

Cityscape

*A Journal of Policy
Development and Research*

HOUSING TENURE AND FINANCIAL SECURITY
VOLUME 22, NUMBER 1 • 2020



PD&R



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U.S. Department of Housing and Urban Development
Office of Policy Development and Research

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Symposium

Symposium on Housing Tenure and Financial Security

*Guest Editors: Jaclene Begley, Christopher Herbert,
Michael LaCour-Little, Kristin Perkins, and Jonathan Spader*

Guest Editors' Introduction

Symposium on Housing Tenure and Financial Security

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Disclaimer: The views expressed are the authors' alone and not those of Fannie Mae, the Federal Housing Finance Agency, or the U.S. Census Bureau. Jonathan Spader's contributions to this article were conducted at the Joint Center for Housing Studies prior to his current employment at the U.S. Census Bureau.

Homeownership has long been a central pillar of financial security for American families. The inclusion of homeownership in the American Dream reflects its close association with wealth creation and residential stability. A decade after the depths of the foreclosure crisis, however, important questions remain about the reliance of U.S. households on homeownership, the different financial options for achieving homeownership, and homeownership's role in facilitating wealth building and financial security.

Emerging issues also raise important questions about the future role of homeownership in the lives of American families. For example, which barriers currently limit households' access to homeownership? What is the role of affordable homeownership programs and non-traditional lending in facilitating homeownership? What are the recent homeownership experiences of low- and moderate-income households? What are the implications of these and other questions for housing policy?

These questions illustrate the need for insight into the breadth of households' experiences with homeownership in recent years. To examine these questions, Fannie Mae and the Harvard Joint

Center for Housing Studies (JCHS) organized a symposium to analyze the evolving relationship between tenure choice and financial security. Held in March 2019 on the campus of Harvard University, the symposium invited the submission of papers that explored the relationship between homeownership and wealth, barriers to mortgage credit availability and homeownership sustainability, alternative tenure and financing options, and the homeownership experiences of older adults and other subpopulations of specific interest.¹ The symposium section in this issue includes a selection of the papers first presented and discussed at that event; each paper describes homeowners' experiences and the operation of mortgage and housing markets in recent years.²

In the first article, "Mortgage Journeys: A Video Ethnography of the Homebuying and Mortgage Process," authors Jefferson and Thomas discuss findings from their ethnographic study that followed low- and moderate-income prospective first-time homebuyers through the home purchase process. The authors specifically focused on mortgage shopping behaviors, which prior research shows have the potential to reduce homeowner costs and facilitate long-term financial security. Their approach identified five major influences on potential homebuyers' attitudes toward mortgage shopping: social networks, real estate professionals, downpayments, time and technology, and participants' financial self-perception. The authors also documented and examined the extent to which participants deviated from recommended mortgage shopping practices; they found this often occurred during the last and most stressful purchasing phase, when mortgage shopping may be most beneficial.

The second and third studies in the symposium examine geographic lending patterns in land contracts and in loans backed by the U.S. Department of Veterans Affairs (VA), respectively, both of which have shown consistent growth during the past decade. In "The American Dream or Just an Illusion? Understanding Land Contract Trends in the Midwest Pre- and Post-Crisis," authors Carpenter, George, and Nelson use a unique proprietary data source to document the growth of land contract activity in six Midwestern states and to examine the extent to which land contracts are concentrated in disadvantaged neighborhoods. The study finds that contract-for-deed usage varies greatly by area, and it tends to be more concentrated in neighborhoods with lower incomes, higher shares of non-White residents, higher rates of vacancy, and less access to traditional mortgage credit. When compared with mortgaged sales, contracts for deed are more likely to be entirely financed and have sales prices that fall below mortgaged sale prices. The results point to the need for greater consumer protection for buyers and greater access to mortgage credit for potential homebuyers purchasing homes valued below \$75,000.

In "Institutions and Geographic Concentration in VA Mortgage Lending," authors Spitzer and Lambie-Hanson examine the role of institutions and geography in determining patterns of VA lending—an important segment of the mortgage market on which limited research has focused. Building on the literature on the importance of institutions and their physical presence in local

¹ The conference agenda, working papers, and videos of the symposium panels are available on the JCHS website at <https://www.jchs.harvard.edu/research/symposia-special-projects/symposium-housing-tenure-and-financial-security-2019>.

² The revised symposium papers submitted for inclusion in this volume were subjected to a peer review process administered by the co-editors of this issue. Each paper was reviewed by at least two referees who were at least single blind (that is, authors were universally blinded to the identity of the referees, but the pool of potential referees included both attendees and non-attendees of the symposium).

markets, they analyzed disproportionate concentrations of VA loan originations using Home Mortgage Disclosure Act data. Among other findings, Spitzer and Lambie-Hanson concluded that proximity to a military site is a strong, positive predictor of county-level VA mortgage lending, even after controlling for a number of related factors. Because VA lending provides veterans with an important tool in the path to homeownership, this analysis offers insight into the pathways through which VA lending broadens access to homeownership for eligible households.

The fourth paper documents the unique barriers to homeownership facing households that have had various types of interactions with the criminal justice system. In “Homeownership Experiences Following Criminal Justice Contact,” author Bryan uses data from the 1997 cohort of the National Longitudinal Survey of Youth (NLSY97) to estimate the association between four points of criminal justice system contact—arrested, charged with a crime, convicted, and incarcerated—and three homeownership outcomes—current homeownership, age of head of household at homeownership entry, and duration of homeownership. Results from a series of regression models support the conclusion that being arrested and being convicted of a crime are negatively associated with homeownership, independent of being incarcerated. Bryan’s findings are important, not only for their implications for the literature on homeownership, but because most prior research focuses only on the negative effects of incarceration. Many millions of individuals, however, experience arrest and conviction but are never incarcerated. This article illustrates the importance of accounting for the negative effects of lower level criminal justice system contact in any assessment of the consequences of criminal justice involvement.

The final two papers in the symposium discuss opportunities to broaden access to homeownership through innovative tenure models and financing options. In “The Potential for Shared Equity and Other Forms of Downpayment Assistance to Expand Access to Homeownership,” authors Perkins, Rieger, Spader, and Herbert estimate the number of potential homebuyers who could achieve homeownership with different levels of financial assistance. Using recent Survey of Income and Program Participation data with a conservative interpretation of Federal Housing Administration underwriting guidelines, the authors estimated that 6.6 million households could purchase a median-priced home in their county with assistance of \$25,000–\$100,000, a subsidy level consistent with typical shared equity programs. An additional 15.2 million households could afford to purchase a home using downpayment assistance of just \$10,500 or less. Among other significant improvements over prior attempts to carefully quantify market size, the authors consider not just current renter households but a broader pool of potential homebuyers that includes potential heads of household between the ages of 25 and 65. These findings highlight the size of the opportunity if financial, administrative, and political barriers to shared equity programs could be overcome.

In “Building Wealth Through Homeownership: A Comparative Study of MHP’s ONE Mortgage Program and FHA,” authors Interrante and Schmiedl examine mortgage and wealth-building outcomes for first-time homebuyers who use the Massachusetts Housing Partnership (MHP) subsidized mortgage program, an affordable mortgage product available to low- and moderate-income households in Massachusetts. The program, which competes with other state Housing Finance Agency products and the Federal Housing Administration (FHA) program, currently has

only a modest market share in the state. Using data on a subset of MHP borrowers, the authors simulated alternative FHA mortgage outcomes for the sample, comparing total monthly mortgage payments, overall equity accumulation, and net financial outcomes from purchase to sale for MHP and FHA options. They find overall better net financial outcomes for the MHP mortgages, show lower default and foreclosure rates for this product over time, and address the potential to expand the program's reach within the state.

These papers contribute to the broader literature on the evolving relationship between housing tenure and financial security. Nonetheless, many questions remain unexamined and in need of future investigation. For example, one surprise of the symposium was that few papers were submitted on topics related to innovation in alternative tenure models, which have seen a burst of investment and experimentation by private startups offering shared appreciation mortgages, rent-to-own contracts, and other alternative forms of tenure. Similarly, what are the implications of recent trends in technological innovation, urban restructuring, and growing income inequality for housing markets and tenure outcomes? Also, given the dramatic growth in older households projected for coming decades, how and where will aging baby boomers choose to live, and how will they manage their home equity? On these and other topics, further research is necessary to understand the extent to which the experiences of the past decade have changed anything fundamental in the attitudes of U.S. households toward homeownership, their openness to alternative tenure options, and the role that tenure decisions will play in the financial security of American households in coming decades.

Mortgage Journeys: A Video Ethnography of the Homebuying and Mortgage Process

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Abstract

Prior research suggests that comparison shopping for mortgages when purchasing a home helps secure a lower interest rate. In theory, the benefits of mortgage shopping should be particularly strong for lower- and moderate-income (LMI) first-time homebuyers, who may face particular underwriting challenges but who also may qualify for city- and state-level first-time homebuyer assistance programs. We have only limited data about the mortgage shopping behaviors of LMI homebuyers, however, and how those behaviors may influence mortgage outcomes. This article presents new ethnographic data about how LMI first-time homebuyers access information and how that information shapes their mortgage shopping in three phases of the homebuying process. We find that study participants' mortgage-shopping behaviors evolved in three phases of a homebuying process, and they took steps that differed from best practices, especially during the stressful purchase phase, when mortgage shopping could have the biggest benefits. The study draws on longitudinal ethnographic video and interview data collected from 14 low-income first-time homebuyers in Boston, Massachusetts and Knoxville, Tennessee in 2015. The findings from the paper illuminate the need to improve the ease of gaining—and being able to act on—information about mortgages at all stages of the homebuying process.

