

Hogar Dulce Hogar? [Home Sweet Home?]: Prepurchase Counseling and the Experiences of Low-Income Latinx Homeowners in Denver

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Abstract

This study examines the extent to which completion of a prepurchase homeownership education and counseling program was associated with (1) the terms and conditions of original mortgage loans; (2) housing and neighborhood quality; (3) subsequent mortgage refinancing; (4) the sustainability of homeownership; and (5) foreclosures and short sales experienced by low-income Latinx homeowners. The sample consists of 303 Latinx former Denver Housing Authority (DHA) residents who purchased homes from 1995 to 2011; 95 of those residents completed DHA's HomeOwnership Program (HOP). Propensity score matching techniques were employed to create a comparison group from the remaining 208 homeowners who purchased homes without assistance from HOP. Overall, Latinx homeowners in the study purchased their homes with little or no downpayment; however, Latinx HOP homeowners were more likely to hold 30-year fixed-rate mortgages at lower interest rates than were non-HOP homeowners. Latinx HOP homeowners also resided in homes that were larger and had fewer upkeep issues and were in neighborhoods with few vacant homes or properties in disrepair. In addition, Latinx HOP homeowners owned their homes, on average, for 12 years—about 2 years longer than did non-HOP homeowners, and their average home value in 2018 was nearly \$322,000—about \$58,500 higher than that of non-HOP homeowners. Nonetheless, one of five Latinx homeowners in the study had experienced a foreclosure by 2018. Moreover, the rate of foreclosures and short sales was 25 percentage points higher for non-HOP Latinx homeowners than for HOP homeowners.

Introduction

The passage of the Fair Housing Act of 1968 and its subsequent amendment in 1988 explicitly prohibited discrimination in the sale, rental, and financing of housing on the basis of race, color, religion, national origin, sex, disability, and familial status. These federal housing policies expanded the opportunities available to lower income, minority families, significantly increasing the Latinx homeownership rate from approximately 42 percent in 1970 to nearly 50 percent by the mid-2000s. The economic and housing crises undergirding the Great Recession, however, triggered a nearly 4-percent drop in Latinx¹ homeownership rates between 2007 and 2015. Since 2015, homeownership rates have risen, with 51.4 percent of Latinx households residing in homes they own by 2020 (NAHREP, 2021; NCRC, 2020). Growth in Latinx homeownership is expected to continue and to constitute the main driver of homeownership growth—60 percent of overall growth—in the United States (NAHREP, 2021; NCRC, 2020). Nonetheless, the Latinx-White² homeownership gap remains about 26 percentage points (Beckett and Atreya, 2017; Cortes et al., 2007; Sanchez-Moyano, 2020), although this gap varies by region and urban or rural location (Acolin, Lin, and Wachter, 2019; Stochak, Young, and McCargo, 2019).

Contributing to the Latinx-White homeownership gap is the inadequate service provided by traditional financial institutions. In 2019, only 24 percent of mortgages to Latinx homebuyers were from banks, and 70 percent of the home loan originations were financed by mortgage companies charging higher fees and mortgage interest rates (NCRC, 2020). Latinx borrowers also were more likely to be denied a mortgage: 10 percent of mortgage applications from Latinx borrowers were denied in 2019, compared with 6 percent for White borrowers (NCRC, 2020). Latinx homeowners remain at higher risk of experiencing mortgage delinquencies and foreclosures, particularly during times of income shocks and economic downturn, because they are more likely to have fewer financial resources, limited equity in their homes, and higher debt-to-income (DTI) ratios (Dey and Brown, 2020; NAHREP, 2021; Neal, Choi, and Walsh, 2020). Bayer, Ferreira, and Ross (2016) estimated that 10 percent of Latinx homeowners had delinquent mortgages during the Great Recession; others have estimated that one of every five Latinx households had lost or were at imminent risk of losing their homes to foreclosure during that period (see Bocian, Li, and Ernst, 2010; Garriga, Ricketts, and Schlagenhaut, 2017; Reid et al., 2017).

The housing market crash and subsequent tidal wave of foreclosures that disproportionately affected Latinx and other minority households sparked renewed debate about the wisdom surrounding efforts to increase homeownership among lower income households. Of overriding concern is the long-term sustainability of homeownership and how housing burden, subprime and predatory lending, and rising nonhousing indebtedness contribute to the increased risk of foreclosure and housing instability for Latinx homebuyers (Cortes et al., 2007; Kochhar, Gonzalez-Barrera, and Dockterman, 2009; Zhang and Lerman, 2019). In addition to expressing concerns about the wealth-building capacity derived from low-income homeownership (Kochhar, Fry, and Taylor, 2011; Shapiro, 2006), previous studies have challenged the extent to which it has improved the housing and neighborhood quality of Latinx families and reduced the homeownership opportunity

¹ In this paper, whenever possible, we use the gender neutral term *Latinx* to refer to Latino and Latina homebuyers; however, *Latino/a* and *Hispanic* may be used interchangeably.

² In this paper, *White* refers to non-Latinx White or Anglo.

gaps between Latinos and Whites (Sanchez-Moyano, 2020; Thomas, Mann, and Meschede, 2018). Others, however, have argued that prepurchase financial counseling and targeted downpayment assistance programs can mitigate those risks and increase the number of Latinx families who are in the financial position to become homeowners (Parrott and Payano, 2016; Santiago, Galster, and Smith, 2017; Stochak, Young, and McCargo, 2019; Turnham and Jefferson, 2012).

In this study, we assess the extent to which participation in a prepurchase homeownership counseling and asset-building program operated by the Denver Housing Authority (DHA) was associated with the following outcomes for Latinx homeowners: (1) the original terms and conditions of mortgage loans; (2) housing and neighborhood quality in destination neighborhoods; (3) subsequent mortgage refinancing of the original home; (4) the sustainability of homeownership; and (5) the experience of foreclosures and short sales. To estimate program impact, those outcomes were assessed over time for a cohort of 303 Latinx former subsidized housing residents who purchased their homes between 1995 and 2010. Only 95 of those residents had graduated from a homebuyer education and counseling program offered by the Housing Authority of the City and County of Denver to its public housing residents and Housing Choice Voucher recipients. This may be the first report to explicitly assess program impacts for Latinx homebuyers not only at the time of home purchase but through the first decade or more of their homeownership experience.

The report begins with a brief review of the homeownership literature that focuses specifically on Latinx knowledge of and access to the homebuying process, including several excellent reviews of the broader literature on Latinx and minority homeownership (see, for example, Cortes et al., 2007; Herbert and Belsky, 2008; Sanchez-Moyano, 2020). Next is a review of evaluations of homebuyer education and counseling programs, with an emphasis on outcomes for Latinx participants. The next section describes the DHA's HomeOwnership Program (HOP) and participants, followed by a description of the analytical strategy and statistical methods employed for assessing HOP program impacts. The following section reports the findings related to original mortgage terms and conditions, housing and neighborhood quality, refinancing and loan modifications, sustainability of homeownership, and foreclosures and short sales. The article concludes with a discussion of the policy implications derived from those findings, focusing on how homebuyer education and counseling programs could be used to promote and sustain Latinx homeownership.

Latinx Knowledge of and Access to the Homebuying Process

Before the Fair Housing Act of 1968, de jure discriminatory practices operating at the federal, state, and local levels severely limited Latinx access to housing and homeownership in nonminority neighborhoods (Martinez and Aja, 2020; Wachter and Megbolugbe, 1992). Redlining and the inability to obtain Federal Housing Administration mortgage financing further constrained the ability of Latinx and other minority residents to purchase homes in minority neighborhoods (Rothstein, 2017). The lingering effects of decades of structural barriers to homeownership—coupled with disparities in wealth, income, and savings, as well as lower credit scores, contribute to ongoing patterns of significantly lower homeownership rates for Latinx households compared to their White counterparts (Acolin, Goodman, and Wachter, 2019;

Beckett and Atreya, 2017; Gyourko, Linneman, and Wachter, 1999; Hyde and Fischer, 2021; Neal, Choi, and Walsh, 2020). Precipitous declines in Latinx homeownership with the collapse of the housing and mortgage markets between 2007 and 2015 were followed by more recent upticks in home purchases, bringing current Latinx homeownership rates to levels slightly above their peak in the mid-2000s (Acolin, Lin, and Wachter, 2019; NCRC, 2020). Indeed, 60 percent of the current net growth in homeownership in the United States is driven by Latinx homebuyers (NAHREP, 2021; NCRC, 2020).

Coupled with concerns about economic constraints limiting Latinx access to homeownership are ongoing apprehensions about the limited knowledge that prospective Latinx buyers have about the homebuying process (Cortes et al., 2006). In their examination of efforts to improve homeownership opportunities for Latinx households, Cortes and colleagues (2006) found that the most common barriers to homeownership were the lack of familiarity with the homebuying process (see also Cortes et al., 2007; Fannie Mae, 2003), which is accentuated for Latinx buyers with limited English proficiency. Lack of a credit history, a thin credit history, or poor credit are often combined with an inadequate understanding of what constitutes creditworthiness, minimal financial literacy skills, and limited interaction with and a general distrust of U.S. financial institutions (Ibarra, 2005; UnidosUS, 2019). The distrust of financial institutions has been exacerbated by the lack of outreach from those institutions to Latinx communities and the limited investment they make in hiring bilingual and bicultural financial professionals (Bowdler, 2005).

Further eroding trust in the homebuying process is the evidence suggesting ongoing differential and more favorable treatment received by White homebuyers relative to Latinx homebuyers from various actors in the process (see review by Quillian, Lee, and Honoré, 2020). In their recent meta-analysis of housing and mortgage discrimination studies, Quillian, Lee, and Honoré (2020) found that compared with White homebuyers, Latinx homebuyers were shown fewer residential options, were more likely to be denied mortgages, and, if offered mortgages, were more likely to receive high-cost mortgages. Indeed, pervasive mortgage lending discrimination during the 1990s and 2000s led to the disproportionate receipt of subprime, interest-only, balloon, jumbo, or other risky loan products for Latinx homebuyers (Bowdler, 2009; Garriga, Ricketts, and Schlagenhauf, 2017; Immergluck, Earl, and Powell, 2019) even when they were qualified for better loans (UnidosUS, 2019; Wilberg Ricks, 2009a). Howell and Korver-Glenn (2018) underscore how various actors (e.g., home appraisers, inspectors) in the homebuying process have colluded to expose prospective Latinx homebuyers to predatory financing.

Homebuyer Education and Counseling Programs—Do They Make a Difference for Latinx Homebuyers?

Completion of prepurchase homebuyer education and counseling is considered foundational to the viability and long-term sustainability of homeownership in low-income and minority communities. These programs provide prospective homebuyers with the requisite skills regarding budgeting and credit, knowledge about mortgages and the mortgage process, and access to sustainable mortgage credit (Argento et al., 2019). The decades-long interest in the effectiveness of these programs has produced an extensive and diverse literature centered primarily on the attainment

of homeownership and short-term, postpurchase mortgage repayment behaviors (see reviews by Collins and O'Rourke, 2011; Mayer and Temkin, 2016; Myhre and Watson, 2017; Quercia and Wachter, 1996). With the collapse of the U.S. housing market in 2007 and 2008, attention shifted to assessing the impact of postpurchase counseling, particularly its role in foreclosure prevention and the sustainability of homeownership (Agarwal et al., 2010; Avila, Nguyen, and Zorn, 2013; Ding, Quercia, and Ratcliffe, 2008).

