and they remain less likely to be satisfied with their neighborhood than renters and repeat homeowners. In addition, the analysis further showed that although all the coefficients of the interactions with overcrowding were not statistically significant in the static and temporal analyses, they told interesting stories. The results may suggest that at one point in time, overcrowding in Hispanic or foreign-born households does not necessarily make them to be less likely to be satisfied with housing; however, over time household crowding seems to take a little toll on housing satisfaction of Hispanic or foreign-born householders, suggesting that these households might have "gradually" adapted the American housing norms.

In the longitudinal analysis, the results mostly support the third hypothesis, i.e., most variables included in the models showed their significant effects. Of the important findings, the results from the fixed-effects (FE) regressions presented in Tables 11 and 12 with and without the balanced panel suggest that with the positive, but insignificant, time effect, individuals' satisfaction with housing and neighborhood may increase over time, *ceteris paribus*. Also, living in CIDs seems to positively affect individuals' satisfaction with housing and neighborhood over time, although CIDs were not statistically significant in the FE models of neighborhood satisfaction.

Table 12: Neighborhood satisfaction: odds ratio of fixed-effects ordered logistic regression model

Neighborhood satisfaction **Variables**	**Baseline**	**Common Interest Development & Interaction Effects**				
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
2.Moderately Satisfied with Housing	1.912***	1.912***	1.911***	1.911***	1.911***	1.703***
	(0.183)	(0.183)	(0.183)	(0.183)	(0.118)	(0.149)
3.Very Satisfied with Housing	7.453***	7.453***	7.450***	7.450***	7.450***	6.481***
	(0.753)	(0.753)	(0.753)	(0.753)	(0.472)	(0.692)
4.Most Satisfied with Housing	67.40***	67.40***	67.37***	67.37***	67.37***	58.03***
	(7.284)	(7.284)	(7.281)	(7.281)	(6.192)	(7.649)
1.Bothersome	0.630***	0.630***	0.630***	0.630***	0.630***	0.645***
	(0.0214)	(0.0214)	(0.0214)	(0.0214)	(0.0211)	(0.0248)
Age	0.973	0.973	0.973	0.973	0.973	0.861**
	(0.0444)	(0.0444)	(0.0444)	(0.0444)	(0.0373)	(0.0645)
1.Male	-	-	-	-	-	-
	-	-	-	-	-	-
2.African American/Black	-	-	-	-	-	-
	-	-	-	-	-	-
3.Native Indian	-	-	-	-	-	-
	-	-	-	-	-	-
4.Asian	-	-	-	-	-	-
	-	-	-	-	-	-
5.Pacific Islander	-	-	-	-	-	-
	-	-	-	-	-	-
6.Multiracial	-	-	-	-	-	-
	-	-	-	-	-	-
1.Hispanic/Spanish Origin	-	-	-	-	-	-
	-	-	-	-	-	-
1.Native-Born	-	-	-	-	-	-
	-	-	-	-	-	-

Neighborhood satisfaction Variables	Baseline (1)	Common Interest Development & Interaction Effects (2)	(3)	(4)	(5)	(6)
2.Above High School	1.311	1.311	1.312	1.312	1.312*	1.494*
	(0.241)	(0.241)	(0.242)	(0.242)	(0.196)	(0.353)
3.At Least Bachelor's	0.943	0.943	0.943	0.943	0.943	1.098
	(0.228)	(0.228)	(0.228)	(0.228)	(0.205)	(0.387)
1.Renter	-	-	-	-	-	-
	-	-	-	-	-	-
3.Repeat Owner	-	-	-	-	-	-
	-	-	-	-	-	-
Income	0.977	0.977	0.978	0.978	0.978*	0.986
	(0.0169)	(0.0169)	(0.0169)	(0.0169)	(0.0118)	(0.0169)
1.Single or Never Married	1.181	1.181	1.181	1.181	1.181**	1.316***
	(0.136)	(0.136)	(0.136)	(0.136)	(0.0839)	(0.132)
2.Single Parent	1.085	1.085	1.085	1.085	1.085	1.073
	(0.108)	(0.108)	(0.108)	(0.108)	(0.0889)	(0.0951)
4.Married Couple w/ Children	1.051	1.051	1.051	1.051	1.051	1.006
	(0.0756)	(0.0756)	(0.0756)	(0.0756)	(0.0567)	(0.0693)
5.Others w/o Children	1.147	1.147	1.148	1.148	1.148**	1.108
	(0.107)	(0.107)	(0.107)	(0.107)	(0.0800)	(0.0818)
Duration of Residence	1.009	1.009	1.009	1.009	1.009	1.004
	(0.00977)	(0.00977)	(0.00977)	(0.00977)	(0.0128)	(0.0156)
1.Moved in Last 12 Months	1.012	1.012	1.012	1.012	1.012	0.993
	(0.0543)	(0.0543)	(0.0543)	(0.0543)	(0.0522)	(0.0798)
2.Same HH with Changes	1.023	1.023	1.023	1.023	1.023	1.046
	(0.0409)	(0.0409)	(0.0409)	(0.0409)	(0.0361)	(0.0484)
3.New Householders	0.940	0.940	0.940	0.940	0.940	n/a.
	(0.0741)	(0.0741)	(0.0741)	(0.0741)	(0.0725)	n/a
Property Value	1.000	1.000	1.000	1.000	1.000	1.000*
	(5.06e-05)	(5.06e-05)	(5.06e-05)	(5.06e-05)	(4.69e-05)	(5.62e-05)
1.HUD-Subsidized Unit	0.859	0.859	0.860	0.860	0.860	0.613**

Neighborhood satisfaction **Variables**	**Baseline** **(1)**	**Common Interest Development & Interaction Effects** **(2)**	**(3)**	**(4)**	**(5)**	**(6)**
	(0.171)	(0.171)	(0.171)	(0.171)	(0.131)	(0.151)
1.Mobile Home/Trailer	-	-	-	-	-	-
	-	-	-	-	-	-
3.SF House, Attached	-	-	-	-	-	-
	-	-	-	-	-	-
4.Apartment	-	-	-	-	-	-
	-	-	-	-	-	-
5. Others	-	-	-	-	-	-
	-	-	-	-	-	-
2.Middle Atlantic	-	-	-	-	-	-
	-	-	-	-	-	-
3.East North Central	-	-	-	-	-	-
	-	-	-	-	-	-
4.West North Central	-	-	-	-	-	-
	-	-	-	-	-	-
5.South Atlantic	-	-	-	-	-	-
	-	-	-	-	-	-
6.East South Central	-	-	-	-	-	-
	-	-	-	-	-	-
7.West South Central	-	-	-	-	-	-
	-	-	-	-	-	-
8.Mountain	-	-	-	-	-	-
	-	-	-	-	-	-
9.Pacific	-	-	-	-	-	-
	-	-	-	-	-	-
1.Metropolitan Area	-	-	-	-	-	-
	-	-	-	-	-	-
1.CID Status		-	-	-	-	-
		-	-	-	-	-