Introduction

Successful homeownership in the United States is associated with a range of social and economic benefits for homeowners and their families. Prior research suggests that homeownership may improve psychological well-being (Manturuk, 2012; Manturuk, Riley, and Ratcliffe, 2012), child outcomes such as educational attainment (Rohe and Lindblad, 2013), and social and political engagement (Manturuk, Lindblad, and Quercia, 2012). Research has also found a positive relationship between physical health and homeownership status (Rohe and Lindblad, 2013). For middle-class Americans that have net assets, housing wealth is their dominant form of wealth (Kuhn, Schularick, and Steins, 2018).

Homeownership, however, and any benefits it bestows are not evenly distributed. Low- and moderate-income (LMI) Americans have historically faced challenges in achieving homeownership, a result of economic and underwriting barriers such as a lack of downpayment or overall savings, low credit scores, and debt-to-income ratios. Other factors limiting low-income and minority homeownership include racial discrimination in lending, household composition, and age (Haurin, Herbert, and Rosenthal, 2007).

One of the critical components of buying a home is successfully shopping for a mortgage. Mortgage shopping is important because it can help to reduce the interest rate of the mortgage and thus the monthly mortgage payment, offering savings to the homeowner over the life of the mortgage. For LMI homebuyers, mortgage shopping can also mean the difference between being able to qualify for a mortgage or not: some mortgage lenders offer first-time homebuyer products offered by a city or state, whereas others do not. Identifying the most suitable and affordable mortgage can also help contribute to the sustainability of homeownership, especially for LMI homeowners, for whom differences in monthly payments may be more important than for homeowners of greater means.

Recent survey research has provided helpful insights about consumer financial attitudes, housing views, and mortgage-shopping behavior in the aggregate. Specifically, research suggests that a significant proportion of homebuyers do not engage in shopping for a mortgage; they rely primarily on their friends, family, and real estate agents for information when looking for a mortgage (for example, CFPB, 2015; Fannie Mae, 2015). Important gaps remain in our knowledge, however, particularly about how LMI first-time homebuyers shop for mortgages. For example, survey research does not assess how potential first-time LMI homebuyers use this information when shopping for a mortgage or the specific activities they undertake when mortgage shopping. In this article, we will address this gap in the existing research literature and provide a granular understanding of how a small sample of LMI first-time homebuyers in two cities went about preparing for and buying their first home and shopping for their mortgage.

The remaining sections of the article begin with a literature review, which shows that, although mortgage shopping is advantageous, a majority of consumers apparently do not shop for a mortgage. A confounding issue in the research literature, however, is that it has not previously described what people actually do if and when they shop for a mortgage. In fact, we found that our study participants shopped for mortgages in evolving ways in three key stages of the home-purchase process, but their stages and steps differed from expectations held by industry stakeholders (housing professionals, policymakers, and researchers).

We briefly review the study design, methodological approach, and characteristics of the study participants before presenting key insights from the data about mortgage shopping. In the findings section, we present data on the mortgage-shopping behaviors of study participants at three different stages of the home-purchase process. We discuss both real and perceived barriers to getting a mortgage. In the discussion section, we explore in more depth the implications of study participants' actual mortgage-shopping activities and the challenges they faced in accessing a mortgage. We conclude by drawing out potential policy and practical responses to this mismatch between mortgage-shopping best practices and actual practice.

Literature Review

Mortgage shopping is a critical yet understudied component of the homebuying process. Studies of mortgage shopping have mostly focused on borrowers' reported behaviors from surveys rather than observing mortgage shopping as a homebuyer undertakes this activity. As a result, our understanding of how the process unfolds is constrained by researchers' existing ideas about how it occurs. In the following literature review, we examine the research to date on mortgage shopping, including why mortgage shopping matters and the role of information sources in the mortgage process.

The Importance of Mortgage Shopping

The U.S. mortgage market is characterized by a large array of private and government mortgages, from 30-year, fixed-rate mortgages to adjustable-rate mortgages to Federal Housing Administration (FHA)-insured loans. Mortgages originated and backed by state Housing Finance Agencies (HFAs) often come with additional grant programs that cover some of the closing costs for a first-time homebuyer or have lower downpayment requirements. Some of these products are targeted to LMI families. Each specific mortgage product has different downpayment, underwriting, and qualification criteria, creating a potentially confusing and complicated mortgage product landscape. In addition, individual lenders do not usually offer the full range of available mortgage products. Whereas the mortgage industry understands these differences, consumers often do not have a good sense of different mortgage qualification criteria (Fannie Mae, 2015).

Given the number of different mortgage products available to first-time homebuyers, and with variability state by state, or city by city, learning about and shopping around for a mortgage is critical. Research has shown that mortgage shopping lowers the costs of the mortgage thousands of dollars over its lifetime (CFPB, 2015). According to Freddie Mac, borrowers that got five different rate quotes saved on average 0.166 percent on their interest rate, which would translate to almost \$3,000 over the life of a \$250,000 mortgage (Freddie Mac, 2018).¹

Despite the potential benefits of mortgage shopping, many potential borrowers do not shop around for a mortgage. Analysis of the Consumer Financial Protection Bureau's National Survey of Mortgage Borrowers, a nationally representative survey of 1,922 homebuyers, revealed that almost one-half of those surveyed did not shop around for a mortgage. Borrowers who were less familiar with the mortgage process tended to shop less (CFPB, 2015). A Fannie Mae study of recent homebuyers found that approximately one-third of all homebuyers did not obtain multiple quotes for their mortgage (Fannie Mae, 2015).²

¹ Theoretically, mortgage shopping is also important to ensure that a borrower gets a mortgage product that is safe (that is, a mortgage product that is not structured in an inherently risky way) and suitable (that is, how appropriate the product is for a given borrower's financial situation). Researchers have not yet tested the relationships between mortgage suitability and safety and mortgage shopping.

² First-time homebuyers, the focus of this study, did not seem to shop around more or less frequently than did repeat buyers.

Research Is Limited on What Activities Borrowers Engage in When Shopping for a Mortgage

Mortgage shopping is a complicated process that includes multiple different activities, such as accessing a variety of information about mortgage products from friends and family, reading online and other mortgage educational sources, getting prequalification letters from mortgage lenders, and applying for multiple preapprovals. In other words, a continuum of activities related to mortgage shopping influence the kind of mortgage product with which a borrower ends up. Having never navigated the process before, first-time homebuyers may be expected to have less information and experience to draw on and therefore engage in more limited mortgage shopping than do repeat buyers or rely more heavily on advice from friends, family, or professionals (real estate agents or lenders). On the other hand, at least some first-time buyers may try to compensate for a lack of experience by engaging in more research and shopping, whereas repeat buyers rely on past experience (whether or not it is optimal).

A challenge with prior research is that it does not provide sufficient detail to describe respondents' specific mortgage-shopping actions. For example, the 2015 Fannie Mae survey data does not reveal how respondents interpret receiving multiple "mortgage quotes"—that is, respondents may interpret this term broadly to include prequalification, preapprovals, and mortgage applications. As a result, fewer respondents may be doing some of the more involved mortgage-shopping activities, such as getting multiple preapprovals from different lenders and for different mortgage products. Less indepth mortgage shopping might be expected to limit the benefits of mortgage shopping.

Potential homebuyers are shopping for not only a mortgage product but also a mortgage lender. Prior research finds that the mortgage channel can significantly affect what mortgage products are available to a borrower; for example, some mortgage lenders do not offer first-time homebuyer program products. Analysis of mortgage data from the Great Recession suggested that mortgage broker-originated loans were more expensive (Ernst, Bocian, and Li, 2008) and significantly more likely to go into foreclosure than were loans from correspondent lenders³ (Jiang, Nelson, and Vytlačil, 2014). Several other pre-Recession studies found that the route a borrower took in getting a mortgage (whether through a retail bank, a mortgage lender, or a mortgage broker) influenced the specific type of mortgage product that the borrower ended up with (Apgar, Bendimerad, and Essene, 2007; Jiang, Nelson, and Vytlačil, 2014). In addition, many studies of fair housing practice have found evidence of widely varying mortgage denial rates by applicants' race and ethnicity (Ross et al., 2008; Turner and Skidmore, 1999). When national surveys ask questions about mortgage shopping, they do not ask from how many and what types of mortgage lenders a borrower sought a quote nor whether a borrower received multiple quotes from the same or different mortgage lenders. Understanding these mortgage-shopping behaviors is important because they influence the array of products that a borrower will be informed about and may affect the suitability of the borrower's final mortgage.

³ Correspondent lenders are wholesale lenders who underwrite and fund mortgages using their own money. This contrasts with mortgage brokers, who originate a mortgage on behalf of a lender for a fee but do not fund the mortgage.

In addition, some research suggests that borrowers are not assessing mortgage lenders based on the products they offer. Instead, factors such as the geographic proximity of the mortgage lender or the lender's reputation influenced a borrower's decision to work with a particular mortgage lender as much as did the mortgage product they offered (CFPB, 2015).

Access to Information and Shopping for a Mortgage

In addition to the activities a borrower undertakes, understanding the information they gain through those activities is critical to thoroughly understand mortgage shopping. Research suggests that the greater the diversity of sources of information about the mortgage, the lower the borrower's interest rate (Pittman, 2008); however, how this information influences mortgage shopping is unclear. Does access to a larger number of information sources mean that borrowers are seeking out a greater number of preapprovals from different mortgage lenders or going through a process to compare interest rates for multiple mortgage products from different lenders before getting a preapproval letter? Further, some sources might be more accurate than others. Multiple nationally representative surveys find that homebuyers' primary and most trusted source of information about mortgage products was a mortgage lender or broker, followed by a real estate agent (CFPB, 2015; Fannie Mae, 2015).