Despite their popularity, the short- and long-term effectiveness and impact of homebuyer education and counseling programs still remain unclear. Moreover, little is known about their effectiveness in improving the homeownership outcomes of Latinx buyers. Previous studies suggest that homeowners who completed homebuyer education and counseling experienced significantly lower rates of mortgage defaults and foreclosures relative to similar homeowners who did not receive such education or counseling (Agarwal et al., 2010; Avila, Nguyen and Zorn, 2013; Hira and Zorn, 2002; Mayer and Temkin, 2016; Temkin et al., 2014). Other studies, however, found no effect of these programs on the timeliness of mortgage payments or foreclosure prevention (Jefferson et al., 2012; Peck et al., 2019; Smith, Hochberg, and Greene, 2017). Moreover, previous studies have focused primarily on examining aggregate impacts (participants vs. nonparticipants) or various delivery methods (in-person vs. online). To date, only a few studies have explicitly examined racial or ethnic differences in the impact of homebuyer education and counseling on homeownership outcomes.

Since the early 2000s, a series of policy briefs and testimonies at federal hearings have touted the benefits of prepurchase homebuyer education, particularly one-on-one counseling, for prospective Latinx buyers (see Bowdler, 2009; Diaz, 2004; Flores, 2014; Garza, 2020; Hizek, Kamasaki, and Schafer, 2002; Ibarra, 2005; UnidosUS, 2018, 2019; and Wilberg Ricks, 2009b). Rigorous evaluations of program impacts for Latinx homebuyers are limited, however. An early evaluation of the Home to Own program piloted in Arizona reported that participants who completed the prepurchase counseling component of the program had significantly lower delinquencies and foreclosures (Johnson and Macias, 1995, as cited in Hizek, Kamasaki, and Schafer, 2002). Santiago and colleagues (2010) found that low-income Latinx buyers who participated in a homeownership education and counseling program in Denver reported significant improvements in neighborhood quality, including newer housing stock and lower crime rates. They also were more likely to rate their destination neighborhood as good as or somewhat better relative to their prepurchase neighborhood. An evaluation of Denver's enhanced Family Self-Sufficiency program, serving primarily Latinx and African-American subsidized housing residents, found that 30 percent of high-intensity participants purchased their own homes within 5 years of starting the program, compared with 2 percent of low- to moderate-intensity participants (Santiago, Galster, and Smith, 2017). Early results from the *First-Time Homebuyer Education and Counseling Demonstration* (Peck et al., 2019) suggest that Hispanic participants in the demonstration were less likely to purchase a home than were White participants. Further, Peck and colleagues found no effect of homebuyer education and counseling on rates of home purchase by Hispanic participants.

To address those gaps in the literature, this study assesses the impacts of a face-to-face homebuyer education and counseling program in Denver that serves low-income subsidized housing residents,

the majority of whom are of Latino origin. Specifically, the study examines whether participation in and completion of the DHA's HOP yields superior outcomes for first-time Latinx homebuyers at the time of home purchase and through a decade or more of homeownership.

Denver's Homeownership Counseling Program

The Denver Housing Authority initiated HOP in late 1994. From its inception until the onset of the Great Recession, HOP's homebuyer education and counseling was open only to DHA public housing residents and Housing Choice Voucher recipients. Since 2007, however, DHA has been a HUD-approved homeownership counseling agency, providing the required Colorado Housing Finance Authority 1-day classes to hundreds of other first-time homebuyers residing throughout metro Denver (DHA First-Time Homebuyer Education, n.d.). DHA does not offer the extended program available to subsidized housing residents through HOP to the general public, however. Between 1995 and 2020, HOP provided homeownership education and counseling to nearly 2,100 subsidized housing residents, the majority (55 percent) of them of Latinx origin.³ To date, 220 subsidized housing residents have graduated and purchased homes through HOP. Although the majority of HOP participants did not purchase homes, they often realized other financial capability milestones, such as increased employment and earnings, credit repair, or debt reduction.

Involvement in HOP includes two phases of program treatment. The initial phase of HOP is geared toward financial capability—increasing employment and earnings, savings accumulation, debt reduction, and credit repair. At the time of HOP enrollment, 52 percent of participants have earnings below \$10,000, and nearly one-third (31 percent) have no earnings at all (Santiago and Galster, 2008). Relatively few start the program with any personal savings, and more than one-half have derogatory debt. In collaboration with HOP case management staff, participants develop Individual Training and Services Plans that assist them to become “mortgage loan ready” (DHA Homeownership, n.d.: para. 1). During the program, HOP participants are eligible for money management counseling that emphasizes budgeting, debt reduction, and savings goals. The program also offers credit management support that includes free credit reports, credit counseling, and assistance with credit repair. To encourage savings for future asset purchases—such as education and training, microenterprise, and homeownership—DHA also offers Matched Savings Accounts for DHA public housing residents enrolled in the program. Deposits into those accounts are matched at a rate of 1:1 up to a maximum participant contribution of \$1,500. In addition, DHA offers Incentive Plus classes on a wide range of financial capability topics (e.g., real estate, self-sufficiency, employment). Participants receive \$20 coupons for every class attended, which can be applied to cover closing costs; however, the DHA matches and coupons are disbursed only to participants who successfully complete the program and go on to purchase a home under the auspices of HOP. For eligible participants who are simultaneously enrolled in the Family Self-Sufficiency (FSS) Program, HOP uses the rent escrow account feature of FSS to foster the accumulation of savings. Rent escrow savings are distributed only to participants meeting the FSS program requirements for employment, earnings, and being Temporary Assistance to Needy Families (TANF)-free as well as completion of all participant-identified Contract of Participation

³ Subsidized housing residents in DHA are diverse. Approximately 55 percent of all HOP program participants are Latino, 24 percent African-American, 10 percent Vietnamese, and 10 percent Anglo.

and Individual Training and Services Plan goals (see Santiago and Leroux [2021] for a full description of the FSS program and requirements).

When HOP counselors identify participants who are within a year of being able to purchase their own home, they are invited to join the Home Buyers Club.⁴ Over the course of a year, the Home Buyers Club offers monthly classes covering topics such as real estate terms, mortgage financing, engaging with real estate agents and loan officers, the home purchase process, and work with contractors (DHA, Homeownership, n.d.). In addition, HOP offers special benefits, such as reduced interest rate mortgage products, mortgage fee discounts, downpayment and closing cost assistance, and, when necessary, second mortgage assistance. Integrated into the homeownership counseling sessions are discussions about fair housing, fair lending, and what constitutes a sound home purchase. During this second phase of the HOP program, participants are expected to attend 9 of the 12 monthly classes; complete an intensive, 1-day homeownership seminar offered by the Colorado Housing Finance Authority (CHFA); and pass the CHFA homeownership exam. As participants move closer to home purchase, they meet regularly (often weekly or biweekly) with their case manager and other HOP program staff members.

Data and Methods

Data

This mixed-methods study uses data from the *Denver Housing Study*, a longitudinal evaluation of HOP operated by the Denver Housing Authority (for additional details about the study and data, see Galster et al., 2019, and Santiago, Galster, and Smith, 2017). The analysis sample used in this study consists of 303 Latino former DHA residents who purchased homes from 1995 through 2011; 95 of them had participated in HOP. The remaining 208 homeowners were DHA residents who purchased homes without assistance from HOP and serve as a comparison group.

Data used in the study include DHA administrative data and quantitative and qualitative data gathered from both prospective and retrospective survey interviews with homeowners who participated in the *Denver Housing Study*. DHA administrative data provided baseline information about the participants in the study and detailed information about their participation in the HOP and FSS programs, as applicable. A series of prospective surveys were conducted with HOP participants beginning in 2001 (the start of the study) and as they moved through the various phases of the program until they purchased their homes. Additional retrospective surveys were completed between 2008 and 2011 with early (pre-2001) HOP graduate homeowners and the sample of non-HOP homeowners. The homeowner survey, a 90-minute in-person or telephone survey, included a battery of questions about home financing at the time of purchase and subsequent refinancing, which are used in conjunction with county administrative data.

County property records, including data on mortgage liens, refinancing, and real estate transaction data, including sales and foreclosures for the period between the original home purchase and

⁴ Requirements for entry into the Home Buyers Club include being employed with the current employer for at least 1 year (or have another stable source of mortgage repayments) and having personal savings of at least \$500. To date, approximately 400 HOP participants have reached this level of the program.

2018, were examined first in-person using microfilm copies available at the Real Property offices in the Denver metropolitan area (primarily Adams, Arapahoe, Denver, Douglas, and Jefferson counties) and then online as those records became available in digitized formats. Office of Tax Assessor records from the date of purchase through 2018 also were reviewed to secure information on appraised home valuations and property tax assessments.

In-person, systematic social observations of the block faces that represent the immediate neighborhood environs where Latinx owners in the study resided were conducted in 2010 through 2011 after several years of homeownership. Those neighborhoods were defined as the block face where an identified study property was located and the block face across the street from the home. The typical block-face neighborhood in Denver comprised 20 properties. For the analyses reported in this study, the sample was restricted to the 202 block faces in the metropolitan Denver area that were owned and occupied by study homeowners at the time of the observations.⁵

Study team members were trained to conduct systematic social observations in the field following the techniques described by Sampson and Raudenbush (1999, 2004). Observer teams walked or drove down every street within the sample of block faces at some point every day between the hours of 9:00 a.m. and 7:00 p.m. Although observer teams were aware of the location of the study property and captured that information on the observation log (e.g., property #7 on the block), they did not know whether those homes were owned by HOP or non-HOP Latinx buyers (copies of those observation logs may be found in appendix A).

Observer teams collected information on five domains of the residential physical environment: land use, dwelling conditions, parcel conditions, infrastructure conditions, and environmental conditions. *Land use* was defined by nine items from the observer logs indicating the percentage of the block face that was used as (1) operating residential property, including vacant units ready for occupancy; (2) abandoned residential properties; (3) operating commercial or retail buildings; (4) operating industrial, construction, or transportation buildings; (5) operating institutional buildings; (6) closed or abandoned nonresidential buildings of all types; (7) transportation rights-of-way, including major roads, freeways, highways, and railroads; (8) parks, playgrounds, recreational facilities, green space, and watercourses; and (9) other land uses not listed.

Dwelling conditions were defined by six items rating the physical conditions of properties located on the observed block faces. The conditions measured included (1) abandoned residential or commercial property; (2) facade or steps broken, missing, or needing repairs; (3) walls with holes, peeling, or needing repairs; (4) roofs or gutters with holes, patched, or needing repairs; (5) windows broken, patched, or needing repairs; and (6) security bars on windows or doors.

Parcel conditions referred to the physical conditions of the parcels of land in the block face, including the presence of (1) large items of trash; (2) litter; (3) broken glass; (4) abandoned or disabled cars; (5) garbage; (6) graffiti; and (7) weeds or lawns that need mowing.

⁵ Followup interviews and systematic social observations scheduled to be conducted during 2020 were postponed because of the COVID-19 pandemic.