Neighborhood satisfaction **Variables**	**Baseline** **(1)**	**Common Interest Development & Interaction Effects** **(2)**	**(3)**	**(4)**	**(5)**	**(6)**
1.CID#1.Renter				-	-	-
				-	-	-
1.CID#3.Repeat Owner				-	-	-
				-	-	-
CID*(YEAR-2015)			1.006	1.006	1.006	1.014
			(0.0157)	(0.0157)	(0.0169)	(0.0171)
2017.YEAR	1.089	1.089	1.087	1.087	1.087	1.352**
	(0.104)	(0.104)	(0.104)	(0.104)	(0.0553)	(0.186)
2019.YEAR	1.184	1.184	1.178	1.178	1.178*	1.917**
	(0.221)	(0.221)	(0.220)	(0.220)	(0.115)	(0.550)
Balanced Panel	No	No	No	No	No	Yes
Observations (inc. copies)	52,110	52,110	52,110	52,110	52,110	34,234
Observations	44,142	44,142	44,142	44,142	44,142	28,764
Panel Units	17,351	17,351	17,351	17,351	17,351	9,662
OMB13CBSA Cluster	No	No	No	No	Yes	Yes
Pseudo R^2	0.2994	0.2994	0.2994	0.2994	0.2994	0.2801

Standard errors in parentheses

**** p < 0.01, ** p < 0.05, * p < 0.10*

CHAPTER 5

DISCUSSIONS

1. Introduction

Whether housing is considered one of the largest consumption items, investments, or both, residential satisfaction is relevant to individuals' quality of life. "Home" is the setting where one finds refuge, rest, and satisfaction (Adams, 1984). The degree to which individuals' needs and aspirations are met by their housing conditions is also a concern for housing developers, policy-makers, and researchers. Considerably, providing a suitable housing environment for every household has become part of national housing goals in many developed and developing countries. Cultural and family norms play an important role in individuals' housing needs, which consequently influence their residential satisfaction. Cultural norms are dictated by societal standards or rules for life conditions, whereas family norms are amounted by households' own standards for housing. However, the cultural norms do not always coincide with the family norms. For example, housing space norms, tenure norms, structure type norms, quality norms, and neighborhood and location norms are part of the housing norms (cultural norms) in the U.S. Therefore, individuals continuously evaluate their housing to determine whether it is in accord with the two norms, given the family life cycle stage in which they found themselves (Morris & Winter, 1975). When individuals' housing does not meet the norms, normative housing deficits are said to exist – dissatisfaction.

In the attempt to further the understanding of the determinants of residential satisfaction at one point in time and over time, this study contributes important elements to the literature which have not fully been considered – FTHBs, CIDs, and temporal analyses of residential satisfaction.

Through incorporating the effects of FTHBs and CIDs into the cross-sectional and longitudinal models of *Housing satisfaction* and *Neighborhood satisfaction* (two observed indicators of residential satisfaction), this study addressed the following questions:

1) How satisfied are first-time homeowners with their housing and neighborhood in comparison with renters or repeat homeowners?
2) How satisfied are individuals with their housing and neighborhood if their places of residence are in CIDs in comparison with those in standard subdivisions?
3) What are the significant effects of these relevant factors on housing satisfaction and neighborhood satisfaction over time?

2. Discussions of Findings

This study used the American Housing Survey (AHS) national data of 2015, 2017, and 2019 and the ordered choice models to conduct the cross-sectional and longitudinal analyses of *Housing satisfaction* and *Neighborhood satisfaction*. To the extent that the empirical results confirmed earlier findings reported in the literature, this study adds confidence to our knowledge about the determinants of residential satisfaction. The results of this study suggest that individuals' residential satisfaction is affected by an array of socio-demographic, housing, and neighborhood characteristics in the static and temporal dimensions.

Regarding the perceptual variables, the analysis showed that one's satisfaction with neighborhood was a significant factor in the static and temporal formation of housing satisfaction. Likewise, one's satisfaction with housing was a significant factor in the static and temporal formation of neighborhood satisfaction. The results therefore suggest that high neighborhood satisfaction or high housing satisfaction is associated with the increased satisfaction with housing or with neighborhood, even over time. The analysis also showed that bothersome neighborhood features were a

significant factor in the temporal, not static, formation of housing satisfaction, and yet they were a significant factor in the static and temporal formation of neighborhood satisfaction. At one point in time, bothersome features about the neighborhood do not seem to affect housing satisfaction while they adversely affect neighborhood satisfaction. Over time, however, bothersome neighborhood factors adversely affect individuals' housing and neighborhood satisfaction.

Among the individual and household socio-demographic characteristics, the analysis showed that age was not a significant factor in the static and temporal formation of housing satisfaction, but it was a significant factor in the static and temporal formation of neighborhood satisfaction. Thus, age do not affect housing satisfaction at one point in time and over time. Age seems to positively affect neighborhood satisfaction at one point in time, and yet over time it negatively affects neighborhood satisfaction. Future studies can further examine residential satisfaction for different age groups. Gender was found to be a significant factor in the static formation of housing satisfaction and not of neighborhood satisfaction. On average, males are less likely to express high levels of housing satisfaction than are females. The gender effect on neighborhood satisfaction is not statistically conclusive. Future studies can investigate differences in residential satisfaction between males and females, even over time. Because this study used the fixed-effects (FE) models in the longitudinal analysis, temporal effects of time-invariant variables, such as gender, were not produced in regressions. Consequently, it imposed limitations on analyzing the temporal effects of such the variables in this study. Future studies, such as the one that will be later suggested, can use a random-effects technique to investigate determinants of residential satisfaction in the longitudinal analysis. Having said that, the interaction effects of time-invariant variables and other variables of interest can offer additional insights in the FE models. The interaction effects analyzed in this study are to be discussed shortly.

Race was found to be a significant factor in the static formation of housing satisfaction and neighborhood satisfaction. On average, Black householders are more likely to be satisfied with their housing than White householders, but they are not more likely to be satisfied with their neighborhood than White counterparts. The results on Black householders' housing satisfaction contrast with those reported in the previous studies. Perhaps, other external factors may have influenced housing satisfaction of African Americans. In addition, planners and policymakers may need to address specific issues in the neighborhoods of the African American population in order to improve the overall quality of life. All other racial groups were found to be not statistically significant with housing satisfaction and neighborhood satisfaction. Nevertheless, these racial groups still need full attention. The Hispanic/Spanish origin was found to be a significant factor in the static formation of housing satisfaction and neighborhood satisfaction. Hispanic householders are more likely to be satisfied with their housing than are non-Hispanic householders, but they are less likely to be satisfied with their neighborhood than are their non-Hispanic counterparts. The latter finding is somewhat unexpected, considering that Hispanic families have been known for their extended kinship ties (Landale et al., 2006). Perhaps, adverse effects of other external factors may have contributed to Hispanics' neighborhood satisfaction. Planners and policymakers can provide additional supports to the Hispanic population in improving their neighborhood quality.