Research has examined the tremendous influence of housing professionals' information on the home search process. Real estate agents have greater knowledge of the process than do homebuyers, but their incentives in the home purchase transaction are not fully aligned with their clients because they are paid through commissions and benefit from closing a large number of transactions quickly. On the seller's side, this translates into pushing homeowners to sell faster and for lower prices (Levitt and Syverson, 2008), whereas on the buyer's side, it manifests as pressure to buy quickly and overshoot their initial price ranges (Besbris and Faber, 2017). On the mortgage side, evidence from fair-lending enforcement tests has suggested that at the preapplication stage, mortgage lenders may give less information about housing affordability, loan products, and downpayment assistance and less coaching on strategies to qualify for affordable mortgage products to African-American and Hispanic testers (posing as prospective homebuyers) than to White testers with the same financial profiles, although the degree of differential treatment varies by market and by lender (Ross et al., 2008).

Fewer consumers obtain information about their mortgage product from outside sources, such as websites, financial and housing counselors, or personal acquaintances (such as friends, relatives, or coworkers) (CFPB, 2015). We are not aware of literature that has investigated the accuracy or completeness of information that prospective homebuyers obtain through family and friends, although it is likely highly variable. One type of information that prospective homebuyers seek from family and friends is a referral for a trusted mortgage broker. Reid (2010) found in 100 interviews in California among low-income and minority communities that borrowers were most likely to get referrals for mortgage brokers from their close families and friends: borrowers preferred mortgage brokers who were part of the local community.

Economic status also influences where borrowers get information about their mortgage. In comparing mortgage-shopping behavior between higher- and lower-income borrowers, Fannie

Mae's National Housing Survey® found that higher-income borrowers are more likely to use online tools or applications, whereas lower-income borrowers are more likely to rely on real estate agents, mortgage lenders, family, and friends for advice and recommendations (Fannie Mae, 2014). Many lower-income and other first-time homebuyers, however, do not have parents or other close relations who are homeowners who can share firsthand knowledge (Pittman, 2008).

These patterns of access to information about mortgages match those seen in other parts of the homebuying process. Real estate agents, in particular, exert a fundamental role not only in responding to homebuyers' preferences but to shaping their preferences, price thresholds, emotions, and experience of the homebuying market as stressful and time pressured (Besbris, 2016). Real estate agents also appear to act as gatekeepers for access to adjacent professionals, such as appraisers (Gotham, 2014; Korver-Glenn, 2018).

In sum, the research suggests that potential homebuyers are getting referrals for mortgage lenders from family and friends and real estate agents. Once potential homebuyers have an established relationship with a real estate agent and a mortgage lender, they are likely to trust these professionals' recommendations for mortgage products. What we do not understand well from the literature to date is what mortgage information potential homebuyers have when they come to the homebuying process, how they make decisions along the way, or how they seek out additional information. Better understanding these gaps in the literature on mortgage shopping can help policymakers better design aspects of the mortgage-shopping process (to the degree that this is within their control) and to think about novel approaches to homebuyer education.

Research Approach and Data

Mortgage Journeys Study Design

To better understand the mortgage-shopping process, we need data about how homebuyers seek out information, what factors are influencing them, and how they make decisions across the entire span of the homebuying process. To get this data with this granularity, we chose a deliberately small sample of LMI first-time homebuyers just beginning their home searches. We collected indepth longitudinal video ethnography data from these individuals in 2015 in a Fannie Mae-sponsored study called the Mortgage Journeys Study.⁴ Data collection incorporated five key elements: (1) indepth interviews; (2) participant video diaries; (3) observations of mortgage and home purchase events; (4) short weekly online surveys (about their housing search, attitudes, and mortgage knowledge); and (5) review of participants' finances and any mortgage-related documents they obtained. Researchers visited each participant in person at least three times at different points in their homebuying journey to conduct indepth interviews and observations of homebuying activities. We interviewed each participant for an average of 10 hours; observed 13 participant homebuying events, including prequalification appointments, loan closings, and online research plus general market activities such as homebuyer education classes in each site; and reviewed approximately 14 hours of video diaries. Researchers also spoke with participants on the phone as needed to manage survey data collection and help participants with conducting video diaries.

⁴ Key results of the Mortgage Journeys Study have been released by Fannie Mae. For details, please see Palim (2018).

In most cases, study participants enrolled in the study before they were prequalified for mortgages. In other cases, participants enrolled in the time between their prequalification and up to a month before their closing.⁵ Participants' involvement in the study varied in length of time, depending on the timeline of their homebuying and mortgage experience. Data were collected from December 2014 to July 2015.

Our ongoing data collection allowed us to develop robust case studies of each participant that captured more of the ups, downs, and shifts in their home searches than can be obtained by one-time data collection. Researchers were able to build strong rapport with participants, who openly shared details about their home search. Notably, participants shared sensitive emotions and financial information; talked about issues in their lives, such as relationship tensions and job anxieties; and effused excitement and frustration over their home searches. We were able to observe the different emotional tenor of the three different home purchase stages and to note the differences in mortgage-shopping behavior at each stage. We were also able to observe how contextual life factors affected each participant's mortgage shopping.

Participant Characteristics

We recruited a small (n=14) purposive sample of prospective homebuyers in two different states.⁶ As shown in exhibit 1, most participants lived in higher-cost urban Massachusetts (n=9 in greater Boston, n=1 in Worcester), whereas fewer lived in lower-cost Tennessee (n=4).⁷ Most participants (n=10) were female, white (n=8), and partnered (n=8). No participants had minor children living with them at the time of the study. Participants' incomes ranged from 26 percent Area Median Income (AMI) (in both sites) to 105 percent AMI in greater Boston (and Worcester) and 97 percent AMI in Knoxville.⁸ By the end of the study, one-half of participants (7) had purchased homes.

⁵ Due to challenges recruiting all participants before prequalification, we accepted one household in Tennessee that had placed an offer on a home.

⁶ Our recruitment criteria were that households earn less than area median income (AMI), be first-time homebuyers, be sure of their decision to purchase a home within the next 6 months, were not yet prequalified for a mortgage, and have regular access to the internet to complete study activities. We recruited through flyers at financial institutions, retailers with community information boards, libraries, and community centers; online and newspaper advertisements; real estate agents; and housing counseling agencies.

⁷ Our research sites were greater Boston and greater Knoxville. One participant we recruited in Boston concluded that the city was too expensive and shifted his search to Worcester, where he had grown up.

⁸ We chose those sites so that we had one site in a higher-than-average-cost housing market and one in a lower-than-average-cost market, both where the lead researchers had existing connections to real estate professionals.

Exhibit 1

Participant Characteristics

		Boston (n=10)	Knoxville (n=4)	Total
Gender (F/M)		8/2	2/2	10/4
Race	White	5	3	8
	African-American	3	1	4
	Latino	0	0	0
	Asian-American	1	0	1
	Other	1 (Haitian American)	0	1
Income Range (AMI)		\$24,000-95,000* (\$90,000)	\$15,600-\$58,000 (\$60,000)	n/a
Single		3	3	6
Partnered/Married		7	1	8
Children Present		1 (Adult Child) 1 (Pregnancy)	0	1
Purchased Home as of 9/16/15		5/10	2/4	7/14

Analysis

We conducted interpretive analysis of interviews and participant video diaries focused on beliefs, concepts, and values about homebuyer experiences. Interpretive analysis is designed to understand the meaning of events from the perspective of those experiencing them; it is explicitly about the discovery of new information rather than testing hypotheses. We conducted ongoing analysis during data collection to make sense of each participant’s journey as data was collected and to inform additional data collection. Once all data were collected, we used a combination of qualitative coding in NVivo 10 software and team analytic debriefings to draw together key themes that provided insights and responses to the study research questions. We incorporated emergent themes related to the research questions into the analysis as relevant. Video material was organized into key themes that emerged from the analysis process.

Limitations

Although we are able to understand participant perspectives indepth through this study, both the small sample size and its limited geographical area limit the conclusions we can draw. The experiences of 14 individuals in two locations are not statistically generalizable to homebuyers in general, LMI homebuyers, or the markets in which the research was conducted. Rather, the study provides exploratory insights into homebuyer perspectives, demonstrating the social processes of getting a mortgage and buying a home rather than being a representative sample of homebuyer experiences. We point readers to the discussion section for further discussion on these limitations.

Additional limitations include that the study was conducted before the qualified mortgage rule and new mortgage disclosure documents were implemented, so findings on those topics should

be read in that context.⁹ The technological requirements of being involved with the study may have introduced a degree of bias into the sample; in particular, older and less technology-savvy participants may have self-excluded. In addition, the time commitment involved in participating in the study may have precluded some interested participants, such as families with young children. The study was also conducted only in English, and non-English-speaking households' experiences may be considerably different. Finally, the study only followed households over 6 months, and some participants' homebuying journeys were longer; as a result, we did not gain the full range of insights possible had we followed them longer.

Findings

This section presents our major findings from the Mortgage Journeys video ethnography. We begin by providing an overview of the three different phases in the homebuying and mortgage process observed for LMI first-time homebuyers in the study: preparation, decisions, and purchase. We then review each phase in detail, first presenting the defining characteristics of the phase, then the real and perceived barriers that study participants faced, and finally how participants approached mortgage shopping in each phase. We conclude that participants engaged in mortgage-shopping behavior in each phase; however, the ways they engaged in mortgage shopping differ from best practices recommended in the mortgage industry, owing to limited information that the homebuyers have, perceived mortgage barriers, financial self-perceptions, and the structure of the mortgage transaction, making comparison shopping challenging.

Phases of the Homebuying and Mortgage Journey

We identified three main homebuying phases within which different mortgage shopping and preparation activities occurred: (1) Preparation, (2) Decisions, and (3) Home Purchase.¹⁰ Exhibit 2 provides an overview of each phase. Participants might move easily from one phase to the next, or they may experience flux, moving from one to the next, only to move back to a prior phase as a result of a failed house offer or after discovering a major fault with the home. Although the graphic shows a linear progression, the process was usually nonlinear because participants faced a range of different barriers along the way in purchasing their home. Homebuyers' timelines ranged from 6 months to more than 2 years;¹¹ during the course of the study, a few put their home searches on hold indefinitely. Participants faced barriers related to both their home and mortgage searches in all phases of the process, from the preparation phase to the active search, until purchase.