Infrastructure conditions consisted of the physical condition of streets and alleys and the presence of sidewalks in the observed block face. Street conditions were measured using a rating scale incorporating the following options: (1) large holes capable of causing auto damage; (2) minor holes, bumps, or cracks in street; (3) smooth street paving; (4) street under construction or resurfacing; and (5) street not paved. The condition of alleys was measured using a rating scale consisting of the following: (1) sufficient trash, junk, or other debris to impede traffic; (2) visible trash, junk, or other debris, but not enough to impede traffic; (3) no visible trash, junk, or other debris; and (4) no alleys in the block face.

Environmental quality conditions referred to the existence of air quality or noise-related problems. They were measured using questions about the existence of noticeable odors (with type detailed) and any types of noise (traffic, industrial, rail transit, loud music, or other) that may have been detected by the observer while at the block face.

During the systematic observations, information on security features and human activities observed on the block face was also collected. *Security features* included items such as a single or gated entrance into the neighborhood and the presence of police or security guards. *Human activities* were assessed by a series of questions regarding the presence and actions of children, teens, and adults in a block face. Those observations included seeing any teenagers or adults congregating in groups, individuals who were loitering, individuals who were homeless, or individuals engaged in extralegal activities. Observers were also asked whether they heard any language spoken other than English.

Finally, longitudinal neighborhood data were compiled at the census tract level for the period between home purchase and 2018 and were derived from the U.S. Census and the *American Community Surveys*. In the period between the 1990 and 2010 censuses, the *Neighborhood Change Database* from GeoLytics was employed because it adjusted the data to account for changes in tract boundaries between the decennial censuses. Estimates of non-census year neighborhood indicators used the strategy employed by Santiago and colleagues (2014) of linear interpolation for the period between 1990 and 2010.⁶ From 2009/10 to 2018, data from the *American Community Survey* were used. Principal components analysis was conducted to reduce the total number of neighborhood conditions to the 10 census tract-level indicators included in these analyses: percentages of African-American, foreign-born, and female-headed households; poverty and unemployment rates; neighborhood occupational prestige; percentage of renters; percentage of individuals age 5 and older who moved within the 12 months of the study period; vacancy rates; and percentage of housing units built before 1940.

Additional details about specific outcome measures are provided in the Results section of this report.

⁶ The authors believe that the use of linear interpolation is less erroneous than using the same values (e.g., either the 1990 or 2000 census tract estimates) for an entire census decade when change in those neighborhood conditions over time is reasonable to expect. Linear interpolation provides a means of estimating change in neighborhood characteristics between the two census anchor years (e.g., between 1990 and 2000; between 2000 and 2010). If the rate of change is steady, then the linear interpolation is specified correctly. Estimates are incorrect only if the rate of change is not constant throughout the decade. Unfortunately, the available data do not provide information that indicates whether the rate of neighborhood change is accelerating or decelerating. Although interpolation is subject to random measurement error, the size of the error is clearly smaller than it would have been if either 1990 or 2000 census indicators of neighborhood conditions had been used for the entire period captured in the study. In addition, because interpolation is subject to random measurement error (hence producing inflated standard errors), the coefficients are more likely to be statistically insignificant; thus, if significant neighborhood effects exist, the size of the effects would be biased downward.

Analytic Approach

Propensity score analysis using one-to-one nearest-neighbor matching techniques was employed to match Latinx HOP homeowners and non-HOP homeowners on a common set of program characteristics (DHA housing program assignment and duration in program) and participant characteristics (age, gender, educational attainment, immigrant status, marital status, family size, and earnings at the time of home purchase). The characteristics of Latinx HOP-graduate homeowners and non-HOP homeowners before matching are summarized in exhibit 1. Those data suggest that Latinx HOP homeowners are more likely to be male, older, and U.S.-born, with higher levels of educational attainment and higher incomes at the time of purchase than non-HOP homebuyers. In addition, Latinx HOP homebuyers were less likely to reside in conventional, DHA subsidized housing, and their housing tenures in DHA were shorter than those of non-HOP homebuyers. The observed differences between the two groups of Latinx homebuyers underscore the need for propensity score matching to estimate program impacts.

Exhibit 1

Characteristics of Latinx Homeowners at Time of Purchase, by HOP Program Status, Before Matching

Characteristic	Non-HOP homeowner	HOP homeowner
Number of DHA residents	211	95
Female (%)	76.8	91.6
Immigrant (%)	48.3	21.1
Age category		
Less than 24 years old (%)	7.6	2.1
24-33 years old (%)	26.5	31.6
34-43 years old (%)	39.8	44.2
44 year old or older (%)	26.1	22.1
Attained schooling beyond high school (%)	2.4	9.5
Average yearly income (\$)	24,180	36,926
Single parent (%)	65.4	58.9
Family size		
1 (%)	1.4	3.2
2 (%)	16.1	14.7
3 (%)	25.1	22.1
4 (%)	24.2	25.3
5 (%)	18.5	24.2
6 or more (%)	14.7	10.5
Spent 5 years or more in DHA housing (%)	44.5	21.1
Housing in DHA development (%)	40.3	28.4
Purchased home prior to 2006 - start of Great Recession in Denver (%)	87.2	79.0

DHA = Denver Housing Authority; HOP = HomeOwnership Program.

Sources: Data compiled by authors from unpublished administrative data from the Denver Housing Authority; Denver Housing Study Baseline surveys

The impact parameter used in these analyses is the average treatment effect on the treated (ATET), which is estimated using a difference in means across matched samples. The goal is to estimate the average treatment effect of participating in and graduating from the HOP program. Because participation in the program is voluntary and participants have to meet certain milestones along the way to remain eligible, selection bias is a possibility: actual participants in the program might be individuals or households who, in particular, stood to gain from participating in the program, whereas those who did not participate might be individuals who believed the program would not offer much benefit.

For a given individual i and outcome Y , the label $Y_i(1)$ is the value of the outcome for that individual if he or she enrolled in and completed the HOP program, and $Y_i(0)$ is the value of that outcome if not. Only one of those two potential outcomes can be observed for each individual, so the missing outcome has to be estimated using propensity score matching. The following logit regression is estimated using maximum likelihood:

$$\Pr[HOP_i = 1 | \mathbf{x}_i] = f(\beta \mathbf{x}_i) + \eta_i$$

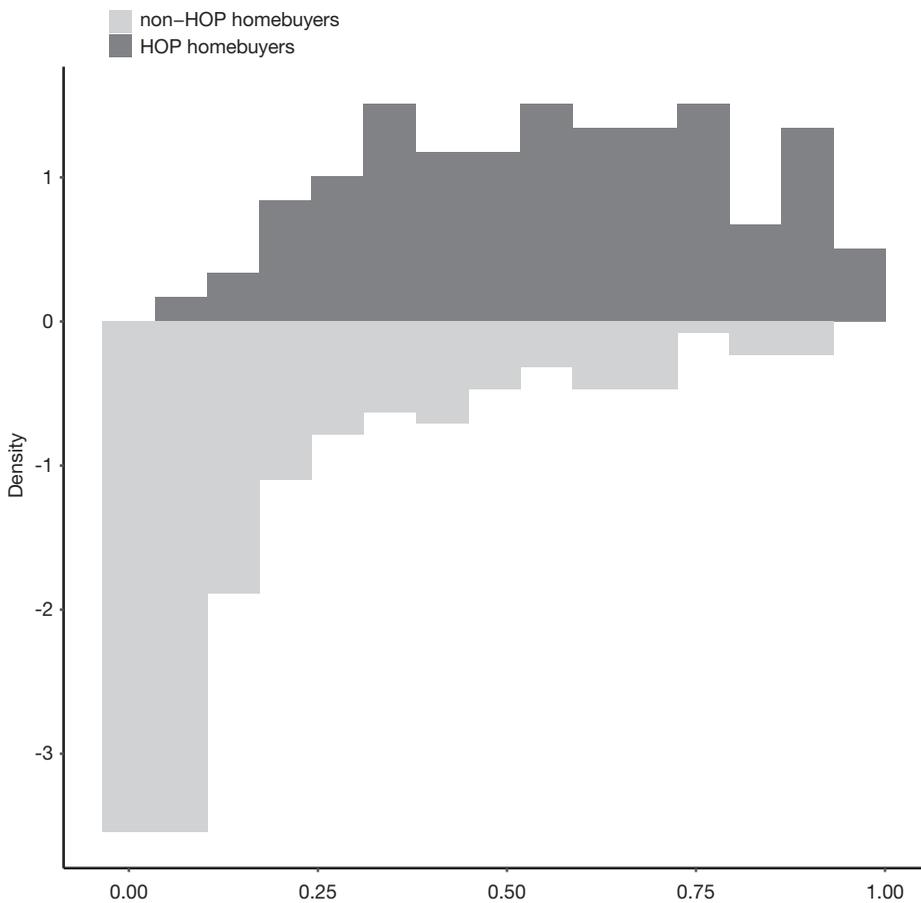
Where HOP_i is an indicator taking on the value 1 if a given individual enrolls in and completes the HOP program, and \mathbf{x}_i is a vector of observable characteristics for each household that help predict whether a given individual participates in the HOP program or not. In particular, the observable characteristics used are demographic, economic, and housing indicators measured before home purchase, many of them discretized to facilitate matching. Those indicators include measures for individual educational attainment beyond high school, the natural log of household income, and a set of demographic indicators for gender, age 40 or older, immigrant status, single parent status, and family size of four or more. DHA program measures include duration of residence in DHA housing greater than 6 years (indicating above-average duration) and whether the homebuyer lived in dispersed housing while in DHA as compared with conventional developments or housing obtained using Housing Choice Vouchers. Finally, an indicator is included that notes whether the house was purchased before 2006, which marks the collapse of the housing market and the start of the Great Recession in Denver.

Having estimated the logit regression, one can then use fitted probabilities for each individual in the sample. Those fitted probabilities are the propensity score—the estimated probability that an individual with the same characteristics would have opted to enroll, participate in, and complete the HOP program. A control group is then created using propensity score matching and the *Match* command in the *Matching* package, version 4.9-9, in R version 4.0.4 (Sekhon, 2011). For each HOP graduate, the single non-HOP graduate with the closest propensity score to the graduate is selected. If nontreated observations are tied as the nearest neighbor for an observation, all are included in the control group but weighted such that the sum of the weights is 1. Thus, the control group approximates the size of the treatment group. The treatment group provides the $Y_i(1)$ directly, and the matched control observation for each treatment provides $Y_i(0)$: the assumption is that the matched observation provides the unobserved potential outcome if that individual had not graduated from HOP. Because each outcome analyzed in this study is estimated for these control groups, and outcomes occurred at times during the homeownership experience, the composition and sample sizes of the treatment and control groups vary by outcome.