The nativity status was shown to be a significant factor in the static formation of neighborhood satisfaction and not of housing satisfaction. The results suggest the negative effect of the nativity status on neighborhood satisfaction and the positive direction of the nativity effect on housing satisfaction. The findings seem intuitive because immigrants often struggle, at least at the beginning of their migration, to match their traditional and heritage-based ways of living with the housing (cultural) norms in the U.S. Once again, planners and policymakers can assess the resi-

dential conditions for these mentioned population groups including the foreign-born population, given that there is evidence of significant effects of economic investments and social/cultural capital on individuals' quality of life (Bourdieu, 1984; Currie, 2018; Hipp, 2009). Education attainment was found to be a significant factor in the static and temporal formation of neighborhood satisfaction and not of housing satisfaction. The effect of having higher education on housing satisfaction was not statistically conclusive, but the effect of having higher education on neighborhood satisfaction was positive. This may point to the theoretical rationale behind the relationship between education and residential satisfaction that remains less clear (Hipp, 2009). Nevertheless, the results may fit into the notion that individuals with higher education are likely to get actively involved in their neighborhoods in regard to demands for actions to improve the neighborhood quality; as a result, it tends to promote social (and cultural) capital.

Housing tenure was found to be a significant factor in the static and temporal formation of housing satisfaction and neighborhood satisfaction. The results suggest that first-time homeowners (FTHBs) are more likely to express high levels of housing satisfaction than are only renters, while they are less likely to express high levels of neighborhood satisfaction than are both renters and repeat homeowners. To be discussed momentarily, the interaction effects of housing tenure and CIDs offer additional insights. To reiterate, because of the FE models, the analysis could not evaluate the temporal effect of housing tenure on housing satisfaction and neighborhood satisfaction. One of future studies can explore potential factors that affect residential satisfaction of renters, FTHBs, and repeat homeowners over time, using the random-effects (RE) technique. Such a study attempt of residential satisfaction with the design AHS is worth our attention. Diaz-Serrano (2006) investigated the determinants of housing satisfaction of renters and homeowners for the European Union (EU) countries, using the panel data and the RE models. The results of that study suggest

that depending on the country, the tenure status might explain from a 41 to 72 percent gap in the average housing satisfaction between renters and homeowners from the period 1994 through 2001.

Household income was found to a significant factor in the static and temporal formation of housing satisfaction and neighborhood satisfaction. The effect of household income on housing satisfaction was not statistically conclusive while it was statistically significant on neighborhood satisfaction. On average, householders with higher incomes are more likely to be satisfied with their neighborhood than are their counterparts, but over time they seem to be less likely to be satisfied with their neighborhood than are their counterparts. Nice neighborhoods tend to have more high-income households while they also tend to be more expensive, especially over time (and *keeping up with the Joneses)*. Future studies may examine residential satisfaction for different income groups. In addition, household type was also found to be a significant factor in the static and temporal formation of housing satisfaction and neighborhood satisfaction. The results suggest that married couples without children are more likely to express high levels of housing satisfaction than all other household types. However, over time they are less likely to be satisfied with their housing than are single parents and married couples with children. As for neighborhood satisfaction, married couples without children are only less likely to be satisfied with their neighborhood than are married couples with children. This finding may fit into the general view that married couples with children tend to get involved in their neighborhood activities because of their children. Over time, however, married couples without children appear to be indifferent to express high levels of neighborhood satisfaction than all other household types, given all the positive coefficients of all other household types. The results suggest that bigger families may improve individuals' satisfaction with their housing and neighborhood over time. It is also worth noting that in the data the total number of *ever* other household types (single persons, single parents, married

couples without children, and other heads without children) is significantly larger than the number of *ever* married couples with children. To a certain extent, the increasing population of these groups may impose a concern for the country in the long term. Planners and policymakers may assist in addressing the four housing problems (affordability, adequacy, availability, and accessibility) multilaterally because successful resolutions to any of these problems may offer additional insights into such potential matters.

Duration of residence was not a significant factor in the static and temporal formation of housing satisfaction, but it appeared to be a significant factor in the static, and not temporal, formation of neighborhood satisfaction. The duration of residence seems to have negative effects on housing satisfaction over time and on neighborhood satisfaction at one point in time. Hipp (2009) and Smith (2011) found no effect of length of residence on neighborhood satisfaction. Diaz-Serrano (2006) suggested that housing satisfaction is u-shaped in duration of residence. Recent moving experience appeared to be a significant factor in the static and temporal formation of housing satisfaction and neighborhood satisfaction. The results suggest that householders with the recent moving experience are more likely to express high levels of housing satisfaction at one point in time and over time. However, they are less likely to be satisfied with neighborhood satisfaction at one point in time but not over time. One possible explanation for its negative effect on neighborhood satisfaction in the short term is that recent movers may not fully know about their "personally defined" neighborhoods because decisions regarding destination are frequently made in a short period of time, from only a few feasible/affordable choices, or with inadequate information.

The same-household status appeared to be a significant factor in the static and temporal formation of housing satisfaction and not of neighborhood satisfaction. The results suggest that householders with the same household composition are more likely to be satisfied with their hous-

ing than are householders with household composition changes and new householders. However, over time they are less likely to be satisfied with their housing than their counterparts. The effect of the same-household status on neighborhood satisfaction was not statistically significant. The results suggest that some changes in individuals' household composition may improve their satisfaction with housing and neighborhood over time. Furthermore, in the most recent years cohabitation or other unconventional types of living arrangement have been seen on the rise. As a result, one's satisfaction with housing and neighborhood may be accommodated by these "in situ" adjustments over time to reduce their residential dissatisfaction, given external factors such as unreasonably high housing costs.