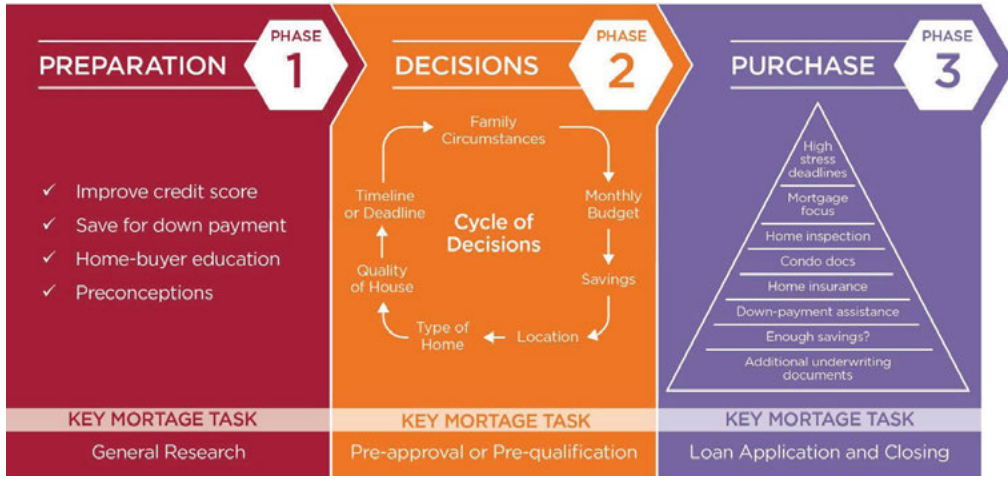
⁹ In the wake of the Great Recession sparked by record defaults on subprime mortgages, the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 (Dodd-Frank) established new rules to prevent some of the worst excesses seen in the subprime mortgage market. Specifically, Dodd-Frank established mortgage lending consumer protections, including the criteria for a Qualified Mortgage (QM), the intent of which was to establish that a mortgage be suitable for a borrower's financial situation (Bocian, 2012). As a result, predatory mortgage products designed to strip equity from a borrower were regulated out of the marketplace.

¹⁰ These phases are similar to the four phases that CFPB identifies: (1) Prepare to shop (our preparation phase); (2) Explore loan choices (our decisions phase); (3) Compare loan offers (our purchase phase); and (4) Get ready to close (our purchase phase). See CFPB (n.d.a).

¹¹ If a participant's journey lasted longer than the study period, that participant reported being engaged in the home search process prior to the study period.

Exhibit 2

Three Nonlinear Phases of Homebuying for Mortgage Journey Participants



We now review each of the phases in greater detail, describing the characteristics of each phase, then discussing the real and perceived mortgage barriers that participants faced in each stage, how they overcame those barriers, and the mortgage shopping they completed. Understanding the mortgage barriers that participants faced is critical because it influences how they went about mortgage shopping.

Preparation Phase

In the preparation phase, participants in the Mortgage Journeys study did preparation work, such as improving their credit score; saving for the downpayment; and, in some cases, attending homebuyer education—either short events presented by realtors or longer courses offered by nonprofit housing counseling agencies. At this stage, they had limited preconceptions and preferences about their desired location, desired housing characteristics (for example, condo or multi-family, fixer-upper or move-in ready), and mortgage terms or lenders, although some were starting to form. Four of the Mortgage Journeys study participants were still in the preparation phase at the end of the study.

Preparation Phase Mortgage Barriers and Strategies to Overcome Them

In the preparation phase, participants encountered both real and perceived barriers based on their past circumstances, current circumstances, or both, as shown in exhibit 3. Real barriers to getting a mortgage related to their past included having no or thin credit files, low credit scores, low levels of savings, a history of credit denials, or a lack of income history. Present-day barriers participants faced included unemployment, job loss, family crises that derailed homebuyers’ preparation for buying a home, and a lack of knowledge about homebuying. In the current study, Franklin¹² was

¹² All names in the paper are pseudonyms.

an expecting father and veteran considering a Veterans Administration loan. He was waiting to gain sufficient employment history at his new job before applying for a mortgage. He was an informed-enough borrower to know, through conversations with lenders and a homeownership education class his partner attended, that improving his employment history would give him access to a more affordable mortgage; however, he was laid off close to the end of the study period, and the couple put their home search on hold indefinitely. Another participant, Gina, had been saving money and working on her credit, but a family crisis (her son being arrested) along with an already unstable housing situation meant she had to put her homebuying journey on hold indefinitely for the second time since she had started down the path of preparing to buy a home.

Participants were aware of their barriers to accessing a mortgage and what they needed to do to overcome them, and their strategies are shown in exhibit 3. A common barrier was the lack of savings for a downpayment. Two participants moved in with their parents and others with roommates to save money, whereas others cut weekly expenses and checked their budgets

Exhibit 3
Preparation Stage Barriers and Strategies to Overcome Them

PHASE 1
PREPARATION

Preparation Stage Barriers

- No/thin credit
- Negative financial experiences
- Requires multiple home purchase attempts 1+ years apart if barrier is significant enough

Preparation Stage Strategies

- Credit repair/credit building
- Moving in with parents/housemates to save money
- Budgeting
- Extra jobs to increase income (part-time, Uber driving, freelancing)
- Non-profit homebuyer education course
- Realtor home-buyer seminar

frequently. Another strategy to build savings was to increase income through extra jobs. James, a 21-year-old single man, started driving for Uber to save extra money. To deal with poor credit, participants worked to pay off debts. Study participants with poor credit sometimes hesitated about talking with a bank or mortgage lender at this early stage. Duncan instead went to speak with a nonprofit mortgage lender, and a few others worked on improving their credit only.

To compensate for a lack of knowledge about the homebuying process, participants took homebuyer courses offered by both nonprofits and realtors. From our observations of both types of class, we noted that both focused on providing relatively impartial information along with introductions to a set of real estate professionals (realtors, mortgage lenders/brokers, and insurance brokers). Unlike their realtor counterparts, however, nonprofit classes included questions to ask of real estate professionals and additional critical lenses through which to assess the homebuying process.¹³

Mortgage Shopping in the Preparation Phase

In the preparation stage, participants formed vague preconceptions about mortgages as they weighed the costs of their tenure choice, most often a monthly mortgage payment against rent. At this stage,

¹³ Research has not established whether the nonprofit homebuyer classes differ in content or successful homeownership outcomes.

participants focused on the total monthly mortgage payment and not its composition—such as principal, interest, taxes, and insurance—or the interest rate or whether it was a fixed or adjustable rate. Some participants used online mortgage calculators to make estimates of affordability, although these calculators cannot take into account specific factors about a particular home nor details such as the interest rate or type (fixed or adjustable) it was advertising. These kinds of activities helped participants prepare for shopping for a mortgage but did not constitute active shopping either for a mortgage originator or a mortgage product.

Participants' self-perceptions shaped the mortgage search from the beginning. For example, participants that considered themselves “low credit” or “uncreditworthy” approached only certain lenders (for example, credit unions over retail banks) or considered only specific products at the prequalification stage.¹⁴ One study participant, Duncan, had previously been denied a business loan and, because of this, wanted to avoid mainstream lenders, which potentially cut him off from valuable and reliable information. He explained, “I actually Googled ‘mortgages for bad credit.’” Through these results, he learned about Federal Housing Authority (FHA) mortgages and later connected to the nonprofit Neighborhood Assistance Corporation of America, which provides financing and housing counseling.

Decisions Phase

The decisions phase is characterized by looking at homes, analyzing budgets, thinking about the quality and location of the home, obtaining a prequalification letter, and synthesizing all this information. The key mortgage-related task in this phase is obtaining a prequalification letter or a mortgage preapproval.¹⁵ The decisions phase ends with the acceptance of an offer to buy a home. One participant described this as the “cycle of decisions” phase, meaning that during this phase they looked at a house; considered all the financial implications, including the cost of the mortgage and repairs; and then had to decide if the property would work for them; if not, they returned to the search for a new property. Two study participants were still involved in the cycle of decisions by the end of the study.

At the time of the study, Cortney from Boston was earning \$52,000 a year employed as a teacher and working over the summer at a summer camp. To save money, she was living with her parents. Motivated to own a home due to the high cost of renting, she also saw it as a way to build equity. In the spring of 2015, she met with a realtor and started attending open houses to get a sense of the available housing stock. She got prequalified by a mortgage broker recommended by the realtor she met with early in the process so she could keep looking at properties. Cortney saw the summer as a key time to focus on the home search process because once the school year began, it was harder to carve out time to go and see properties. She was focused on whether a property was the right one; she was willing to wait or continue saving to purchase a more expensive property. Over the summer, she found a potential property but after some consideration decided not to move forward

¹⁴ One can understand this in light of the brain's negativity bias—to remember previous negative events more strongly than positive events, even of similar intensity (for example, Baumeister et al., 2001).

¹⁵ A prequalification letter is a letter documenting the mortgage amount a borrower is likely to get, based on information submitted by the borrower, whereas a preapproval relies on secondary data checks, including review of the borrower's credit score.

with an offer; the property was not quite right. She was guided in her financial decisionmaking by her financial advisor, who was also a family friend. He provided suggestions to her about how much to put down for the downpayment and how to budget as a homeowner. By the end of the study, she was still looking for the right home, continuing to live with her parents and save for a downpayment.