Consistent with Abadie and Imbens (2016, 2006), the necessary assumptions of conditional independence, $Y(1), Y(0) \perp HOP | x$, and the common support assumption, $0 < p(x_i) < 1$, are followed. The conditional independence assumption states that after controlling for the selection variables used in the matching process, HOP participant status has no effect on the level of potential outcomes. The common support assumption states that no individual in the sample will either surely choose HOP or surely not choose HOP. Further, the probabilities of treatment are between 0 and 1 (Abadie and Imbens, 2016; Guo and Fraser, 2015; Rosenbaum and Rubin, 1983). No assumption is made about the minimum or maximum probability of treatment between the two groups. The distribution of estimated propensity scores for the HOP and non-HOP groups on the outcome of home value appreciation is shown in exhibit 2 to illustrate that the common support assumption is plausible (common support graphs for all study outcomes are available from the authors upon request).

Exhibit 2

Common Support Graph Depicting Propensity Score Distribution for Annualized Home Value Appreciation Outcome, by HOP Program Status



HOP = HomeOwnership Program.

Source: Data compiled by authors from Real Property records in the respective counties where homes were purchased

This process allows for a straightforward comparison of the means for the treated and control groups to ascertain the average treatment effect on the treated (ATE):

$$ATE = (\bar{Y}_t - \bar{Y}_c)$$

where \bar{Y}_t is the outcome mean in the treated group and \bar{Y}_c the outcome mean in the matched control group.

To assess match quality, the covariate balance for each outcome was verified using standardized differences and variance ratios (Austin, 2009). An illustrative example of this analysis, again using home value appreciation, is presented in exhibit 3; covariate balance tests for all outcomes are available from the authors upon request. Most matching variables are closely balanced following matching, with standardized differences falling within the 0.1 to 0.2 range suggested by Stuart (2019) between the two groups after balancing. One variable did not fall within the suggested range: HOP homeowners were more likely to be immigrants than were the matched comparison group—a standardized difference of 0.31. Although no caliper was explicitly imposed, Rosenbaum and Rubin (1983) suggest that a caliper of 0.25 times the standard deviation of the propensity score is sufficient to reduce bias, and Austin (2009) shows that a caliper of 0.2 times the standard deviation of the propensity score performs well in simulations. Imposing a caliper of that size would not have modified the matches here.

Exhibit 3

Illustrative Covariance Balance Statistics for Propensity Score Matching—Latinx Homeowners

	Standardized differences between treatment and control groups		Variance ratio	
	Raw	Matched	Raw	Matched
Female (%)	0.55	-0.17	0.42	2.22
Age 40 years or older (%)	-0.04	0.01	0.99	1.01
Immigrant (%)	-0.68	0.31	0.67	2.21
Attained schooling beyond high school (%)	0.24	0.00	3.99	1.00
Natural log yearly income	1.40	0.17	0.52	0.93
Single parent (%)	-0.20	0.01	1.10	1.00
Family size four or more (%)	0.11	0.16	0.96	0.95
Dispersed unit (%)	-0.36	-0.09	1.04	0.98
Time in DHA	0.45	0.07	1.04	0.98
Purchased home prior to 2006 (%)	-0.25	-0.03	1.64	1.04
Propensity score matching presented using illustration of covariance balance for annualized home value appreciation of original home				
Number of observations: 270 raw, 172 matched				
Treated observations: 85 raw, 85 matched				
Control observations: 185 raw, 87 matched				
Propensity scores are matched one-to-one with the nearest neighbor. If non-treated observations are tied with the nearest neighbor for an observation, all are included in the control group but weighted such that the sum of weights add to one.				

DHA = Denver Housing Authority.

Source: Data compiled by authors from unpublished administrative data from the Denver Housing Authority

To assess potential bias due to selection on unobserved variation in the treatment assignment process, sensitivity analysis was conducted by calculating Rosenbaum's bounds (DiPrete and Gangl, 2004; Rosenbaum, 2002) using the *rbounds* R package version 2.1 (Keele, 2014). Results for selected variables that were found to be statistically significant are presented in appendix B; full results are available from the authors upon request. Sensitivity analysis evaluates the potential bias in the estimate of the *ATET* based on hypothetical sizes of omitted variable bias in treatment assignment. The null hypothesis of the Wilcoxon signed-rank test is that there is no difference in medians between the treatment and control groups. The hypothetical odds ratios of omitted variables were tested from 1 to 3 in 0.1 increments. Gamma (Γ) values produced by the analysis refer to the odds ratios (OR) of different assignment to treatment due to unidentified covariates. Appendix B reveals that the treatment effect of HOP on receipt of 30-year fixed-rate mortgage terms is insensitive to an omitted variable with an OR as great as 3.0. In addition, the treatment effect of HOP on home value appreciation of the original home is as great as 2.5. In contrast, the *ATET* of HOP for experiencing a foreclosure or selling the original home via a short sale was insensitive to an omitted variable with an OR only as great as 1.4.

A combination of unobserved covariates is unlikely to have an OR as high as 3 for this program intervention after conditioning on gender, age, immigrant status, income, single-parent status, family size, duration in DHA, DHA housing program, and starting year in the program (as is done in this study). An OR of 1.4 is a reasonable size for an omitted variable, however, so we turned to the literature to assess possible sources of omitted variable bias on the experience of foreclosure or selling a home via short sale. One potential omitted variable is self-efficacy, which measures an individual's belief in the ability to successfully complete a task. In earlier work (Santiago and Galster, 2004), the authors developed a nine-item self-efficacy scale that focuses on participant beliefs in their ability to improve financial capability, build assets, complete the homeownership program, and become a homeowner. Unfortunately, that self-efficacy measure was not collected for all homeowners in the *Denver Housing Study* before home purchase because of the addition of the early HOP homebuyers and non-HOP homebuyers starting in 2008. Nonetheless, using a sample of HOP Phase I participants, Santiago and Galster (2004) found that expectations of becoming a homeowner in 5 years were associated with self-efficacy (OR = 1.190). Moreover, expectations of successfully exiting DHA were also associated with self-efficacy (OR = 1.237). In both examples, the magnitude of the OR was less than the gamma values detected in the sensitivity analysis. As a result of those observed effect sizes of potential omitted variables in previous research, the authors contend that the positive and statistically significant outcomes reported here are more likely the result of participating in and completing HOP and less likely caused by the selection process (e.g., differential persistence or self-efficacy). The precision of the estimates for experiencing a foreclosure or short sale should be interpreted with caution, however.

One limitation of this study is the relatively small sample size of Latinx homeowners from which the *ATET* estimates are derived; however, in simulations conducted by Pirracchio, Resche-Rigon, and Chevret (2012), they found that even small sample sizes (~50) did not introduce large biases in the propensity score matching estimators. The relatively small sample size for some of the outcome measures in this study reduces the precision and the ability to detect differences between the treatment and control groups. Nonetheless, the confidence intervals on the estimates, although wide, provide bounds on the size of the differences between the two groups.

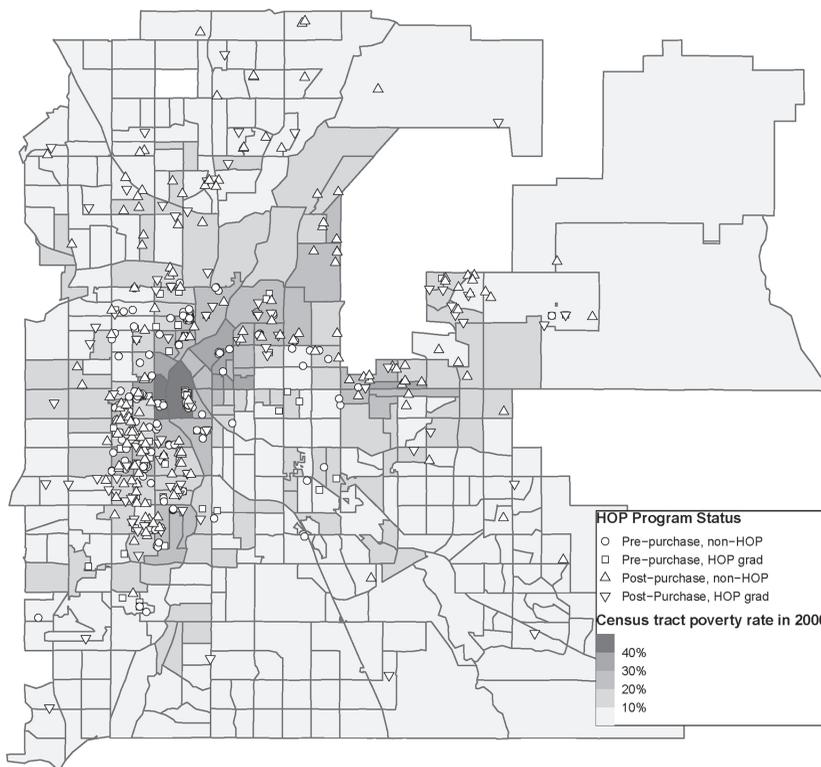
Results

The Spatial Location of Latinx Low-Income Homeowners in Denver

Exhibit 4 shows the residential locations of Latinx low-income homebuyers in the study both before and after purchasing their first homes. Before their purchase, both Latino HOP homebuyers and non-HOP homebuyers resided in subsidized housing units that were clustered in older neighborhoods in West Denver. Some homebuyers resided in neighborhoods with poverty rates that were higher than average for the City and County of Denver (15 percent in 2000), but unlike other large cities in the Northeast and Midwest, little evidence exists of concentrated poverty (> 40 percent) outside one census tract, where one public housing development (Sun Valley) is primarily bounded by railyards. Historically, West Denver was the epicenter of the Latinx enclave—an ethnic settlement spanning multiple generations. DHA housing developments are found in more than 60 percent of all Denver neighborhoods, but larger family units are clustered in North and West Denver. Although home purchases show some degree of clustering in established enclaves across North and West Denver, both Latinx HOP and non-HOP homebuyers also purchased in areas of new housing growth in East and South Denver. Further, both groups of Latinx homebuyers purchased homes in neighborhoods that were home to significant fractions of White homeowners.

Exhibit 4

Pre- and Postpurchase Residential Location of Latinx Homebuyers, by HOP Status



HOP = Home Ownership Program.

Source: Data compiled by authors, Denver Housing Study

Original Mortgage Terms and Conditions

As shown in exhibit 5, the average purchase price that Latinx homeowners paid for their first homes was approximately \$140,000. As a point of reference, the average median home value in the Denver metro area was \$166,600 in 2000. Latinx homeowners had limited equity in their homes at the time of purchase, with loan-to-value (LTV) ratios hovering around 95 percent regardless of HOP program status. Significant differences can be seen, however, between the two groups of Latinx homeowners relative to original mortgage terms and initial mortgage interest rates. Although 97 percent of all Latinx HOP homeowners had 30-year fixed-rate mortgages (the remainder had shorter term fixed-rate mortgages), only 57 percent of non-HOP homeowners did. Non-HOP homeowners typically held subprime adjustable-rate, interest-only, or balloon mortgages. The average interest rate at the time of home purchase was 6.03 percent for HOP homeowners compared with 7.26 percent for non-HOP homeowners. Given differences in the time of purchase, the interest rate spread over the prime rate was also compared using data from FRED (Board of Governors of the Federal Reserve System [US], 2021), but this finding was not statistically significant. Also, one of four HOP homeowners held second mortgages at the time of home purchase, typically silent second mortgages held by the Denver Housing Authority to assist homebuyers by lowering the amount borrowed on their original mortgages.