Property values were found to be a significant factor in the static and temporal formation of housing satisfaction and neighborhood satisfaction. However, the positive effect of property values on each satisfaction was very marginal, i.e., the magnitude of the effect was almost zero or neutral. Higher property values may bring additional satisfaction at one point in time and over time. However, more property and other local taxes can also leave their long-term adverse effects on individuals' well-being since decisions on such public policy assessments tend to be more permanent. The analysis also showed that housing costs were not a significant factor in the static and temporal formation of housing satisfaction. However, the positive effect of housing costs on housing satisfaction was also very marginal, i.e., the magnitude of the effect was almost zero or neutral. It is worth noting that association membership fees were included in housing costs. As a result, the effect of association membership fees on housing satisfaction had the same direction as did the effect of total housing costs (e.g., a partial derivative of a function of several variables). To conservatively argue that the effects of property values and housing costs on the satisfaction are to be "neutral", it may suggest that because these values or expenses are ineluctable for individuals, they

may matter little on what individuals can do in the short or long term given the fact that everyone requires shelter. Also, a dynamic environment in the housing market may discourage relocation because of increases in home prices alone. In a sense, the "neutral" effect may fit into the notion of "willingness to pay for what's worth or required". Again, successful resolutions to the four housing problems (affordability, adequacy, availability, and accessibility) may offer additional insights into promoting individuals' general quality of life. Of course, low property values or high housing costs hastily create the unpleasant sentiments for individuals. Note that in this study, housing costs was not considered in the regressions of neighborhood satisfaction because the AHS did not define "neighborhood" for the respondents, and thus self-reported values of housing costs might only reflect individuals' *defined* neighborhoods, not neighborhoods per se.

Subsidized housing was found to be a significant factor in the static and temporal formation of housing satisfaction and neighborhood satisfaction. The results suggest that householders who live in subsidized housing units are more likely to be satisfied with their housing, even over time. However, they are not more likely to be satisfied with their neighborhood at one point in time and over time. Although it appears to be a success for housing assistance programs in promoting the housing quality, additional policies on neighborhood selections may be necessary for such housing assistance programs, given persistent challenges such as neighborhood segregation (Frey, 2021). In addition, the analysis showed that housing adequacy was a significant factor in the static and temporal formation of housing satisfaction. The results suggest that householders who live in the adequate housing units are more likely to be satisfied with housing than their counterparts who live in the moderately or severely inadequate housing units at one point in time and over time. To reiterate, housing adequacy was not considered in the regressions of neighborhood satisfaction because of individuals' *defined* neighborhoods.

Structural type of the unit was a significant factor in the static formation of housing satisfaction and neighborhood satisfaction. The results suggest that householders who live in single-family detached homes seem to be more likely to be satisfied with their housing and neighborhood than their counterparts who live in all other structural types. These findings somewhat reflect the American housing norm, i.e., single-family detached homes surrounded by a green lawn are the most preferred structure. However, two points from the results are worth noting, given contemporarily look-alike interiors of housing units, high housing costs, and tiny home/van home movements. Although their coefficient estimates were not statistically significant in the housing satisfaction model, the findings suggested that there were little differences in the magnitudes of the coefficients between single-family detached homes and single-family attached homes or apartments. This may suggest a tradeoff between similarity and affordability. Of all structural types, only the effect of other structural types, such as van homes, on neighborhood satisfaction was positively large, considering a very small number of observations for this category. Perhaps, this may suggest a tradeoff between flexibility and conformability, e.g., van homes with the "open space" environment. Future studies can explore this area since the overall U.S. housing stock has benefited from the housing booms in the early 2000s and the post-Great Recession of 2008. For example, open-concept floor plans or open-space homes have been increasingly popular. Moreover, household crowding, or overcrowding, was found to be a significant factor in the static and temporal formation of housing satisfaction. The results suggest that householders who experience overcrowding are less likely to be satisfied with their housing than are their counterparts, even over time. Crowded housing is generally undesirable, and thus it adversely affects occupants as well as neighbors or neighborhood. Also note that overcrowding was not considered in the regressions of neighborhood satisfaction because of individuals' *defined* neighborhoods.

Locational variables were found to be a significant factor in the static formation of housing satisfaction and neighborhood satisfaction. The findings support sociologists' long-held belief that the different types of communities one lives in affect attitudes (Burgess, 1925; Wirth, 1938). Individuals seem to consider the intangibles associated with various communities, such as CIDs or metropolitan areas, when they evaluate their housing unit as a place to live. Householders in the East South Central, West South Central, and Mountain divisions are more likely to be satisfied with housing than are those in the New England division. Accidentally, these divisions are part of the Sun Belt region of the U.S. Furthermore, householders in the Mountain and Pacific divisions are less likely to be satisfied with neighborhood than are those in the New England division. As neighborhoods in the Mountain division appear to be isolated by its population and geographic areas, neighborhoods in the Pacific division seem to be more expensive in terms of the cost of living in comparison with the rest of the country. Moreover, householders who live in the metropolitan areas are less likely to express high levels of neighborhood satisfaction than are their non-metropolitan counterparts. The effect of metropolitan areas on housing satisfaction was not statistically significant, and yet it had the negative effect. In general, metropolitan areas likely experience more problems often than do suburb or non-metropolitan areas.

Of the significant findings, the analysis showed that CIDs were a significant factor in the static and temporal formation of housing satisfaction and neighborhood satisfaction. The results suggest that householders who live in CIDs are more likely to be satisfied with housing and neighborhood than are their counterparts who live in standard subdivision at one point in time and over time. Thus, CIDs appear to be successful in promoting residential satisfaction. Furthermore, given the CIDs status, the effect of renters or repeat homeowners on housing satisfaction and neighborhood satisfaction remained in the same direction. In other words, given the CIDs status, FTHBs

are still more likely to express high levels of housing satisfaction than are renters, whereas they are still less likely to express high levels of neighborhood satisfaction than are renters and repeat homeowners. Perhaps, renters' housing satisfaction may potentially suffer from CC&Rs while their neighborhood satisfaction may be compensated by all attractive amenities and services CIDs have to offer. Future studies can extend the analysis of CIDs.

Finally, the analysis showed that the interaction effects were not statistically significant. However, they told interesting stories. The results suggest that overcrowding in the Hispanic or foreign-born households may not necessarily make them to be less likely to express high levels of housing satisfaction than are non-Hispanic or native-born counterparts. However, overcrowding may take its little toll on the Hispanic or foreign-born households over time, suggesting that these households may have "gradually" adapted the American housing norms over time. Similarly, the time effect on housing satisfaction and neighborhood satisfaction was all positive, but it was not all statistically significant in all regressions. This may suggest that individuals' satisfaction with housing and neighborhood likely increase over time.

3. Implications for Practice

As Pynoos et al. (1973) have put it in the context of the sociology of housing, "When households consume 'housing', they purchase or rent more than the dwelling unit and its characteristics; they are also concerned with such diverse factors as health, security, privacy, neighborhood and social relations, status, community facilities and services, access to jobs, and control over the environment. Being ill-housed can mean deprivation along any of the dimensions…" (Foley, 1980, p. 457). Understanding how individuals form their residential satisfaction is important because these subjective evaluations help them to determine their housing adjustment and mobility behavior as well as the basis of demand for actions (public and private such as in CIDs).

The knowledge is also useful for designing more effective housing and neighborhood programs and managing problems that may result because the perceptions of the developers and policymakers do not always coincide with those of the residents.