Decision Stage Barriers and Strategies to Overcome Them

The decision stage is a tumultuous, cyclical one, in which participants explore housing options in their preferred neighborhoods and learn about costs and financing options through prequalifications. As the numbers became more specific, individuals reported being able to make more sense of whether and how they would be able to manage the mortgage. Patricia, a Haitian-American woman in her late twenties, had gone through a previous cycle of trying to purchase a home prior to being in the Mortgage Journeys study. During her first attempt to buy a home, as the information from the seller became more specific, she was able to see that the combination of the condo fees and the likely mortgage payment would not be affordable for her. With a renewed understanding that a higher credit score could lower her interest rate and mortgage payment, she had gone back to the drawing board and started working on improving her credit score to over 700.

During this stage, some participants also learned they had insufficient savings to cover a downpayment on their preferred house (see summary of decision stage barriers and strategies in exhibit 4). Participants responded by returning to the preparation phase or by searching for additional resources to help with the downpayment. Resources that participants sought out included first-time homebuyer downpayment assistance and low downpayment government or nonprofit mortgage products. Indeed, six participants used various first-time homebuyer programs and mortgage products. Participants considered the Neighborhood Assistance Corporation of America, the Veterans Administration, the Federal Housing Administration, municipal downpayment assistance programs, and State housing finance agency first-time homebuyer loans. Participants found out about these programs through active online research, referrals from trusted professionals or family and friends, and general day-to-day conversations.

In the decisions phase, participants also faced barriers beyond their control that precluded them from moving forward in their home purchase. These included unemployment, family crises, and a change in household composition that changed the parameters of the home search. Facing and dealing with barriers in the cycle of decisions phase often meant extending the anticipated timeline for purchasing the home, putting the search on hold, or changing the location of the home search. Barbara's case illustrates how, despite overcoming a barrier of insufficient savings through a Housing Finance Agency (HFA) product, other barriers sent her from the decisions phase back into preparation.

Barbara had attended a homebuyer education course at a nonprofit in Knoxville as part of her preparation to buy a home. She frequently referred back to materials in the binder that had been given to participants and was trying to follow the instructors' advice closely. Because of this, she had become focused on obtaining a low downpayment first-time homebuyer loan through the

Tennessee Housing Development Agency and on using a credit union instead of a bank; however, she discovered that her preferred credit union did not offer her preferred type of mortgage. Barbara was shopping for both mortgage product and mortgage originator but found a mismatch.

Her savings were insignificant, and she could not increase her income due to medical conditions that limited how much she could work. She researched neighborhoods and available housing stock by driving through neighborhoods and doing some limited online research; however, her car needed several costly repairs that constrained her ability to both search for housing and build her savings. During the course of the study, she moved from the cycle of decisions phase back to preparation—researching neighborhoods, looking at homes, rebuilding her credit after amassing debt on a store credit card, and trying to continue saving even as she encountered unexpected expenses.

Exhibit 4

Decisions Phase Barriers and Strategies

PHASE 2
DECISIONS

Decisions Stage Barriers

- Unemployment/job loss
- Family Crises
- Low credit
- Insufficient down payment
- Lack of income history (self employed)
- Problems with housing stock—too little affordable housing or needs too much work
- Qualifying for programs

Decisions Stage Strategies

- Choose a different house (e.g., needing fewer repairs)
- Choose a different loan product
- Choose a different lender
- Go back to preparation if barrier significant enough

Mortgage Shopping in the Decisions Phase

During the decisions phase, participants' main mortgage-related focus was obtaining a preapproval letter. Mortgage Journeys participants worked hard to get mortgage preapprovals for loan products that they perceived would make financial sense for them, based on their available financial resources for a downpayment and closing costs, along with ongoing monthly income. Similar to their behavior during the preparation phase, Mortgage Journeys participants continued to focus closely on the monthly mortgage payment and the total mortgage amount, which would determine whether or not they could buy their preferred home.

We observed Mortgage Journeys participants selecting lenders for preapproval based on several factors, including their self-perceptions (discussed later), misinformation and confusion about the mortgage process, and referrals from their realtors. Echoing research suggesting homebuyers are not always informed about the mortgage process, a few participants were confused. One study participant, Nancy, provides an example of how misinformation about the mortgage process could influence participants' shopping behaviors. Nancy explained the common fear that too much shopping around for a mortgage can lower one's credit score and lead to obtaining worse mortgage terms:

One fast-talking mortgage guy, that I didn't like because he sounded like a salesman, said that I could prequal

everywhere in 30 days and it won't affect my credit score. And somebody told me that wasn't true. I think it was our friend at [financial institution they used]. I was like, concerned. Your credit score drives your interest rate on the mortgage. So the more mortgage shopping you do, it would negatively affect your credit score...and that probably drove the number of people I let draw prequals for me. I just didn't want that many people looking at my credit and showing up as several queries.

Referrals from real estate agents were the most common way participants identified their mortgage lenders, although in a few cases, other considerations drove the choice.¹⁶ Betsy and her partner “literally took the guy’s word who worked with our realtor...We did no shopping, no research, nothing.” Similarly, Steve and Joelle chose their mortgage broker because she co-led an hour-long first-time homebuyer seminar Joelle attended. Steve described their working relationship with this pair as “a match made in heaven,” and they did not speak to any other lenders (see Besbris, 2016 on how realtors evoke emotional connections to their clients). In these cases and in Nancy’s case of confusion about mortgage shopping, the perceived value of housing professionals’ advice shaped how little shopping around participants did (however, Nancy did not listen to advice encouraging her to shop around because she had absorbed fear about lowering her credit score).

Once prospective buyers selected a lender for a preapproval, buyers who moved into the purchase phase usually continued working with this lender and very rarely reevaluated lender or mortgage choices. The only times we observed Mortgage Journeys participants reevaluate lender or mortgage choices was in a reactive way if something went wrong with either their lender or product (as we discuss later).

Purchase Phase

The purchase phase is the final phase of the homebuying process and requires homebuyers to focus on multiple aspects of the home purchase simultaneously and within a short amount of time. These can be broken down into three main categories: (1) activities related to the house and home contract, (2) activities related to the lender, and (3) activities related to the mortgage product and loan terms. Slippage in any of those areas can jeopardize the closing date. With a great deal of emotion—excitement, anticipation, and nervousness—riding on the successful completion of the home purchase, Mortgage Journeys participants who reached this stage (n=7) overwhelmingly focused on activities related to completing the home purchase: the inspection, reviewing condo documents, negotiating or completing repairs, and submitting a variety of different documents necessary for the mortgage application to move ahead (see Besbris, 2016 on real estate agents’ role in invoking anxiety and pressure to buy quickly because of scarcity in the market). Homebuyers were actively involved in both the home- and mortgage-related parts of this phase but in different ways. Study participants paid close attention to details of the purchase agreement, especially repairs and price concessions. In Tennessee, the inspection could be an opportunity for homebuyers to improve the quality of the home and/or lower the purchase price. Both Steve and Joshua in Knoxville negotiated on repairs after they had a signed purchase agreement and the house went through inspection. Joshua was able to negotiate for the seller to complete repairs of plumbing, electrical, exhaust, and subfloor issues. Steve and Joelle had repairs, including repair of their

¹⁶ These other considerations included whether a lender offered a downpayment assistance program or first-time homebuyer mortgage or, in one case, if a lender worked with a participants’ preferred attorney for closing.

electrical unit, completed at the seller's expense. We did not see any buyers in Boston use this strategy, perhaps because the tight housing market and associated higher competition for houses allowed sellers to reject demands for repairs more easily.

Mortgage Journeys participants were more passive or reactive about mortgage-related parts of the purchase phase compared to the home-related tasks. Homebuyers at this stage actively submitted a formal loan application with their selected lender and provided requested documentation—a significant amount of work. Once they submitted their loan documentation, however, the title search and underwriting process happened largely out of their view, with no active homebuyer involvement. A few participants did mention getting calls from unknown professionals at this stage—such as the title insurance agent—and not being sure who they were or how they were involved in the process.

Purchase Phase Barriers and Strategies

Study participants in the purchase phase reported overwhelming levels of stress with tight timelines to review large numbers of documents, communicate with real estate professionals, and complete closing. Participants described the large volume of paperwork required and the associated stress of not understanding what was in the documents.¹⁷ During this final and high-pressure phase, Mortgage Journeys participants also learned more specific information about first-time homebuyer programs. Although participants had learned some details about those programs in the decisions phase, actually qualifying for the programs happened in the purchase phase. In two cases, including James' (discussed in the following section), participants encountered problems at the last minute that threatened to derail their home purchases.

Unresponsive real estate professionals sometimes put the closing date in jeopardy; participants felt helpless and that they would do whatever they were told or needed to do to finalize the closing, whether or not that was the optimal financial decision. In scenarios in which participants decided not to move forward with the purchase, they returned to the decisions phase.

Mortgage Shopping in the Purchase Phase

Recommended best practice for mortgage shopping is to ask for multiple loan estimates from different lenders after selecting a home,¹⁸ yet this high-stress and deadline-driven purchase phase was not conducive for Mortgage Journeys participants to comparison shop. A signed purchase agreement sets a firm deadline with an aggressive timeline, often 30 to 45 days, leaving very little room for slippage in a typical closing process. In broad brush, the closing process includes a series of steps related to the home purchase and several mortgage-related activities. In this compressed, high-stress, and deadline-driven process, homebuyers had limited ability to engage with all aspects

¹⁷ Even after having it explained by mortgage and real estate professionals, participants who reviewed their loan packets with researchers did not understand what was in the documents after the loan closing and expressed feelings ranging from indifference to frustration that none of the professionals involved had taught them what the documents meant.