Exhibit 5

Original Mortgage Terms and Conditions for Latinx Homeowners, by HOP Program Status

Outcome	Mean by HOP Program status		Difference (ATET)	Standard Errors	N of Observations	
	Non-HOP (estimate) [†]	HOP Grad			Treated	Weighted Control
Purchase price of original home (\$)	140,236	138,137	-2,098	9,864	92	92
Original mortgage was 30-year, fixed rate	0.57	0.97	0.40	0.08	89	89
Interest rate at time of purchase (%)	7.26	6.03	-1.23	0.38	82	82
Interest rate spread over prime at time of purchase (%)	-0.26	-0.52	-0.77	-0.51	82	82
Held second mortgage at time of purchase	0.16	0.25	0.09	0.08	85	85

[†]Estimate is difference of value for HOP group and ATET, and has same margin of error as ATET.

ATET = average treatment effect on the treated. HOP = HomeOwnership Program.

Notes: Differences with $p < 0.05$ bolded. Propensity scores are matched one-to-one with the nearest neighbor. If non-treated observations are tied with the nearest neighbor for an observation, all are included in the control group but weighed such that the sum of weights add to one.

Sources: Data compiled by authors using Office of Tax Assessor and Real Property data from the various counties where homes were purchased; unpublished administrative data from the Denver Housing Authority; and data obtained from the Denver Housing Study Baseline survey

Housing and Neighborhood Quality

Given concerns about the quality of housing and neighborhoods that low-income households can afford to purchase, this study used Real Property records, census-derived data, and systematic social observations to assess the conditions of the homes Latinx owners purchased, the physical and social conditions in the immediate neighborhood surrounding their homes, and the characteristics of the larger neighborhoods in which they resided before and at the time of purchase and over time. Those findings are presented in exhibits 6 through 10.

Housing Quality. Exhibit 6 provides a summary of the dwelling and parcel conditions of the homes purchased by Latinx homeowners. Compared with non-HOP homeowners, Latinx HOP homeowners resided in homes that were slightly larger in terms of square footage and the number of bedrooms and bathrooms. The majority of Latinx homeowners purchased single-family homes that were approximately 40 years old at time of purchase.

The 2010–11 systematic social observations included a thorough assessment of the exterior condition of the homes owned by Latinx homeowners and the upkeep of their properties at a point at which the majority of homeowners had resided in their homes for 5 years or more. Overall, Latinx homeowners had homes and yards that were well maintained, but the authors discovered three upkeep areas of significant difference between HOP and non-HOP homeowners. First, nearly 43 percent of the homes owned by HOP homeowners had security bars installed on windows and doors; by contrast, only 15 percent of homes owned by non-HOP homeowners did. Second, non-HOP homeowners were more likely to have windows that were broken, patched, or needing repairs (25 percent) compared with 5 percent of HOP homeowners. Finally, observers noted garbage on 5 percent of the parcels owned by HOP homeowners; none was observed on the non-HOP-owned properties.

Exhibit 6

Dwelling and Parcel Conditions of Homes Purchased by Latinx Homebuyers by HOP Program Status (1 of 2)

	Mean by HOP Program Status			Standard Errors	N of Observations	
	Non-HOP (estimate) [†]	HOP Grad	Difference (ATET)		Treated	Control
Dwelling Characteristics						
Square footage	1,057.9	1154.9	97.0	(45.5)	94	94
Number of bedrooms	2.6	2.8	0.3	(1.2)	94	94
Number of bathrooms	1.4	1.7	0.4	(0.1)	94	94
Has basement	0.4	0.6	0.2	(0.1)	94	94
Age of housing unit at time of purchase (years)	39.8	40.9	1.1	(3.6)	94	94
Type of Dwelling						
Single family home (%)	83.1	91.6	8.5	(7.5)	94	94
Townhome (%)	4.2	3.2	-1.1	(3.0)	94	94
Condo (%)	12.7	5.3	-7.5	(6.1)	94	94
Dwelling Conditions in 2010/2011						
Abandoned property (%)	3.8	0.0	-3.8	(2.5)	79	79
Façade/steps broken, missing or needing repairs (%)	15.0	12.5	-2.5	(6.3)	79	79
Walls with holes, peeling, needing repairs (%)	7.5	5.0	-2.5	(3.5)	79	79
Roofs/gutters with holes, patched, needing repairs (%)	3.8	2.5	-1.3	(3.2)	79	79
Windows broken, patched, needing repairs (%)	25.3	5.0	-20.3	(4.9)	79	79
Security bars on doors/windows (%)	14.7	42.5	27.8	(10.5)	79	79

Exhibit 6

Dwelling and Parcel Conditions of Homes Purchased by Latinx Homebuyers by HOP Program Status (2 of 2)

	Mean by HOP Program Status			Standard Errors	N of Observations	
	Non-HOP (estimate) [†]	HOP Grad	Difference (ATET)		Treated	Control
Parcel Conditions						
Trash (large items) (%)	6.3	2.5	-3.8	(3.7)	79	79
Litter (%)	3.7	6.3	2.5	(3.7)	79	79
Broken glass (%)	0.0	0.0	0.0	(0.0)	79	79
Abandoned or disabled vehicles (%)	0.0	2.5	2.5	(1.8)	79	79
Garbage (%)	0.0	5.1	5.1	(2.4)	79	79
Graffiti (%)	NA	0.0	0.0	NA	79	79
Weeds or lawns needing mowing (%)	17.4	25.0	7.6	(7.7)	79	79

[†]Estimate is difference of value for HOP group and ATET and has same margin of error as ATET.

ATET = average treatment effect on the treated. HOP = HomeOwnership Program.

Notes: Differences with $p < 0.05$ bolded. Propensity scores are matched one-to-one with the nearest neighbor. If nontreated observations are the nearest neighbor for an observation, all are included in the control group but weighted such that the sum of weights add to 1.

Sources: Real Property data; Denver Housing Study systematic social observations conducted by authors (N=202)

Quality of Surrounding Properties. Exhibit 7 provides a snapshot of the dwelling conditions of homes located on the block face where Latinx homeowners had resided for 5 years or more. For the most part, Latinx homeowners lived in areas where their neighbors also maintained the exterior of their homes and yards. Significant differences were found in three areas. First, Latinx HOP homeowners resided in neighborhoods where nearly one-third of the other homes also had installed security bars on their windows and doors; by contrast, bars were found on 24 percent of the homes in the neighborhoods where non-HOP homeowners lived. Second, nearly 3 percent of the homes where non-HOP homeowners lived were vacant and abandoned at the time of the systematic social observations, compared with less than 1 percent in the neighborhoods where HOP homeowners resided—a visible sign of the aftermath of the foreclosure crisis. Third, garbage was found strewn on lawns in about 2 percent of homes neighboring where Latinx HOP homeowners resided; this issue affected less than 1 percent of dwellings near non-HOP homeowners.

Exhibit 7

Dwelling and Parcel Conditions of Homes in the Immediate Neighborhood of Latinx Homeowners, by HOP Program Status, 2010–2011

	Mean by HOP Program Status			Standard Errors	N of Observations	
	Non-HOP (estimate) [†]	HOP Grad	Difference (ATET)		Treated	Weighted Control
Neighborhood Dwelling Conditions						
Abandoned property (%)	2.5	0.8	-1.6	(0.8)	79	79
Façade/steps broken, missing or needing repairs (%)	13.5	11.9	-1.6	(2.6)	79	79
Walls with holes, peeling, needing repairs (%)	5.4	4.4	-1.0	(2.1)	79	79
Roofs/gutters with holes, patched, needing repairs (%)	4.3	2.2	-2.1	(1.4)	79	79
Windows broken, patched, needing repairs (%)	3.4	3.1	-0.3	(1.5)	79	79
Security bars on doors/windows (%)	23.8	32.4	8.6	(3.4)	79	79
Neighborhood Parcel Conditions						
Trash (large items) (%)	2.2	2.8	0.7	(1.2)	79	79
Litter (%)	4.9	3.6	-1.3	(1.1)	79	79
Broken glass (%)	0.3	0.3	0.1	(0.1)	79	79
Abandoned or disabled vehicles (%)	1.0	1.3	0.3	(0.2)	79	79
Garbage (%)	0.8	2.2	1.4	(0.7)	79	79
Graffiti (%)	0.2	0.1	-0.1	(0.1)	79	79
Weeds or lawns needing mowing (%)	26.1	15.7	-10.3	(5.4)	79	79

[†]Estimate is difference of value for HOP group and ATET and has same margin of error as ATET.

ATET = average treatment effect on the treated. HOP = HomeOwnership Program.

Notes: Differences with $p < 0.05$ bolded. Propensity scores are matched one-to-one with the nearest neighbor. If nontreated observations are the nearest neighbor for an observation, all are included in the control group but weighted such that the sum of weights add to 1.

Source: Denver Housing Study systematic social observations conducted by authors (N=202)

Neighborhood Public Infrastructure, Environmental Quality, and Land Use. During the systematic observations, the quality of public infrastructure in the neighborhood, any environmental quality issues, and current land use were documented. As shown in exhibit 8, Latinx homeowners in the study resided in predominantly residential neighborhoods comprising single-family homes, generally well-maintained infrastructure, and few noise or air quality issues. Latinx HOP homeowners resided in neighborhoods with a higher proportion of residential homes (95 percent vs. 90 percent) and a lower proportion of vacant properties (0.1 percent vs. 0.8 percent) than did non-HOP homeowners.

Exhibit 8

Public Infrastructure, Environmental Quality, and Land Use of Neighborhoods of Latinx Homeowners, by HOP Program Status, 2010–2011

	Mean by HOP Program Status			Standard Errors	Observations	
	Non-HOP (estimate) [†]	HOP Grad	Difference (ATET)		Treated	Weighted Control
Public Infrastructure						
Smooth street paving	48.6	57.5	8.9	(11.2)	79	79
Alley has visible trash/junk	12.6	7.5	-5.1	(5.7)	79	79
Environmental Quality						
Noticeable odors (air quality)	2.5	3.8	1.3	(4.6)	79	79
Noise from traffic (freeway or highway)	12.5	16.3	3.8	(8.6)	79	79
Noise from industrial activity	0.0	1.3	1.3	(1.3)	79	79
Noise from freight rail or light rail transit	0.0	2.5	2.5	(1.8)	79	79
Loud music heard	0.0	7.6	7.6	(2.9)	79	79
Other types of noise	5.0	7.5	2.5	(4.2)	79	79
Minimal or no noise	82.6	77.5	-5.1	(9.1)	79	79
Land Uses						
Operating residential frontage (%)	90.4	95.1	4.7	(1.9)	79	79
Operating commercial frontage (%)	2.6	0.9	-1.7	(2.2)	79	79
Operating industrial frontage (%)	0.0	0.3	0.3	(0.2)	79	79
Operating institutional frontage (%)	1.0	0.6	-0.4	(1.1)	79	79
Vacant residential frontage (%)	0.8	0.1	-0.7	(0.3)	79	79
Vacant non-residential frontage (%)	0.0	0.0	0.0	(0.4)	79	79
Transportation rights-of-way frontage (%)	3.9	0.0	-3.9	(2.9)	79	79
Parks, playgrounds, recreational facilities, watercourses, and green spaces (%)	0.0	1.7	1.6	(0.9)	79	79
Other land use (%)	1.4	1.4	0.0	(1.1)	79	79
Single-family homes (%)	68.8	87.1	18.2	(9.5)	79	79

[†]Estimate is difference of value for HOP group and ATET and has same margin of error as ATET.