In the fields of economics and family and consumer sciences, this study intends to get consumers informed about first-time homeownership and ownership interests in subdivision types of residential real estate development. In the U.S., qualified individuals may become first-time homebuyers more than one time in their lifetime. Most importantly, the private and public sectors support first-time homebuyers (financial and non-financial) through their first-time homebuying assistance programs (NerdWallet, 2021; U.S. HUD, n.d.-a, n.d.-b, n.d.-d). For example, HUD homeownership programs also help qualified renters get into homeownership while these renters are concurrently participating in HUD housing assistance programs. The results in this study suggest that first-time homebuyers are more educated and satisfied with their housing, given the views of the new-house-smell experience and the housing norms. To the extent, homeownership appears to be the norm, even outside the U.S. (Fu, 2014; Rohe & Watson, 2007). However, the idea of "renting the American Dream" should not be ignored either in the political, social and economic dialogues (Schuetz, 2019). After all, renters and homeowners are still the nation's citizens.

Knowing about certain types and rights of ownership interests in CIDs, standard subdivisions, and undivided interest subdivisions can help individuals effectively determine their housing choices. CIDs may be one of the channels toward helping to improve individuals' quality of life, given all attractive amenities and services CIDs have to offer their residents. Their impacts on residents, entities, and economies have become increasingly significant. Nonetheless, the matters such as double taxation, special taxes in CIDs, good practices of CC&Rs, and land uses should remain under discussion. Additionally, this study suggests that bothersome neighborhood features

are a relevant factor that adversely affect individuals' satisfaction with their housing and neighborhood over time. Therefore, it is necessary to take additional public and/or private actions to address specific bothersome neighborhood factors in order to improve residential satisfaction and quality of life of the residents. Racial, ethnic, and nativity differences in residential satisfaction may be addressed by adapting cultural differences in residential design. Studies in other fields have assessed cultural differences in residential design in order to define consumer housing types, given common mismatches between immigrants' traditional and heritage-based ways of living and the housing (cultural) norms in the U.S. (Hadjiyanni, 2019; Lee & Park, 2011; Mazumdar & Mazumdar, 2016; Orthel, 2021).

4. Future Research

This study addressed and validated few missing points in the literature. After controlling for CIDs and other relevant variables, for example, this study found the significant effect of recent moving experience on residential satisfaction, which was in line with the migration literature (i.e., mobility would help improve migrants' residential quality). In addition to topics of future studies mentioned in the previous discussion section, future studies may also consider the following suggestions. Future studies may consider evaluating buyer's remorse. Buyer's remorse does not always refer to home-buyers remorse, but home-buyers remorse is much of interest. With convenient ways of financing arrangements and advanced technology such as virtual home tours, an increasing number of households, especially for first-time homebuyers, get into contracts without personally visiting and assessing potential units and/or neighborhood locations. In general, the terms of renters' contract are normally more flexible and shorter than the terms of home buyers' contract. What appears to be affordable may be no longer affordable once other related, but not previously factoring-in, costs come into play subsequently. Some of these potential factors may be used to

examine home-buyers remorse for first-time homeowners. Furthermore, future studies can focus on residential satisfaction between female and male first-time homebuyers, given that Rieger et al. (2019) showed the shifting profile of first-time homebuyers in the U.S. between 1997 and 2017. As previously discussed, the fixed-effects approach has certain limitations. For example, it cannot evaluate the effects of relevant time-invariant factors. Future studies may use the random-effects technique to further our understanding of the determinants of residential satisfaction over time. Last but not least, it is much of interest to see the transitional effect of residential community associations, such as HOAs, on residential satisfaction.

5. Conclusion

The purpose of this study was to conduct cross-sectional and longitudinal analyses in an attempt to further the understanding of the determinants of residential satisfaction at one point in time and over time. Using the unique national data of the redesigned AHS, the research questions and hypotheses were addressed through incorporating first-time homebuyers (FTHBs) and common interest developments (CIDs) into the empirical analyses of housing satisfaction and neighborhood satisfaction (two observed indicators of residential satisfaction). Given that there remains little research on explaining the factors that shape residential satisfaction over time, this study adds confidence to our knowledge about the longitudinal effects of the relevant socio-demographic, housing, and neighborhood characteristics on residential satisfaction.

Researchers and practitioners can extend analyses to address specific areas of research, including what have been suggested in this study. Policies that address the neighborhood selection for housing assistance programs, racial subgroups, or ethnic groups are useful for assessing the neighborhood quality. Furthermore, the knowledge of residential satisfaction may bridge the existing gap toward finding successful resolutions to the four housing problems (affordability, ade-

quacy, availability, and accessibility). Consequently, it helps not only individuals to improve their quality of life, but it can also help planners and policymakers to design more effective housing and neighborhood programs and avoid problems resulting from the different perceptions of developers, policymakers, and residents. As the ongoing research seek new directions to identify factors that shape individuals' formation of residential satisfaction, one worthy endeavor is to investigate first-time homebuyers' remorse.

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APPENDICES

A. DEFINITION OF TERMS

A.1. *Household*. A household consists of all people (related and unrelated) who occupy a particular housing unit (U.S. Census Bureau, 2015, 2017, 2019).

A.2. *Householder*. A householder refers to a person who is the first household member listed on the questionnaire and who is an owner or a renter of the sample housing unit with the age of 15 years or older (U.S. Census Bureau, 2015, 2017, 2019).

A.3. *Housing*. Housing may refer to more than an individual's dwelling and its objective characteristics because it may mean differently to people. For example, "*Smith (1776) defines the housing as a commodity; Ricardo (1817) – as tangible asset with potential return; Jevons (1871) – as fixed asset regardless the housing is owned or rented; Marshall (1890) – as a capital that is similar to the machine, if it is operated by a worker, but as a commodity if it is not operated*." (Henilane, 2016, p. 169). Housing is considered not only a composite of the overall physical and social components that make up the housing system (Francescato et al., 1987) but also a multidimensional phenomenon that is made up of structural type (e.g., single-family housing unit), tenure (own or rent), location (e.g., metro central city), and political jurisdiction (Shlay, 1998). By Merriam-Webster's definition, housing means "dwellings provided for people" (Merriam-Webster, n.d.-a). From the study of housing concept and analysis of housing classification, a general definition for the concept of "housing" is as follows: Housing is "a building or part of a building where a household can live all year round and which meets certain statutory requirements, including also residential address" (Henilane, 2016, p. 173).

A.4. *Housing Tenure*. Housing tenure refers to the homeownership status that an individual self-identifies as either a renter (tenant), a first-time homeowner, or a repeat homeowner. A renter is a person whose name is on the lease, or a person who is responsible for paying the rent if there is no lease. An owner is someone whose name is on the deed, mortgage, or contract to purchase. A housing unit is owner-occupied if someone whose name is on the deed, mortgage, or contract to purchase lives in the unit. All other occupied housing units are classified as renter-occupied units (U.S. Census Bureau, 2015, 2017, 2019).