¹⁸ For example, the Consumer Financial Protection Bureau (n.d.b.) recommends this practice in several resources, including in Your Home Loan Toolkit and on its Owning a Home portal. See https://files.consumerfinance.gov/f/201503_cfpb_your-home-loan-toolkit-web.pdf and <https://www.consumerfinance.gov/owning-a-home/process/compare/request-multiple-loan-estimates/>.

of the process. Many Mortgage Journeys participants were savvy in shopping around for a mortgage in the preparation and decisions phase of the process (primarily looking for prequalifications) and also in shopping for homes, yet they did not shop around for multiple loan estimates once they had selected a home.

From observing seven Mortgage Journeys participants completing the home purchase phase, we conclude that the structure of the transaction creates an environment of stress, anxiety, and fear, which limits mortgage shopping at the purchase phase. The purchase phase is high pressure with limited time, looming deadlines, and a fear of being rejected from the mortgage process. Participants nervously waited for their approval and were visibly happy and relieved when they got it. Although those factors may create stress for all homebuyers, for first-time homebuyers, this is the first time they are completing a large, complex, financial transaction with significant financial consequences, which further enhances their stress.

Exhibit 5

Purchase Phase Barriers and Strategies



Barriers to Mortgage Shopping

Participants encountered multiple barriers to effective mortgage shopping at the purchase phase, including inaccurate information about the negative effect of multiple mortgage applications on their credit, overreliance on trusted advisors, decision fatigue, and a perception of insufficient time to reach out to multiple lenders and compare loan terms. Exhibit 5 summarizes these barriers and participants' strategies in response. No one mentioned considering submitting multiple mortgage applications.

As discussed in the preceding section and suggested in other literature, trusted professionals played major roles in guiding participants to mortgage products and through the application and closing process (Besbris, 2016; Besbris and Faber, 2017; Korver-Glenn, 2018). To alleviate their stress, participants placed a heavy reliance on trusted advisors and chose not to focus on mortgage details compared with home selection, which seemed easier to understand. They responded to mortgage professionals who were understanding of and responsive to their personal situations and demonstrated accessibility (see CFPB, 2015 on factors affecting lender selection). In our study, Patricia chose a lender who "seemed reasonable, she seemed understanding, maybe she was a family person and understood where I was coming from" in purchasing a multifamily home with her sibling. Those professionals often discouraged shopping around both implicitly and explicitly,

however (see Besbris and Faber, 2017, and Levitt and Syverson, 2008 on real estate professionals' incentives). For example, by omitting the need to shop around, momentum carries participants forward with the same lender recommended by a trusted advisor. Only nonprofit entities—housing counseling agencies and a nonprofit lender—encouraged clients to shop around. Further, realtors with strong mortgage broker relationships implicitly discouraged shopping around because that broker is seen as “the” person who works with that realtor, as if part of a “package deal” (see Temkin, Levy, and Levine, 1999 for a case study of an integrated real estate–mortgage lender system).

Phillip and Rose present an interesting case study in receiving constrained advice, even with apparent advantages in the mortgage search. Phillip's family had financial assets that they might have shared with him, but he did not feel comfortable asking for financial assistance. Further, after a period of unemployment, Phillip secured a job supporting a mortgage underwriting team. When pushed by Rose to ask for help with the downpayment, his family members refused. Rose and Phillip received periodic discouraging advice and suggestions from family members in both the decisions and purchase phases of the homebuying process. As they considered taking on a larger mortgage to afford a house in a neighborhood of Boston they wanted to live in, family members gave them negative (and possibly realistic) feedback about taking on the monthly payment for a \$400,000 house on their \$74,000 income.

After many sleepless nights; a series of gut-wrenching arguments about whether they could stretch to cover the costs; detailed consideration of their budget, analyzed in Excel; and being unable to secure help from Phillip's family, it was with a great deal of relief that they did not buy the property and returned to the “cycle of decisions” phase. Rose described how much she was in love with the property and how hard it was to let it go. In late spring 2015, they put down an offer on a single-family home for \$274,000 in a lower-priced neighborhood, farther from the center of Boston. Working with the same mortgage company that Phillip worked for, they signed a 30-year fixed-rate mortgage and moved into the property in a residential neighborhood in a middle-class suburb of Boston. The emotional journey through the different stages of the homebuying process—and Phillip's sense of obligation to his employer—left little room for Phillip and Rose to consider getting mortgage applications from other mortgage lenders or banks.

Another key aspect of homebuyers' flagging attention to the mortgage emerges from the “decision fatigue” literature. Taken together, these psychological and economic studies show that people perform worse on mental tasks the more decisions and trade-offs they have had to make (Danzinger, Levav, and Avnaim-Pesso, 2011; Levav, Reinholtz, and Lin, 2012; Spears, 2010). The effect can be seen both within a day (for example, decisions deteriorating over the course of a day) or over a sustained period of time (for example, living in poverty). Further, humans tend to choose an urgent activity with a deadline over a more important activity (Zhu, Yang, and Hsee, 2018). In the home purchase phase, the set of deadlines pushes forward decisions toward purchasing the home and getting the mortgage, even when multiple mortgage applications (mortgage shopping) might be more financially optimal. As Besbris (2016) finds, real estate agents directly contribute to this time pressure by creating a sense of urgency and scarcity in their clients. Worth exploring in further research is whether homebuyers' decisionmaking capabilities are depleted by making early-

stage decisions, leaving less decisionmaking power for later decisions, such as obtaining multiple mortgage quotes.

Given these purchase stage barriers, buyers' choices about lenders and products in earlier phases of the process were by and large "sticky" at the time of actually applying for the mortgage. In other words, although the industry and consumer advocates separate the process of preapproval and mortgage application, in practice, borrowers in our study collapsed those phases. Study participants' mortgage shopping occurred during the preparation and decisions phase before choosing a specific house and, therefore, prior to knowing the actual mortgage terms. When things went awry at the purchase stage with one of those earlier decisions, homebuyers did not have the emotional or mental capacity to adjust their mortgage choices within the perceived high-pressure timeline of their contract.

James' experience illustrates how time pressure inhibits comparison shopping for even a highly motivated, informed, and savvy homebuyer. James, who planned to become a realtor, began his home search by engaging closely with details about the mortgage. As the timeline progressed and he neared the mortgage closing and home purchase, however, the details became overwhelming. A few days before closing, he realized that he needed to get the city of Worcester's downpayment assistance program because his savings would not cover the downpayment and the closing costs. The mortgage lender that he was working with was not actually qualified to provide that program due to some bureaucratic problems with the city. Within the last 24 hours before the loan closing, James had to find another bank with whom to get a mortgage. Understandably, he talked about this experience as highly stressful.

As he explained, "I would have loved" to have seen all the options for every lender who was qualified to work with the HFA downpayment assistance program he used. "But given I was so crunched for time I felt like I needed to rush, so I used the general guidelines I had for what I wanted, a 30-year loan product," and did not have time to compare specific loans: "I just went with the first thing that I could." Although James was more specific about his preference to shop around at the purchase stage, his experience of the high time and emotional pressure leading to suboptimal comparison shopping was typical of other participants who went through the complete home purchase process.

Factors Influencing Participants' Mortgage Shopping Experiences

Across all stages of the homebuying process, five major influences shaped participants' attitudes and behavior toward mortgage shopping: social networks, real estate professionals, downpayments, time and technology, and participants' financial self-perception. Social networks and real estate professionals have been widely documented as shaping the home search process (for example, Besbris, 2016; Besbris and Faber, 2017; Korver-Glenn, 2018; Pittman, 2008); the same held true in our analysis of mortgage-shopping behavior. Access to money for a downpayment—again noted as a barrier to homeownership in general (for example, Goodman et al., 2017)—was fundamental to the types of mortgages participants sought. Lack of or a limited downpayment created preferences for low-downpayment mortgage products or sent several participants in search of downpayment assistance programs or gifts or loans from family members. In other cases, limited savings confined

participants' budgets to lower home prices. Having flexible time and access to technology gave some participants advantages in the entire home search process, including the mortgage. They could respond quickly to opportunities or requests during working hours, for example, by taking advantage of a flexible schedule to have meetings or using down time at work to scan and fax paperwork. Those without such benefits had more challenges completing home purchase tasks.

Finally, participants' financial self-perception has not been described in prior literature about financial decisionmaking;¹⁹ however, we found that whether participants considered themselves as having bad credit was a major negative influence on their mortgage search process. Other identities, including an aspiration to live debt-free and self-identifying as Black, each affected participants' attitudes and behaviors about mortgage shopping.²⁰ Those influences on the mortgage-shopping process were at play at all stages of mortgage shopping, although the degree of influence for each one varied by participant and by stage of home purchasing.

Summary: Mortgage Shopping Varied by Stage in the Homebuying Process

As shown in the preceding sections, Mortgage Journeys participants' mortgage-shopping behavior varied by the stage they were at in the homebuying process. Exhibit 6 summarizes Mortgage Journeys participants' shopping behavior through each of the different stages. The table also includes best practices recommended by the Consumer Financial Protection Bureau (CFPB) to highlight where Mortgage Journeys participants converged and diverged from these best practices.²¹

CFPB breaks down the homebuying process into four steps that roughly mirror the three phases identified in this paper: (1) Prepare to shop (our preparation phase); (2) Explore loan choices (our decisions phase); (3) Compare loan offers (our purchase phase); and (4) Get ready to close (our purchase phase). The steps listed in exhibit 6 are the detailed recommendations from the four steps identified by CFPB (in some of the variations, we have consolidated some of CFPB's recommendations for ease and to better describe our participants' behavior). In the left column, the graphic shows recommended home shopping behaviors that Mortgage Journeys participants engaged in. The middle column shows activities in which participants either did some variation on the recommended behavior or did so partially. For example, we added homebuyer education as a variation on best practice because it is not explicitly recommended by CFPB but can be a way to accomplish several of their steps (including "build a network of advisers," "learn about loan costs," and "understand the kinds of loans available"). Further, our participants varied in whether they undertook homebuyer education early and proactively or late in the process in response to a loan that required it. The type of homebuyer education also varied, ranging from a one-hour seminar

¹⁹ Besbris (2016) presents a detailed study of how real estate agents incite emotional responses in prospective homebuyers, including individualizing their matches to homes by connecting to salient, positive aspects of homebuyers' identities. Our findings extend this into the mortgage side of the transaction, including both positive and negative identities, although the power of negative identities (for example, not creditworthy) seemed stronger.