ATET = average treatment effect on the treated. HOP = HomeOwnership Program.

Notes: Differences with $p < 0.05$ bolded. Propensity scores are matched one-to-one with the nearest neighbor. If nontreated observations are the nearest neighbor for an observation, all are included in the control group but weighted such that the sum of weights add to 1.

Source: Denver Housing Study, systematic social observations

Social Environment of Neighborhoods. During the systematic social observations in Denver, study team members were asked to note the presence of children and adults in the neighborhoods, the presence of others, and the types of activities that occurred during the observation period. Those observations of the neighborhood social environment are summarized in exhibit 9. Overall, the social environment where Latinx homeowners resided was similar for both groups of homeowners. The most frequently observed interactions were adults making home repairs outdoors and children playing in their yards. Children playing under the supervision of their parents was observed more often in neighborhoods where non-HOP homeowners resided (16 percent) than where HOP homeowners resided (8 percent).

Exhibit 9

Neighborhood Social Environment of Latinx Homeowners, by HOP Program Status, 2010–2011

Neighborhood Social Environment	Mean by HOP Program Status				Observations	
	Non-HOP (estimate) [†]	HOP Grad	Difference (ATET)	Standard Errors	Treated	Weighted Control
Security Features						
Presence of any police (%)	0.0	1.3	1.3	(0.8)	0	79
Human Activities						
Presence of children playing in front yard (%)	17.4	22.5	5.1	(6.8)	0.74	79
Presence of children playing on sidewalk or street (%)	3.7	5.0	1.3	(5.0)	0.25	79
Presence of children under adult supervision (%)	16.4	7.5	-8.9	(1.2)	-7.51	79
Presence of children (other) (%)	2.5	1.3	-1.3	(2.2)	-0.58	79
Presence of teenagers	8.6	17.5	8.9	(6.1)	1.45	79
Presence of teenagers in groups of three or more	2.5	1.3	-1.3	(4.3)	-0.30	79
Presence of adults (any)	73.9	65.0	-8.9	(8.9)	-0.99	79
Presence of adults hanging out, loitering	7.6	2.5	-5.1	(3.4)	-1.48	79
Presence of people drinking	0.0	1.3	1.3	(1.3)	0.99	79
Non-English languages heard	1.2	7.5	6.3	(3.4)	0.37	79

[†]Estimate is difference of value for HOP group and ATET and has same margin of error as ATET.

ATET = average treatment effect on the treated. HOP = HomeOwnership Program.

Notes: Differences with $p < 0.05$ bolded. Propensity scores are matched one-to-one with the nearest neighbor. If nontreated observations are the nearest neighbor for an observation, all are included in the control group but weighted such that the sum of weights add to 1.

Source: Denver Housing Study, systematic social observations

Pre- and Postpurchase Neighborhood Conditions. To what extent did Latinx homeowners experience improved neighborhood conditions after moving to their destination neighborhoods? Did prepurchase counseling influence the kinds of destination neighborhoods that homeowners selected? Exhibit 10 provides a summary of the census indicators that described the demographic composition, economic conditions, and housing conditions of the census tracts of both prepurchase and destination neighborhoods. An 11th indicator for suburban residence was added to describe destination neighborhoods. Two indicators require further explanation: neighborhood occupational

prestige and residential instability. Neighborhood occupational prestige serves as a proxy indicator of affluence and reflects the mean level of occupational prestige based on the General Social Survey prestige score, weighted by the observed proportional distribution of occupations of employees within the tract. Scores range from 16 to 80, with higher scores indicating higher prestige. Residential instability reflects the percentage of individuals in the census tract who moved within the past 12 months and serves as an indicator of neighborhood turnover.

Exhibit 10

Pre- and Postpurchase Neighborhood Conditions of Latinx Homeowners, by HOP Program Status

	Mean by HOP Program Status				Observations	
	Non-HOP (estimate) [†]	HOP Grad	Difference (ATET)	Standard Errors	Treated	Weighted Control
Neighborhood Characteristics While Residing in DHA						
African-American residents (%)	5.9	7.1	1.2	(1.9)	94	94
Foreign-born residents (%)	30.2	24.4	-5.8	(2.4)	94	94
Female-headed households (%)	34.0	34.0	0.0	(2.7)	94	94
Poverty rate (%)	13.1	13.7	0.7	(2.5)	94	94
Unemployment rate (%)	8.6	9.5	0.9	(1.1)	94	94
Occupational prestige	37.0	37.8	0.8	(0.6)	94	94
Housing built before 1940 (%)	26.0	27.1	1.1	(3.2)	94	94
Renters (%)	37.4	34.1	-3.3	(3.1)	94	94
Vacancy rate (%)	2.3	3.5	1.3	(0.5)	94	94
Residential instability (%)	25.1	26.0	0.8	(1.7)	94	94
Characteristics of Destination Neighborhoods						
African-American residents (%)	6.0	9.4	3.3	(4.2)	94	94
Foreign-born residents (%)	19.3	21.3	2.0	(2.4)	94	94
Female-headed households (%)	23.1	26.8	3.7	(2.2)	94	94
Poverty rate (%)	10.7	13.7	3.0	(1.5)	94	94
Unemployment rate (%)	5.3	6.5	1.1	(0.5)	94	94
Occupational prestige score	38.5	37.9	-0.7	(0.8)	94	94
Housing built before 1940 (%)	8.4	12.3	3.9	(2.1)	94	94
Renters (%)	32.1	34.1	2.1	(2.4)	94	94
Vacancy rate (%)	2.2	2.8	0.7	(0.4)	94	94
Residential instability (%)	24.6	24.5	0.0	(1.5)	94	94
Suburban place of residence (%)	58.1	32.6	-25.5	(8.2)	94	94

[†]Estimate is difference of value for HOP group and ATET and has same margin of error as ATET.

ATET = average treatment effect on the treated. DHA = Denver Housing Authority. HOP = HomeOwnership Program.

Notes: Differences with $p < 0.05$ bolded. Propensity scores are matched one-to-one with the nearest neighbor. If nontreated observations are the nearest neighbor for an observation, all are included in the control group but weighted such that the sum of weights add to 1.

Sources: Geolytics National Change Database, 1970-2010; American Community Surveys, 2009-2018

Before home purchase and while living in DHA, Latinx homeowners resided in neighborhoods that were predominantly White but with large proportions of immigrants and female-headed households. Those neighborhoods had lower levels of occupational prestige, poverty rates hovering around

13 percent, and unemployment rates around 9 percent. Prepurchase neighborhoods had high proportions of renters, residential instability, and older housing stock. Vacancy rates were under 4 percent and were even lower in neighborhoods where non-HOP homebuyers resided while in DHA.

The postpurchase destination neighborhoods where Latinx homeowners lived during the 2010s suggest that buyers made decisions to move to more ethnically and income-diverse locations. Destination neighborhoods were still predominantly White but with slightly higher fractions of African-American residents and lower fractions of foreign-born residents. Fewer households were headed by females, and unemployment rates were lower. Latinx homeowners resided in newer subdivisions in the suburbs with fewer older housing units and low vacancy rates. Suburban residence was significantly higher for non-HOP homeowners who were encouraged to move into those higher priced neighborhoods whether they could afford the housing or not. Although the destination neighborhoods where Latinx HOP homeowners resided had higher poverty and unemployment rates than those of their non-HOP counterparts, HOP counseling would have assessed characteristics such as housing affordability and quality vis a vis other neighborhood conditions.

Mortgage Loan Refinancing and Modifications

As shown in exhibit 11, no statistically significant differences exist between Latinx HOP homeowners and non-HOP homeowners relative to mortgage loan refinancing and modifications. Between 21 and 25% of Latinx homeowners had mortgages that exceeded the value of their homes; those underwater mortgages were inextricably linked to the collapse of the housing market and the subsequent drop in home values during the Great Recession. Nearly one-half of non-HOP homeowners and one-third of HOP homebuyers had refinanced their original mortgages, and about one-half had modified their loans since purchasing their homes. In addition, slightly more than 10 percent of Latinx homeowners had modified their mortgage loans two or more times since purchase.

Exhibit 11

Refinancing and Loan Modifications to Original Mortgages by HOP Program Status

Outcome	Mean by HOP Program Status			Standard Errors	N of Observations	
	Non-HOP (estimate) [†]	HOP Grad	Difference (ATET)		Treated	Weighted Control
Original mortgage was "underwater"	0.21	0.24	0.02	0.08	89	89
Refinanced original mortgage	0.46	0.31	-0.16	0.11	85	85
Any loan modification	0.54	0.48	-0.06	0.11	85	85
Two or more loan modifications	0.16	0.10	-0.05	0.07	86	86

[†]Estimate is difference of value for HOP group and ATET and has same margin of error as ATET.

ATET = average treatment effect on the treated. HOP = HomeOwnership Program.

Notes: Differences with $p < 0.05$ bolded. Propensity scores are matched one-to-one with the nearest neighbor. If nontreated observations are the nearest neighbor for an observation, all are included in the control group but weighed such that the sum of weights add to 1.

Source: Data compiled by authors from Real Property information obtained from the counties where homes were purchased

Sustainability of Homeownership

The extant literature has underscored the precarity of low-income homeownership, often pointing to housing tenures that are cut short by unexpected familial and economic shocks and through limited gains in home value appreciation. In 2018, slightly less than one-half of the Latinx homeowners in the study still resided in their original homes (see exhibit 12). They had owned their homes, on average, for more than a decade, but those who had participated in the HOP program resided in their homes about 2 years longer. Moreover, one-third of Latinx HOP homeowners and one-fifth of non-HOP homeowners had sold their original homes by 2018. About 15 percent of HOP homeowners went on to purchase subsequent homes—twice as many as non-HOP homeowners. Although not statistically significant, approximately one-half of Latinx homesellers returned to renting after the sale of their original homes.

Latinx HOP homeowners also saw significantly higher home value than did non-HOP homeowners. In 2018, the value of the original homes owned by Latinx HOP homeowners was \$58,000 more than that of their non-HOP counterparts (\$321,653 vs. \$263,142). Home value appreciation since the time of purchase was approximately 43 percent higher for HOP homeowners than for non-HOP homeowners (\$185,210 vs. \$128,630). Moreover, Latinx HOP homeowners saw an average annualized home value appreciation of \$12,212 compared with \$8,527 for non-HOP homeowners. As a point of reference, the 2018 median home value in the rapidly appreciating seven-county metro Denver region was \$409,000, which suggests that although Latinx homeowners have homes that are appreciating, the rate of appreciation is still lower than that experienced by other homeowners in the region. The gap was narrower for HOP homeowners, though.