A.5. *Housing Unit*. A housing unit refers to a house, apartment, group of rooms, or single room occupied or intended for occupancy as separate living quarters (U.S. Census Bureau, 2015, 2017, 2019).

A.6. *Housing Unit Occupied*. An occupied housing unit refers to a housing unit that is occupied by at least one person who lives in the unit as a usual resident at the time of the interview, or by the occupants who are only temporarily absent, for example, on vacation. However, if the unit is occupied entirely by people with a usual residence elsewhere, the unit is classified as vacant. By definition, the count of occupied housing units is the same as the count of households (U.S. Census Bureau, 2015, 2017, 2019).

A.7. *Housing Unit Type*. A type of housing unit refers to a unit structure, or a structural type of a unit, that is classified as either 1) mobile home or trailer, 2) single-family detached house, 3) single-family attached house, 4) apartment, or 5) Others (boat, van, etc.). A manufactured or mobile home or trailer refers to a housing unit with and without permanent rooms added. A single-family detached house refers to a housing unit that stands by itself apart from other buildings in the neighborhood. A single-family attached house refers to a housing unit that runs together or is

attached together (e.g., town houses or row houses). An apartment refers to a multiunit residential building with 2 or more units (U.S. Census Bureau, 2015, 2017, 2019, p. A-4).

A.8. *Residential Community Association (RCA).* A residential community association, including a homeowner's association (HOA), a condominium association, a cooperative association, refers to a formal organization that is legally established under laws by the developers and/or the residents. All RCAs in the U.S. have three characteristics: 1) automatically mandatory membership for all members (fee and non-fee), 2) binding documents for establishing mutual obligations to be performed by the individual owner and the community, and 3) mandatory lien-based charges or fees. These organizations are not charitable organizations, but most of them are non-profit corporation or unincorporated associations created for the purpose of serving their members and managing their common interest communities such as planned developments or condominiums. Because these residential associations are governed by their board of directors who are elected from their own memberships, their governing documents by law consist of: 1) the articles of incorporation, which is the entity's legal document, 2) bylaws, which are the entity's rules for conduct, and 3) the Declaration of Covenants, Conditions, and Restrictions (CC&Rs), which is private regulations of real property that states what is promised to do or not to do by a covenant, what is qualified for the grant of interest by a condition, and the free use of the property by an individual owner is limited by a restriction. Moreover, when a lot, unit, or parcel in a CID is transferred to a new owner, the homeowner membership in the association is automatically transferred with it – no separation of the association membership from the property ownership (Community Associations Institute, 2017; Esquivel & Alvayay, 2014). More information on RCAs and amenities is in Appendix B.

A.9. *Standard Subdivision*. In a standard subdivision of residential real estate development, the homeowner has exclusive ownership interests of real property (e.g., lots or parcels) with no additional ownership of any property or rights within the subdivisions, other than any appurtenant easement or usage rights that "run with the land" or "right-of-way" (Community Associations Institute, 2017; Esquivel & Alvayay, 2014).

A.10. *Subdivision*. A subdivision refers to "the division of a lot, tract, or parcel of land into two or more lots, plats, sites, or other divisions of land for the purpose, whether immediate or future, of sale or of building development. It includes resubdivision and, when appropriate to the context, relates to the process of subdividing or to the land or territory subdivided." (DOC, 1928, p. 6). Subdivisions are for the purpose of either residential development or other non-residential developments of real estate.

A.11. *Subdivision of Residential Real Estate Development*. A residential subdivision refers to a residential development of real estate or property where there is the division or separation of ownership interests in real property, i.e., the land and anything attached to it, including the space above and below the land (Community Associations Institute, 2017; Esquivel & Alvayay, 2014).

A.12. *Subdivision of Residential Real Estate Development by Classification.* A new residential subdivision may be classified as either a "new" subdivision or a newly constructed subdivision. A "new" residential subdivision, or a so-called conversion subdivision, may result from the conversion of real property to any of these subdivision types mentioned above. For example, rental apartments are commonly converted into condominiums. Nonetheless, the developers of such conversion subdivisions and newly constructed subdivisions must still follow the same subdivision laws (Community Associations Institute, 2017; Esquivel & Alvayay, 2014).

A.13. *Subdivision of Residential Real Estate Development by Type.* All residential subdivisions are defined by law and distinguished by ownership rights. A residential subdivision may be one of the following types: 1) standard subdivision, 2) common interest development, or 3) undivided interest subdivision (Community Associations Institute, 2017; Esquivel & Alvayay, 2014).

A.14. *Subdivision of Undivided Interest*. In an undivided interest subdivision, the homeowner has the ownership jointly over 1) a residential property as a co-owner and 2) an exclusive right to use a portion of the property (e.g., an apartment unit) that is managed by the entity (Community Associations Institute, 2017; Esquivel & Alvayay, 2014).

A.15. Technical Terms. *Ceteris Paribus*. The Latin term *ceteris paribus* used in this study means either with other conditions remaining the same, all else being the same, or everything else being the same. *Subsidized Housing.* HUD-assisted units refer to the housing units that households receive HUD rental assistance to reduce their cost of housing, which is in the form of public housing, vouchers, and privately owned assisted housing units (U.S. HUD, n.d.-c). Income limits are set by the Department of Housing and Urban Development (HUD) to determine eligibility for assisted housing programs (U.S. HUD, 2015). Public housing refers to the properties that households live in units that are owned by the local public housing authorities (PHAs) as the landlord. A program of Housing Choice Voucher refers to a type of the rental assistance program that qualifies households for housing vouchers from a public housing authority, where all or some of the rent is covered by the voucher. A privately owned multifamily unit refers to multifamily subsidized housing that is owned by a private landlord or corporation as the recipient of government subsidies to provide affordable housing; it is commonly known as a "project-based" subsidy because the subsidy stays with housing development (project), not a tenant (U.S. Census Bureau, 2015, 2017,

2019, p. A-14). *OMB13CBSA*. OMB13CBSA refers to the 2013 OMB CBSA codes in the American Housing Survey whose values represent the metropolitan areas. The values adhere to the Office of Management and Budget (OMB) definitions for Core Based Statistical Areas (CBSAs) as they existed in February of 2013 (U.S. Census Bureau, 2015, 2017, 2019, p. A-23). *Reference Category*. A reference category refers to a group to which other groups compare themselves. In this study, a reference category is explicitly stated or denoted with asterisk (*****) after the labeled term. For example, Male (reference category) or Male***** is used to indicate that it is the reference category for the gender of a householder to which the female category compares. *Variable Type*. A variable type refers to one of the following categories: primary variable, derived variable, proxy variable, independent variable, dependent variable, manifest variable, and latent variables. A primary variable refers to one that is available in the original data source. A derived variable refers to one that is derived from two (or more) primary variables. A proxy variable, or a surrogate variable, is an indirect measure of the variable that one wishes to study. An independent variable, a predictor variable, or an explanatory variable is one which is not affected by the experiment itself. A dependent variable or a response variable is directly linked to the primary outcome of the study. A manifest variable is one whose values can be directly measured or observed. A latent variable is one that cannot be directly observed or measured but rather is approximated through various measures presumed to assess part of the given construct (i.e., whose values must be inferred); thus, it is a theoretical entity or construct that is used to explain one of more manifest variables (American Psychological Association, n.d.).