²⁰ Specifically, three of our four Black participants (three African-American, one Haitian-American) were wary of the way they believed lenders might treat them because of their race. We did not see this perception among White or Asian participants in the study. An extensive literature documents racial discrimination in mortgage lending (for example, Ross et al., 2008; Turner and Skidmore, 1999), and awareness of those patterns from social networks contributed to Black participants' trepidation.

²¹ Consumer Financial Protection Bureau, n.d.a.

given by a realtor and her team to a full-day course given by a nonprofit organization.

As exhibit 6 shows, participants' mortgage-shopping behavior hewed closer to best practices advice in the early stages but not in the later stages, when the time pressures and complexity increase—precisely at the time the stakes for the mortgage get higher. CFPB's recommendation is to keep open one's field of choices partway through the purchase phase (that is, to submit multiple mortgage applications). By contrast, Mortgage Journeys participants conducted the most research and comparison shopping for their mortgages at the decisions phase; the purchase phase was largely for them to execute those decisions.

This may explain some differences in understanding between consumers and professionals (industry, consumer advocates, and policymakers). Our study suggests that homebuyers perceive shopping around at the prequalification stage to be sufficient, not fully understanding the difference that shopping around at the application stage—when a specific home has been selected—can make to their costs of homeownership. Mortgage Journeys participants also did not seem to distinguish the differences between mortgage originator and mortgage product as specifically as do industry analysts. This goes some way toward explaining how homebuyers perceive themselves to have shopped around for mortgages (that is, researched lenders and products), whereas industry analysts do not (because they do not apply for more than one mortgage).

Exhibit 6

Mortgage Shopping by Homebuying Phase and Best Practices

	BEST PRACTICES FOLLOWED	VARIATIONS ON BEST PRACTICES	BEST PRACTICES NOT FOLLOWED
PHASE 1 PREPARATION	Check (and build) credit	Decide how much to spend on a home	Consider total costs of homeownership
	Determine down payment	Assess spending	Create a loan application packet
	Assess whether to buy now	Homebuyer education	
	Build network of advisers		
PHASE 2 DECISIONS	Understand available loan types	Contact multiple lenders	Learn about loan costs
	Research first-time homebuyer programs	Select the kind of loan that meets your needs	Request & compare multiple loan estimates
			Gather & update paperwork
PHASE 3 PURCHASE	Submit documents & answer questions from lender		Request, review & compare multiple loan estimates
	Schedule home inspection		Consider negotiating loan estimates
	Close loan		Shop for homeowner's insurance, title insurance & closing services
			Review documents before closing

Source: Authors' adaptation of CFPB's "Buying a House: Tools and Resources for Homebuyers"

Discussion

The Mortgage Journeys project enabled several insights about mortgage shopping with implications for housing policymakers, regulators, and industry professionals. Underlying those insights is the observation that the current structure of the home purchase created barriers to mortgage shopping for study participants. This section will discuss those insights before turning to policy suggestions for the mortgage industry to increase the ease of mortgage shopping at each phase of the home purchase process.

Before turning to the discussion of the findings in more detail, we wish to speak to potential concerns about the study's sample size and whether findings based on that sample are sufficient to inform policy. A small, in-depth qualitative sample of this nature obviously cannot be representative or account for every possible scenario across the United States; however, it can provide insights that challenge the assumptions and foundations of mortgage education and mortgage-shopping policy. Those insights come from looking at the underlying social processes that influence mortgage shopping. Four key social processes transcend this study's small sample, providing key insights for the mortgage industry. First, the three phases of the homebuying process and types of mortgage shopping associated with each, which do not match industry perceptions of mortgage shopping; second, the absence of real estate professionals promoting mortgage shopping; third, the distinction in shopping for a mortgage product and shopping for a lender, particularly for first-time homebuyers; and fourth, how participants' financial self-perceptions influenced all these processes.

The first key insight reveals the mismatch between participants' mortgage-shopping activities in each of three phases of the homebuying process and industry expectations of mortgage shopping. Our data illustrate three key stages in the home purchase process (preparation, decisions, and purchase), involving increasing numbers of homebuying and mortgage-related activities and progressively shorter and more deadline-driven time frames. As first-time homebuyers encounter each of the phases, their mortgage-shopping behavior changes. They are most active in mortgage shopping in the two earlier phases of the home search and least active in mortgage shopping in the purchase phase.

As we note earlier in the paper, industry guidelines do not match the mortgage-shopping behaviors of study participants, mostly at the purchase stage. Although industry guidelines rightly encourage consumers to shop for their mortgage once they have an accepted offer on a house (seeking multiple preapprovals or making multiple loan applications), the structure and emotional tenor of the purchase phase presented barriers to mortgage shopping for study participants. The real estate industry—including mortgage lenders—needs to develop tools and processes to enable more accurate mortgage shopping in the decisions phase of the home purchase or reduce the barriers to mortgage shopping in the purchase phase. Later in this section, we suggest some ways policymakers might do that.

The second key insight is that, with the exception of one study participant, we did not hear real estate agents and mortgage lenders encouraging study participants to shop around for a mortgage at any stage in the process. Industry actors such as realtors and lenders, acting as trusted advisers,

are not incentivized to profit when consumers shop around; indeed, they may lose a client with whom they have a close relationship or be forced to cut their profit, and, as Besbris (2016) points out, real estate professionals are incentivized to close as many deals—and at the highest price they can—as quickly as possible. Policymakers need to consider how to incentivize real estate professionals to promote mortgage shopping so that homebuyers and real estate professionals' transactional goals are aligned.

The third insight from the paper is the distinction of shopping for a mortgage lender and shopping for a mortgage product. Some study participants were actively shopping for both the lender and the product, whereas other study participants did not shop for either and trusted the recommendations made early in the home purchase journey by trusted advisers. Helping borrowers understand this distinction and developing recommendations for how borrowers can shop for each at the same time is a critical component.

The fourth insight from the paper is how participants' financial self-perception and prior experiences influence the mortgage search. Self-perceptions and experiences strongly influenced mortgage product and lender preferences. For example, previous denials of credit or having had family and friends experience foreclosures with a particular bank during the Great Recession strongly influenced which lenders those participants sought out and how they presented themselves in the larger home and mortgage search. Although this research cannot outline exhaustively the different kinds of financial self-perceptions, it does highlight the need for the mortgage industry and policymakers to take note of the role of financial self-perception and to consider how to engage with those self-perceptions to homebuyers' benefit.

Understanding homebuyer experiences in this more granular way can help the mortgage industry better reach and serve potential low- and moderate-income homebuyers and ensure that certain segments of the population are not excluded from the benefits of homeownership. More specifically, consumers' perspectives—especially when they do not match the current industry consensus on best practices—can help improve ways the mortgage transaction is structured to allow for easier comparison of mortgage products and to help first-time homebuyers draw on a wider set of prospective lenders.

Policy Implications

This study has the potential to both inform future research and offer some preliminary ideas for making the homeownership and mortgage process more transparent. Increasing the transparency and ease for first-time homebuyers in shopping for both the mortgage originator and the mortgage product is critical because it promotes access to sustainable homeownership and consumers' financial well-being. As policymakers and mortgage industry professionals consider how to do this, incorporating end-user research is critical.

The key insights from this paper could lead to a call for greater consumer education. As a case in point, a response to a research brief about this project from the Mortgage Bankers' Association (MBA) placed the onus of the mortgage-shopping process on consumers (Finkelstein, 2018). From this interpretation, the correct policy intervention is more consumer education to train consumers

how to conform to the industry's standards of best practice. Although we support additional education of first-time homebuyers, focusing only on consumer education would miss the key insight that the structures in the homebuying process discouraged Mortgage Journeys participants from being able to follow best practices. We believe that shifting the “choice architecture” of the homebuyer process is critical for first-time homebuyers to truly engage in mortgage shopping at all stages of the homebuying journey. In this final section of the paper, we suggest some possible directions for policymakers and industry to consider with that goal in mind.

Shift mortgage-shopping “choice architecture”: The primary goal of restructuring the mortgage-shopping process should be to ease the process of comparison shopping and increase transparency for consumers, particularly at the mortgage application stage. We urge housing policymakers and industry professionals to follow the turn in other industries toward using human-centered design and behavioral insights to gain additional consumer insight and to test emerging ideas for a revised choice architecture. Based on the key insights from this paper, we suggest several options to alleviate friction points and enable easier and more transparent mortgage shopping.

To address the lack of mortgage shopping in the purchase phase, one option might be to increase the ease of submitting multiple mortgage applications. We suggest the creation of a mortgage application portal where consumers could submit a single application, including required documentation, once they had an accepted sale and purchase agreement on a property and have the application sent to multiple institutions for a mortgage quote.²² Ideally, applications could be either online or in person through a participating lender so that consumers with lower access to or comfort with technology would not be excluded from the service.²³ Prospective homebuyers could choose to receive multiple quotes from different types of mortgage institutions (for example, a credit union within X miles of the home, an online-only lender, a regional or national bank). Such a tool might also incorporate standard comparisons of mortgage rates between different types of mortgage originators (for example, broker, lender, and bank). Achieving scale with the new mortgage portal is critical to increase consumer choice and improve rates of mortgage shopping among a large number of participating lenders and type of products—including first-time homebuyer products.