Exhibit 12

Indicators of Homeownership Sustainability by HOP Program Status Foreclosures and Short Sales

Outcome	Mean by HOP Program Status			Standard Errors	N of Observations	
	Non-HOP (estimate) [†]	HOP Grad	Difference (ATET)		Treated	Weighted Control
Total years of home ownership	10.4	12.1	1.7	1.5	93	93
Lived in original home in 2018 (%)	48.4	49.5	1.1	11.7	93	93
Original home appreciation (\$) (if homeowner still in OH in 2018)	128,630	185,210	56,580	24,265	47	47
Original home appreciation (annualized) (\$) (if homeowner still in OH in 2018)	8,527	12,212	3,684	1,957	47	47
Value of original home in 2018 (if still homeowner of record)	263,142	321,653	58,512	21,122	47	47
Sold original home (%)	18.8	32.3	13.4	9.8	93	93
Has purchased a second home (%)	7.0	14.0	7.0	7.0	93	93
Has purchased a third home (%)	0.0	1.1	1.1	1.6	93	93

[†]Estimate is difference of value for HOP group and ATET, and has same margin of error as ATET.

*Last home value of original home is 2018 if still owned; otherwise, it was the last recorded value until time of foreclosure or sale.

ATET = average treatment effect on the treated. HOP = HomeOwnership Program. OH = original home.

Notes: Differences with $p < 0.05$ bolded. Propensity scores are matched one-to-one with the nearest neighbor. If nontreated observations are the nearest neighbor for an observation, all are included in the control group but weighed such that the sum of weights add to 1.

Sources: Data compiled from Office of Tax Assessor and Real Property in the counties where homes were purchased

By the end of 2018, about 20 percent of all Latinx homeowners in the study had lost their homes to foreclosure, with the majority occurring between 2006 and 2010, at the height of the Great Recession in Denver (exhibit 13). By 2018, an additional 3 percent of HOP homeowners and 27 percent of non-HOP homeowners had executed a short sale to avoid foreclosure. Combined housing losses to foreclosures or short sales, therefore, were significantly higher among non-HOP homeowners. The probability of foreclosure or short sale for non-HOP homeowners was 25 percentage points higher than for HOP homeowners.

Exhibit 13

Foreclosures Experienced by Latinx Homeowners through 2018 by HOP Program Status

Outcome	Mean by HOP Program Status			Standard Errors	N of Observations	
	Non-HOP (estimate) [†]	HOP Grad	Difference (ATET)		Treated	Weighted Control
Ever foreclosed original home	0.20	0.19	-0.01	0.08	89	89
Foreclosed or made a short sale	0.47	0.22	-0.25	0.10	89	89
Sold original home	0.18	0.26	0.08	0.08	89	89

[†]Estimate is difference of value for HOP group and ATET, and has same margin of error as ATET.

ATET = average treatment effect on the treated. HOP = HomeOwnership Program.

Notes: Differences with $p < 0.05$ bolded. Propensity scores are matched one-to-one with the nearest neighbor. If nontreated observations are the nearest neighbor for an observation, all are included in the control group but weighted such that the sum of weights add to 1.

Source: Data compiled by authors from Real Property and Office of Tax Assessor in the counties where homes were purchased

Exhibit 14 examines more closely the timing of first home purchases, foreclosures, and short sales. Latinx homebuyers who purchased their homes before 2000 experienced few foreclosures or short sales before 2006, and those that occurred were tied to the deaths of primary wage earners. Most foreclosures and short sales for those early Latinx homebuyers occurred between 2006 and 2010. By 2018, nearly 19 percent of pre-2000 Latinx homebuyers had lost their homes. By contrast, almost 48 percent of Latinos who purchased their homes between 2001 and 2005 lost them to foreclosure or short sale by 2018, with most occurring during the Great Recession. Although significantly fewer Latinos purchased homes during the Great Recession than in previous periods, approximately two-thirds were still homeowners in 2018, whereas 28 percent lost their homes during the Great Recession and post-Recession recovery. Latinx homebuyers in the 2001–05 period purchased homes at the top of a housing bubble in Denver and—based on a review of Real Property administrative data and retrospective survey data—with predatory loan products. When the housing bubble burst in 2006, the housing market in Denver plummeted and triggered a massive wave of foreclosures, which prompted the start of the Great Recession in Denver much earlier than in other metro areas in the United States.

Exhibit 14

Timing of First Home Purchases and Foreclosures or Short Sales Robustness Checks

Year Purchased	Total Purchased	Never Foreclosed or Sold Short	Foreclosure or Short Sale Pre-2000	Foreclosure or Short Sale 2001-2005	Foreclosure or Short Sale 2006-2010	Foreclosure or Short Sale Post 2010	% Foreclosed or Sold Short
Pre 2000	118	96	1	3	16	3	18.6
2001-2005	139	73		15	44	7	47.5
2006-2010	46	33			6	7	28.3
Total	303	202	1	18	66	17	33.3

Sources: Data compiled by authors from Office of Tax Assessor and Real Property records in the counties where homes were purchased

As a robustness check, ordination least squares (OLS) regression models were estimated with fixed effects for the year of purchase and robust standard errors to predict whether completion of the HOP program was associated with obtaining a 30-year fixed-rate mortgage, owning the original home in 2018, experiencing a foreclosure or short sale, and home value appreciation by 2018. The results of those analyses are found in exhibit 15. The overall model Adjusted R² values ranged from 0.015 to .328, and the models were statistically significant for predicting a 30-year fixed-rate mortgage, ever experiencing a foreclosure or short sale, and home value appreciation. Compared with Latinx non-HOP homeowners, HOP homeowners had a 27 percent higher probability of obtaining a 30-year fixed-rate mortgage and a 16 percent higher probability of still owning their original home in 2018, although those coefficients were marginally significant (p < .10). HOP homeowners also were 21 percent less likely to have experienced a foreclosure or short sale (p < .01) by 2018. Being an HOP graduate had no effect on home value appreciation between the time of purchase and 2018 for those Latinx homebuyers who still owned their original homes.

Exhibit 15

OLS Regressions Predicting Selected Homeowner Outcomes

Selected Characteristics	Ever Foreclosed or Sold Short		Lived in Original Home in 2018		Mortgage was 30 Years, Fixed Rate		Original Home Appreciation (Still in OH in 2018 Only)	
Homebuyer Characteristics								
HOP graduate	-0.21	*** (0.08)	0.16	* (0.08)	0.27	*** (0.06)	15931.10	(15994.76)
Age 40 or older	0.03	(0.06)	0.05	(0.07)	0.08	(0.05)	-8016.76	(10522.75)
Female	-0.06	(0.09)	0.03	(0.10)	-0.01	* (0.07)	-4036.07	(29726.65)
Immigrant	-0.06	(0.06)	-0.03	(0.07)	0.04	(0.05)	-263.98	(14006.94)
Educational attainment of HS degree or higher	0.04	(0.12)	-0.16	(0.14)	-0.07	(0.12)	-34989.85	(23126.44)
Household Characteristics at Time of Move-in								
Single parent	-0.03	(0.08)	0.02	(0.08)	-0.04	(0.05)	21574.08	(16906.85)
Family size >= 4	-0.11	* (0.07)	0.04	(0.07)	-0.01	(0.05)	4014.43	(11681.01)
Household income (ln)	0.05	(0.08)	-0.04	(0.08)	-0.03	(0.07)	-9836.64	(17163.15)
DHA Program Characteristics								
Duration in DHA greater >= 6 years	-0.01	(0.06)	0.02	(0.06)	-0.08	* (0.05)	-2161.20	(11530.98)
27	-0.10	(0.06)	0.08	(0.07)	-0.05	(0.05)	-8105.68	(11521.54)
Fixed effects for year of purchase	YES		YES		YES		YES	
N	270		270		275		122	
R2	0.202		0.110		0.257		0.467	
Adjusted R2	0.117		0.015		0.179		0.328	
F-statistic	2.365	***	1.159		3.292	***	3.362	***
df	26; 243		26; 243		26; 248		25; 96	

*p<0.1; **p<0.05; ***p<0.01, based on robust standard errors.

DHA = Denver Housing Authority. HOP = HomeOwnership Program. OH = original home. OLS = ordinary least squares.

Source: Data compiled by authors

Conclusions, Caveats, and Implications

Many concerns have been raised about the long-term viability of homeownership for low-income, minority households, especially given the devastating impact that the housing market crash and subsequent Great Recession had on those families. Numerous scholars (e.g., Bayer, Ferreira and Ross, 2016; Bocian, Li and Ernst, 2010; Garriga, Ricketts, and Schlagenhauf, 2017; Immergluck, Earl, and Powell, 2019; Reid et al., 2017) have underscored the disproportionate losses experienced by Latinx homeowners—losses facilitated by predatory practices in the housing and mortgage lending markets that took advantage of vulnerable and uninformed prospective buyers. Scholars, community leaders, and policymakers have called for the use of homebuyer education and counseling programs as tools to combat such predation. Although those programs have garnered considerable attention and popularity in light of the Great Recession, findings about their impact are mixed. Information is lacking about the long-term impact of those programs for sustaining homeownership and good housing and neighborhood quality. Also, the effectiveness of those programs across various groups of prospective homebuyers has been woefully understudied. Of particular relevance to this study, there is a dearth of empirical evidence that assesses the impact of homebuyer education and counseling for Latinx homebuyers.

This study has addressed several of those gaps by examining the impact of HOP, an innovative public housing authority-administered homebuyer education and counseling program in Denver. Using data from 303 low-income homebuyers who left public housing for homeownership, the authors were able to test for program impacts on a wide array of outcomes and over durations that are much longer than prior studies. Homeownership outcomes were assessed for 95 Latinx homebuyers who participated and completed HOP and a comparison group of 208 non-HOP homebuyers who were matched using propensity score techniques.

HOP homebuyers benefited from securing 30-year fixed-rate mortgages and lower interest rates at the time of purchase and avoiding the risky loan products that were more common among non-HOP homebuyers in this study and among Latinx homebuyers in general (Garriga, Ricketts, and Schlagenhauf, 2017; Immergluck, Earl, and Powell, 2019; NCRC, 2020). Overall, Latinx homebuyers experienced positive gains with moves to their postpurchase destination neighborhoods within the Denver metropolitan area, buying homes that were of good quality in neighborhoods with increasing home values. At least in the case of Denver, some of the fears expressed by scholars and policymakers—particularly about the limited wealth-building capacity and returns to minority homeownership (e.g., Kochhar, Fry, and Taylor, 2011; Shapiro, 2006; Thomas, Mann, and Meschede, 2018)—have been allayed, although those gains still lag behind the average for the metropolitan area. Latinx homebuyers in this study also experienced high rates of foreclosures or short sales, however, triggered primarily during the Great Recession, and at levels that were even higher than those estimated by Garriga, Ricketts, and Schlagenhauf (2017) and Reid and colleagues (2017). The rate of default and short sales was significantly lower for HOP homeowners—most likely tied to the better mortgages they secured at the time of purchase and their access to HOP counseling assistance after home purchase when owners ran into difficulties. Those lower default rates associated with completion of homeownership education and counseling are consistent with findings reported by Avila, Nguyen, and Zorn (2013); Mayer and Temkin (2016); and Temkin et al. (2014).