B. NOTES

B.1. *Residential Satisfaction*. It is important to recognize the way residential satisfaction is measured in empirical analysis because of its direct influence on the findings (Lu, 1999). Therefore, as do many previous studies (e.g., Bruin & Cook, 1997; Lu, 1999; Ren & Folmer, 2016; Rent & Rent, 1978), this study considers both housing satisfaction and neighborhood satisfaction as the two observed indicators of residential satisfaction because they represented its related dimensions. Secondly, housing satisfaction is distinguished from neighborhood satisfaction because neighborhood satisfaction is considered a separate measure (Crull et al., 1991; Hipp, 2009; Lu, 1999). Furthermore, housing satisfaction (i.e., "How do you feel about your housing situation?") is not home satisfaction (i.e., "How do you feel about your home life?") (Sirgy & Cornwell, 2002, p. 96). Last but least, while some studies refer housing satisfaction as residential satisfaction and not vice versa (e.g., Mohit & Raja, 2014; Barcus, 2004), other studies use all three terms interchangeably – residential satisfaction, housing satisfaction, neighborhood satisfaction (e.g., Diaz-Serrano, 2006).

B.2. *Common Interest Development*. The term "Common Interest Development (CID)" is not universally applied across the U.S and in other countries. Depending on the U.S. state statutes, the name or designator of CID may include Common Interest Community (CIC) and Common Interest Realty Association (CIRA); nevertheless, one characteristic all CIDs have in common is a-must common areas in their real estate developments. Furthermore, Community Associations Institute (CAI) uses the term "community association" to refer to the types of CID – planned developments/communities, condominiums, community apartment, and cooperatives; sometimes CAI refers planned communities as HOAs because HOAs are created by law to oversee their planned communities (Treese, 2020). For the historical overview of CIDs, Clarke and Freedman (2019), Ellickson (1982), Gibson and Lombard (2005), and Young (1996) are some useful sources.

On a final note, the term “housing estate” and therefore the term “housing or estate satisfaction” are also used in residential satisfaction research, mostly by the studies conducted in Europe. A housing estate refers a large group of buildings, with at least of 2,000 housing units, that is recognized as a distinct and discrete geographical area, planned by the state or with state support (Dekker et al., 2011; Power, 1997).

B.3. *Residential Community Association (RCA) and Amenities*. To avoid confusion, this study uses the term “residential community association” to distinguish its meaning from the term “community association” used by Community Associations Institute (Community Associations Institute, 2017). RCAs include homeowner’s associations, condominium associations, cooperative associations, and mobile home associations. Furthermore, the terms “homeowner’s association (HOA)” is commonly used interchangeably with other terms across studies. For example, HOAs, private neighborhood governments, and gated communities are often used synonymously although some HOA neighborhoods are not gated and most gated communities have their HOAs (Cheung & Meltzer, 2014). Scheller (2017) uses HOAs and private neighborhood governments interchangeably. This study uses the meanings of RCAs and its types uniformly. Finally, RCAs are not the same “neighborhood civic leagues” or “neighborhood associations” because of two distinct differences – a lack of documentation and voluntary membership for the latter groups (Gibson & Lombard, 2005; Scheller, 2014). It is also worth noting that the terms ‘‘Amenities,’’ ‘‘Club goods,’’ and the similar names are used interchangeably, and they are references to the private provision of public goods provided by RCAs, unless it is noted otherwise.

B.4. *Latent Variable*. In the econometrics literature, a latent variable, as well as an observable variable, can be a dependent variable or an independent variable in a latent variable model. A latent variable may be either unidimensional (i.e., scalar) or vector valued dimension

(i.e., dimension $d \leq k$ observable variables), and its measurements are normally constructed. Hence, the framework analysis of structural equation modeling (SEM) is necessary to estimate both the measurement model and the structural model. In other words, a measurement model specifies some number of latent variables, and each of them is measured with a specified number of observable variables. A structural model includes a set of paths (regression coefficients) or correlations between the various measurable and unmeasurable variables. However, proxy variables are substitutes for latent variables. Kmenta (1991) identified that the term "latent" has been used by various authors to refer to only one type or all three types of unobservable variables. In general, there are three main classes of unobservable variables in econometric models other than stochastic disturbances: 1) variables for exact measurements are not available and which are represented by error-contaminated substitutes; 2) unobservable variables that can be represented only through closely related substitutes called "proxies"; and 3) variables that are intrinsically not measurable (i.e., variable are frequently not properly defined such as "permanent income" or "intelligence") but are related to a number of measurable (manifest) variables (e.g., age, or educational attainment). Hence, by conceptual and practical differences between these three types of unobservable variables, the second type of unobservable variables, which is different from the first type and the third type, is offered by observations on closely related variables that can be used as "surrogates", specifically when the unobservable variable could not be measured no matter how good the measurement instruments are, even with its well-defined concept. Furthermore, the use of proxy variables is appropriate even if they less often make their appearance as surrogates for dependent variables, than normally for explanatory variables. Econometrically speaking, the consequences of using proxy variables in place of their unobservable counterparts in a regression model are the same as in the case of measurement errors (Kmenta, 1991, p. 74). One of previous SEM studies

related to the satisfaction topic is the study of identifying determinants that affect the patient satisfaction at a training hospital in Turkey. The instrument includes 22 questions under five dimensions (factors) – satisfaction with physicians, satisfaction with nursing care, satisfaction with services related to patients' rooms, satisfaction with other hospital facilities, and satisfaction with admission and discharge procedures (Sahin et al., 2007). Ren and Folmer (2016) is another SEM study on residential satisfaction.

B.5. *Three Perspectives on Satisfaction Formation*. Three perspectives on how satisfaction is conceived – cognitive evaluation, affective evaluation, and conative/behavioral evaluation. The cognitive evaluation is to understand the degree to which different facets and roles of goal-oriented users contribute to their satisfaction (Canter & Rees, 1982; Mandler, 1984; Oseland, 1990). The affective evaluation is to understand affective relations with the environment (Weidmann & Anderson, 1985). The conative/behavioral evaluation refers to the conceptualization of residential satisfaction with the cognitive, affective, and conative dimensions (Francescato et al., 1989). The term "conative" refers to behavioral intentions (Francescato, 2002, p. 24; Francescato et al., 1989). The "attributes of housing" mean either "the referent of interaction" (Canter & Rees, 1982) or the domain of the environment (Francescato, 2002); the attributes are categorized into three groups – social/psychological, management/organizational, and physical attributes (Amole, 2009, p. 77).

B.6. *Type of Approach on Conceptualizing Residential Satisfaction*. Three perspectives on how satisfaction is conceived – cognitive evaluation, affective evaluation, and conative/behavioral evaluation. Galster (1987, p. 540) explained that most studies on residential satisfaction are based on two main approaches – the purposive approach and the actual-aspiration gap approach. The purposive approach refers to the conceptualization of residential satisfaction as a measure of

the degree to which facilitates or inhibits the goals of the user – the cognitive view (Canter & Rees, 1982; Mandler, 1984; Oseland, 1990). The actual-aspiration gap approach refers to the conceptualization of residential satisfaction as a measure of the difference between one's actual and desired (or aspired-to) housing and neighborhood situations (or residential situation/living situation/housing needs) (Galster, 1987; Galster & Hesser, 1981). This latter approach is adopted in this study.

B.7. *Theory of Family Housing Adjustment*. "Housing Adjustment Theory" or "Housing Deficit Theory" is often referred as Theory of Family Housing Adjustment by some researchers outside the United States (Emami & Sadeghlou, 2021; Mohit & Raja, 2014). In addition, it is worth noting that cultural norms can sometimes be referred to as external or peer-effect norms and family norms as internal norms (Vera-Toscano & Ateca-Amestoy, 2008).

B.8. *Cultural Norms as Housing Needs*. As Morris and Winter (1975, p. 81) have put it, "We believe it to be the case that housing norms in American culture are (1) widely agreed upon, (2) quite specific and detailed, and (3) important in the sense that sanctions, largely in the form of withdrawal of respect and loss of self-respect, are widely applied and deeply felt by families. As a result, much effort and sacrifice are expended in order to conform to housing norms." Therefore, housing needs reasonably may be equated with cultural norms for housing since they derive from cultural standards against which actual housing conditions are judged, not derive from minimum shelter needs or minimum health and safety standards in any absolute sense.

B.9. *American Housing Norms*. Built upon the concepts of adjustments and maladjustment (Riemer,1943, 1945, 1947), Structural Functional Theory (or Functionalism), and Family Systems Theory (1974), Theory of Family Housing Adjustment coins American housing norms. The housing norms that a household seeks in the family housing adjustment process can be subsumed under a five-fold classification – 1) housing space norms; 2) tenure norms; 3) structure type

norms, 4) quality norms, and 5) neighborhood and location norms (Morris & Winter, 1975, p. 82). Housing space norms explain required housing space for the various activities, including bedroom sharing. Tenure norms describe how householders feel attached to the concept of home ownership. Structure type norms illustrate the single-family home is the most favor type of the unit structure. Quality norms pay attention to subjective matters based on the respondents' perceptions of distinguishing attributes – "what attributes are thought of as contributing to quality by reference to the subjective responses of people to those attributes… income and housing quality should be congruent". Neighborhood and location norms define predominantly specified areas, e.g., in a good school district, with safe, well-maintained streets, and residential in character.

B.10. *Levels of Environment*. Levels of environment refer to the scales of the environment (Aragonés et al., 2002, pp. 3-5) or levels of environmental interaction (Canter & Rees, 1982) that are defined as the scales of the environment which have a hierarchical order. Essentially, these are the different levels at which people may experience satisfaction such as the house and the neighborhood (Amole, 2009, p. 77, footnote 3). Furthermore, Amole (2009) acknowledged that most studies of residential satisfaction usually focused on one of the levels of the environment, albeit unintentionally and with very little differentiation between the levels. This means that residential satisfaction is conducted with a level, or scale of the physical environment such as dwelling units, neighborhoods, locations of residence (community or country). Information on differences in user responses to different levels of the environment and some levels that are more important than others can be found in literature (Canter & Rees, 1982; Francescato et al., 1989).

B.11. *Morphological Configuration.* Differing from the housing unit types, the morphological configuration, or typologies known in architecture, refers to the spatial and organizational form of the building based on certain physical characteristics (Amole, 2009, p.77, footnote 2).

B.12. *Efficiency* refers to "the costs of coming to a decision as well as being closer to the median voter's ideal point." (Grace & Hall, 2019, p. 128).

B.13. *Income Status*. In addition to using *Income* as a continuous variable in the analysis, this study also includes a binary variable *Income status* to indicate the income status of households, i.e., whether a household's income is above or below the median household income of the area or the area median income (AMI), for an illustrative purpose. The binary variable *Income status* takes a value of 1 if a household's annual income is at least 80 percent of the median household income level for the area where the household's housing unit is located (and 0 otherwise). One of the reasons behind the household income status is to have a more intuitive interpretation of *Income* in the perspective of housing tenure choice model under the user costs of housing approach. Another reason is to examine the share of household income that is above or below AMI over time. To construct this binary variable, this study uses a two-step process. In the first step, this study compiles the information on the median household income of metropolitan areas from matching the metropolitan areas defined by the 2013-OMB-CBSA code (i.e., OMB13CBSA) in the AHS PUF microdata with the two external data sources of the U.S. Census Bureau, i.e., the reports of "Household Income: 2015, 2017, 2019" (Posey, 2016; Guzman, 2017, 2019, 2020) and of "Income and Poverty in the United States: 2015, 2017, 2019" (Denavas-Walt & Proctor, 2015; Fontenot et al., 2018; Proctor et al., 2016; Semega et al., 2017; Semega, et al., 2020). In the second step, using the compiled data, *Income status* is coded "1" if a household's income is at least 80 percent of the median household income level for its area (and 0 otherwise).

C. POLICY AND PROCEDURE COMPLIANCE

C.1. *IRB Approval for Not-Human Subject Research.* The public use file (PUF) micro-data of the American Housing Survey (AHS), sponsored by the U.S. Department of Housing and Urban Development (HUD) and conducted by the U.S. Census Bureau, is the publicly accessible data source; hence, a determination request of not human subjects research for this study was submitted to Human Subjects Office, the University of Georgia Office of Research. This requested submission for the Institutional Review Board (IRB) approval was sent in the semester of Fall 2021, and it was approved by the Human Subjects Office on December 23, 2021.

C.2. *Confidentiality of American Housing Survey.* Confidentiality is guaranteed to the respondents by law (Title 13, section 9(a) of the U.S. Code). For more information, visit Questionnaires: The survey questionnaires for Core and Topical Module sections (U.S. Census Bureau, 2021c).