The findings here also are consistent with previous studies that suggest homebuyer education and counseling can mitigate the risks associated with homeownership among vulnerable homebuyers, especially low-income minority homebuyers (see Parrott and Payano, 2016; Santiago, Galster, and Smith, 2017; Stochak, Young, and McCargo, 2019). Further, the findings suggest that program impacts may endure long beyond the early years of homeownership. The authors conclude that completion of HOP seems to have facilitated the long-term viability of homeownership for low-income Latinx homeowners compared with their non-HOP peers by significantly increasing the duration of homeownership tenure; facilitating the purchase of homes in neighborhoods that experienced significant appreciation in home equity; and decreasing the likelihood of housing loss through foreclosure or short sale. The impacts observed may be tied to counseling that emphasizes how to make sound home purchases and navigating the mortgage lending process, the assistance that HOP provides in securing the most favorable mortgage terms and conditions possible, and the open-door policy at DHA that has enabled HOP graduate homebuyers to seek assistance when issues have surfaced after home purchase.

Caveats

The authors offer several contextual comments so the study results can be interpreted with proper caution. First, the study is based on a sample of Latinx former recipients of subsidized housing in Denver. About one-third of them participated in HOP, and the remainder did not; however, all of those individuals went on to purchase their homes. The experiences of the Latinx homebuyers observed in this study are not representative of all Latinx homebuyers or all low-income homebuyers, nor are they representative of all households receiving rental housing assistance.

In addition, the vast majority of HOP participants never complete the program, and completion rates are similar to what has been reported for other programs nationally. Findings from previous work suggest that participants acquire financial capability skills that they take with them even if they do not complete the HOP program (see Santiago and Leroux, 2021). Earlier analyses of HOP attrition (Santiago and Galster, 2008) suggest three critical transition points for HOP participants: at 4 months after program entry, at 12 months, and then at 24 months. Early program exiters leave primarily because of program noncompliance—for example, they failed to comply with DHA or Housing Choice Voucher (HCV) housing regulations, did not complete required documentation, or did not attend the required HOP orientation and money management assessment sessions. Program exiters at 12 months or between years one and two of the program often are associated with positive program exits—for example, those individuals move into private rentals because of increasing income or relocate for job or educational opportunities. Participants who leave HOP toward the end of their program but before completion often have experienced familial or economic shocks that have to be resolved before they resume homebuyer activities. Previous work (Santiago, Galster, and Smith, 2017) suggested streamlining or automating ways in which participants can meet HOP requirements, particularly through the use of online forms and program options, and making available other forms or formats of homebuyer education and counseling to increase access. That suggestion has already happened with the introduction of the 1-day Colorado Housing and Finance Authority (CHFA) course that DHA administers to first-time homebuyers

in the Denver metropolitan area and was required for all current HOP participants or interested homebuyers during the past 15 months because of the COVID-19 pandemic.

Finally, our analyses are still based on relatively small, matched samples of fewer than 100 participants in treatment and control groups. Although Pirracchio, Resche-Rigon, and Chevret (2012) found that sample sizes lower than these did not introduce large biases in the propensity score matching estimators, some of these parameters are measured less precisely and could contribute to the inability to detect differences between the treatment and control groups for some outcomes that may be significant.

Implications for Homebuyer Education and Counseling Programs

The findings of this study suggest several strengths of homebuyer education and counseling programs such as HOP for Latinx and other minority homebuyers. Because Latinx HOP homebuyers experienced superior home value appreciation relative to their non-HOP peers, the efforts by HOP to educate new buyers about desirable dwelling and neighborhood conditions seem to have been successful. Moreover, the ability of HOP to arrange for downpayment assistance and favorable mortgage financing at fixed rates provided Latinx homebuyers with the strong financial foundation needed to build sustainable homeownership and mitigate against foreclosure or short sales. Finally, the HOP program delivery model suggests the utility of a multipronged approach to low-income homeownership that includes (1) pre- and postpurchase financial capability and asset-building activities, such as money management and credit counseling; (2) pre- and postpurchase homebuyer education and counseling, including home maintenance and repairs that foster home value appreciation; (3) savings incentives, such as matched savings accounts and escrow accounts; and (4) fixed-rate mortgages at reasonable interest rates. For Latinx homebuyers, this type of homebuyer education and counseling program can lead to sustaining *hogar dulce hogar* (home sweet home).

Appendix A

**DENVER HOUSING STUDY
HOMEOWNERS
STREET OBSERVATION FORM**

DHS ID:		ADDRESS	
DATE:		NEIGHBORHOOD	
COMPLETED BY:		CENSUS TRACT	
TIME OF DAY:		WEATHER CONDITIONS AT TIME OF SURVEY	

- 1a. To access the block, did you need to pass through a single entrance to the community?
 - No
 - Yes
- 1b. **If Yes:** Was this entrance staffed by security?
 - No
 - Yes
2. Condition of street paving on block [check one]:
 - Holes in pavement large enough to cause potential harm to vehicles, bikes or pedestrians
 - Some minor holes, bumps, cracks or irregularities in pavement
 - Consistently smooth surfaces
 - Under construction/resurfacing
 - Street not paved
3. Sidewalks: Does block have paved sidewalks?
 - No
 - Yes
4. Condition of alleys [check one]:
 - Alleys contain sufficient trash, junk, etc. to impede traffic
 - Alleys contain visible trash, junk, etc. but not enough to impede traffic
 - Alleys do not contain visible trash, junk, etc.
 - Does not have alleys
5. Air Quality: Are there any noticeable odors on the block face from within your car, such as smoke, chemicals, sewers, garbage, etc.?
 - No
 - Yes
6. Noise Quality: Can noise from any of the following sources be heard on the block face from within your car:
 - Traffic from a limited-access (freeway) highway?
 - Industrial activity?
 - Freight rail or light-rail transit services?
 - Other, please specify: _____
 - There is minimal/no noise on the block face from within the car.
7. What is the approximate share of the frontage of the block face (both sides, including corners) constituting:
[NOTE: in Q. 7, "frontage" means the linear footage, not the number of parcels]

LAND USE	PERCENT
Operating (occupied or vacant but ready for occupancy) residential properties	_____ %
NON-operating (abandoned) residential properties	_____ %
Operating commercial or retail (stores, offices, gas stations) buildings	_____ %
Operating industrial, construction or transportation buildings	_____ %
Operating institutional (schools, hospitals) buildings	_____ %
NON-operating (closed or abandoned) non-residential buildings-facilities of all types	_____ %
Transportation rights-of-way (major roads, railroads)	_____ %
Parks, playgrounds, recreational facilities, green space, watercourses	_____ %
Other land uses not noted (Write in):	_____ %
Note: the above percentages must sum to 100% [ensure that they do]	
	_____ %

8. Density: What percentage of the Residential Parcels (multifamily building=one parcel) are single-family detached homes?
 _____ %

**DENVER HOUSING STUDY
HOMEOWNERS
SOCIAL OBSERVATION FORM**

DHS ID:		ADDRESS	
DATE:		NEIGHBORHOOD	
COMPLETED BY:		CENSUS TRACT	
TIME OF DAY:		WEATHER CONDITIONS AT TIME OF SURVEY:	

1. Did you see a **police officer** on the block face?
(CIRCLE ALL THAT APPLY)
 - In a vehicle..... 1
 - On a bicycle/horseback..... 2
 - On foot..... 3
 - Did not see a police officer..... 9

2. Did you see any **private security guards** on the block face?
 - Yes..... 1
 - No..... 0

3. Did you see any **children** on the block face?
(CIRCLE ALL THAT APPLY)
 - Playing in the front private yards..... 1
 - Playing on the sidewalk or in the street..... 2
 - Under adult supervision/accompanied by an adult 3
 - Arguing, fighting, acting hostile or threatening... 4
 - Saw children but not in above activities..... 5
 - Did not see any children..... 9

4. Did you see any **teenagers** on the block face?
 - Yes..... 1
 - No (GO TO 9)..... 0

5. Did you see any **teenagers in groups** of three or more?
 - Yes..... 1
 - No (GO TO 9)..... 0

6. Were teenagers in the groups you saw **male, female, or mixed**?
 - All male..... 1
 - All female..... 2
 - Mixed male/female..... 3
 - Did not see teenagers in peer groups..... 9

7. Did you see teenagers in the group who were...?
(CIRCLE ALL THAT APPLY)
 - Wearing the same style clothes?..... 1
 - Wearing the same color(s)?..... 2
 - Wearing the same insignia?..... 3
 - Wearing the same hats, jewelry, or shoes?.... 4
 - Saw teenagers in groups but none of the above..... 5
 - Did not see any teenagers in groups..... 9

8. Did any of the groups of teens you saw appear to be a **gang**?
 - Yes..... 1
 - No..... 0
 - Did not see teenagers in groups..... 9

9. Did you see any **adults** on the block face?
 - Yes..... 1
 - No (GO TO 12)..... 0

10. Did you see any adults on the block face **loitering, congregating or hanging out**?
 - Yes..... 1
 - No..... 0

11. Did you see any **prostitutes** work on the block face?
 - Yes..... 1
 - No..... 0

12. Did you see any **homeless** people or people **begging** on the block face?
 - Yes..... 1
 - No..... 0

13. Did you see people who were **selling illegal drugs** on the block face?
 - Yes..... 1
 - No..... 0

14. Did you see any people drinking **alcohol** openly on the block face?
 - Yes..... 1
 - No..... 0

15. Did you see any **drunken** or otherwise **intoxicated people** loiter on the block face?
 - Yes..... 1
 - No..... 0

16. Did you hear **loud music** playing from boom boxes or any of the buildings on the block face?
 - Yes..... 1
 - No..... 0

17. Did you hear or see another **language** other than English on the block face? *(CIRCLE ALL THAT APPLY)*
 - Heard or saw other language(s) but don't know which one..... 01
 - Spanish..... 02
 - Other, Specify..... 03
 - No people around or did not hear or see any non-English language(s)..... 99

Appendix B. Rosenbaum Sensitivity Analysis for Selected Significant Outcomes

Original Mortgage Terms: 30-year Fixed Rate

Gamma	Lower Bound Significance Level	Upper Bound Significance Level
1.00	0	0
1.10	0	0
1.20	0	0
1.30	0	0
1.40	0	0
1.50	0	0
1.60	0	0
1.70	0	0.00001
1.80	0	0.00002
1.90	0	0.00004
2.00	0	0.00007
2.50	0	0.00065
3.00	0	0.00303

Experienced Foreclosure or Sold Original Home via Short Sale

Gamma	Lower Bound Significance Level	Upper Bound Significance Level
1.00	0.00227	0.00227
1.10	0.00079	0.00589
1.20	0.00028	0.01293
1.30	0.0001	0.02486
1.40	0.00004	0.04295
1.50	0.00001	0.06803
1.60	0	0.10032
1.70	0	0.13946
1.80	0	0.18456
1.90	0	0.23438
2.00	0	0.28748
2.50	0	0.55549
3.00	0	0.75676

Home Value Appreciation of Original Home		
Gamma	Minimum Significance Level	Maximum Significance Level
1	0	0
1.1	0	0
1.2	0	0
1.3	0	0
1.4	0	0
1.5	0	0.0001
1.6	0	0.0002
1.7	0	0.0005
1.8	0	0.001
1.9	0	0.0018
2	0	0.0032
2.5	0	0.0234
3	0	0.0803

Note: 1 gamma = odds of differential assignment because of unobserved factors.

Source: Data compiled by authors

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