Although creating a national mortgage portal or an underwriting clearinghouse may sound daunting, it is not unprecedented. For example, the Free Application for Federal Student Aid (FAFSA) provides an approximate analogy: prospective college students and their families gather

²² Mortgage brokers offer the service of contacting multiple institutions to provide clients with mortgage quotes; however, the brokerage system is not necessarily transparent, and mortgage brokers' incentives may not be aligned with consumers' needs. Some online mortgage calculators also present comparison shopping options: they estimate mortgage information based on details a consumer enters on the website, then link to “offers” from many lenders showing a lender name, annual percentage rate, and estimated monthly payment. Each entry has a link to “learn more,” which takes the user to the lender's website to provide details of their expected mortgage again. This lender-by-lender process is more burdensome for the consumer, especially in providing documentation, and does not allow for ready comparability of quotes.

²³ Recent years have seen an increase in online lenders—such as Rocket Mortgage, SoFi, and Lenda—that attempt to streamline the mortgage application process. They do so by getting electronic information about applicants' earnings, assets, debts, and credit scores through financial institutions. Although this eases the burden on consumers to find, copy, and deliver copies of financial documents, applicants receive a quote only from the lender they select, rather than obtaining multiple quotes they can compare.

financial information for one application, and the results can be sent to multiple colleges and lenders of the student's choice. Already in the mortgage industry, major players have created the Mortgage Electronic Registry System (MERS) to facilitate mortgage sales on the secondary market. MERS is a private database that allows secondary mortgage market actors to keep a mortgage registered to MERS even as it is bought and sold by different investors, rather than having to update county-level public records with each transaction. These examples suggest that when sufficient benefit and sufficient will exist, an integrated system such as we suggest is feasible.

Enable prepurchase mortgage education: This study's key findings could be the basis for a prepurchase mortgage education or counseling tool to increase borrowers' awareness of the kinds of factors that may influence their mortgage journey. By making those factors explicit, housing counselors could help homebuyers best align the mortgage product (according to a variety of features) for their particular situation or suggest how to identify and navigate sources of information. Although we envision this for use in housing counseling, it could also potentially be used by real estate agents or other trusted advisers. Alternatively, it could be a self-guided tool or a smartphone app. Such a tool would help make explicit potential homebuyers' financial self-perceptions, for example, by exploring positive or negative banking, credit, and debt experiences, as well as those of family and friends, that might influence their mortgage journey. Homebuyers could then explore their options and compare products from a broader range of lenders.

Homebuyers most often use housing counseling services as a loan closing requirement—too late to affect loan choice. This study and others have found that homebuyers respond to professionals that are emotionally available to them at critical moments in the homebuying and mortgage journey. Instead of providing counselors, and in addition to real estate professionals, policymakers might consider making homebuying coaches available to first-time homebuyers. A coaching model differs from current homebuyer education courses.²⁴ Services are client led, provide one-on-one guidance, and only deliver content specific to each person's situation. Both a prospective tool and homebuyer coaching would reach their broadest audiences by being available online or, in the case of coaching, online (video chats, chat windows) or by phone.²⁵

Another avenue for broadening mortgage education is to embed the content into widespread media, such as HGTV or popular financial advisers. The mortgage preparation content could be embedded in existing programs or incorporated into a new show focused on first-time homebuyers. Hosts could also increase the amount of financing-related tips they give in segments around commercial breaks.

²⁴ A major difference between homebuyer education and coaching is that homebuyer education intentionally covers a broad set of topics—including home maintenance and potential delinquency—that prospective buyers may not even be aware of. By contrast, financial coaching (on which homebuyer coaching could be based) is explicitly driven by a client's goals. If practitioners were to develop homebuyer coaching services, standards and practices would be needed for how to allow client priorities to drive the engagement while still introducing content beyond their immediate concerns.

²⁵ HUD's first-time homebuyer study found that study participants assigned to use remote housing counseling services did so at more than twice the rate of participants assigned to in-person homebuyer education (63 percent versus 26 percent) (Moulton et al., 2018).

Work with real estate agents and lenders to encourage more comparison shopping: Real estate agents and mortgage lenders both have strong incentives to keep homebuyers within their networks, and little evidence indicates that either group routinely encourages comparison shopping and may indeed discourage it. Homebuyers could potentially benefit from engaging a third-party adviser with no financial stake in their purchase. Because of the primacy of real estate agent and lender relationships, they are key partners to engage in referring prospective homebuyers to nonprofit housing counseling or homebuyer education.

Currently, real estate and mortgage broker education has limited—if any—information on such services. Including information on third-party nonprofit education options in real estate professionals' training is an important first step. We further suggest that state government or nonprofits pay a small referral fee to real estate agents who refer their clients to a third-party certified nonprofit housing counseling or homebuyer education resource. States could also structure an incentive, such as a mortgage interest rate buy-down (an eighth of a point, for example) or a rebate for some amount of closing costs, after a first-time homebuyer has gone through a certified homeownership education program.

These are only a few of the potential routes that policymakers could consider to increase homebuyers' mortgage shopping. We are confident that industry stakeholders and policymakers will see additional ways to engage with the insights from this paper. By better understanding first-time homebuyers' attitudes, resources, and experiences, industry and policymakers are better equipped to meet their needs.

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The American Dream or Just an Illusion? Understanding Land Contract Trends in the Midwest Pre- and Post-Crisis

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Disclaimer: The views expressed in this work are not necessarily those of the Federal Reserve Banks of Atlanta, Chicago, or Cleveland, or of the Federal Reserve System.

Abstract

This paper examines contract for deed activity across six Midwestern states to improve our understanding of this market and the places in which this activity occurs. Using contract for deed transaction data from ATTOM Data Solutions and block group level data from the U.S. Census, we examine neighborhood characteristics where contract for deed activity is prevalent and assess the differences between contract for deed sales and mortgaged sales on select transaction characteristics. We find contracts for deed tend to be more concentrated in neighborhoods with lower incomes, higher shares of non-White residents, higher rates of vacancy, and less access to traditional mortgage credit. When compared with mortgaged sales, contracts for deed are more likely to be entirely financed and have sales prices that fall below mortgaged sale prices. The strongest findings from this analysis indicate that contract for deed activity varies greatly by area and tends to concentrate in communities with weak housing market indicators.

Introduction

Access to purchase mortgage credit has remained limited in the wake of the Great Recession, particularly for communities of color, distressed local housing markets, and other underserved areas. In the near absence of traditional mortgage credit in certain markets, contract for deed activity has gained attention as an alternative means of financing home sales. Little is known about contract for deed activity, however, beyond analyses focusing on smaller geographies and corporate sellers.

Lack of reliable data makes it difficult to analyze contract for deed activity. This data deficiency stems from the uneven reporting requirements and adherence to these requirements within and between states. National data were previously available through the U.S. Census' biennial American Housing Survey. Unfortunately, the survey eliminated this question after 2009. Thus, national data have been lacking for a decade, a period in which the housing market underwent massive fluctuations and restructuring.

Procuring disaggregated data previously required intensive data scraping or public records requests on a county-by-county basis, a process that made regional or national analysis burdensome. Thus, recent analyses of contract for deed sales have focused on small geographic areas in jurisdictions where recordation is required or on identifying properties owned by certain large-scale sellers such as Harbour Portfolio Advisors LLC, a process that is complicated by the dozens of related entities under which these sellers operate. For example, the Wisconsin attorney general identified 39 limited liability corporations associated with one corporate seller of contracts for deed, Vision Property Management, LLC.

With the acquisition of a new data set containing approximately 400,000 valid land contracts recorded between 2004 and 2017, this paper builds on existing research by documenting neighborhood and contract characteristics of contract for deed activity across six contiguous Midwestern states that require or have a custom of contract for deed reporting, including Indiana, Iowa, Michigan, Minnesota, Ohio, and Wisconsin.

The scope of our research question is somewhat different from prior work on this topic. Previous studies have focused on contract for deed activity associated with institutional investors and corporate sellers and have examined whether these institutions have exhibited predatory behavior toward African-American communities. These studies have identified institutional investor names through news and legal sources and have flagged real estate transactions involving these entities as likely contract for deed property sales. In contrast, our study asks what demographic, socio-economic, and housing market factors are associated with all contract for deed activity, the majority of which is non-institutional. While not all contract for deed activity is predatory in nature, there are negative implications for households regardless of who the seller is, such as the inability to accrue housing equity and the lack of consumer protections offered by a traditional mortgage. Therefore, it is crucial for policymakers to understand what factors are associated with contract for deed activity irrespective of whether institutional investors are involved.

The differences in our research question compared with prior literature are important to bear in

mind when we interpret our results. Notably, we do not examine whether institutional contract for deed sales disproportionately affect African-American communities or other vulnerable populations, a finding which is now well established, because our data include mostly non-institutional sellers. We do examine, however, whether contract for deed activity overall is more prevalent in communities of color, low-income communities, and distressed housing markets.

Background

Contracts for deed are variously known as land contracts, installment contracts, lease contracts, sales contracts, bond for deed, bond for title, agreement for deed, and, colloquially, as a “poor man’s mortgage” (Carpenter, Lueders, and Thayer, 2017). Ta-Nehisi Coates described the practice as “...a predatory agreement that combined all the responsibilities of homeownership with all the disadvantages of renting—while offering the benefits of neither” (Coates, 2014).

Essentially, the contract for deed instrument is a private real estate contract between a buyer and seller. The parties agree to a transaction amount, downpayment, and interest rate similar to a traditional mortgage. The amortization period ranges, generally, from 5 to 30 years and may include one or more balloon payments. The deed to the property does not transfer to the buyer, however, until the final payment has been made. In theory, this arrangement could be favorable to a buyer without a credit score sufficient to secure a mortgage or for buyers lacking access to formal financial services. Parties may also benefit from the speedier process, relative to a traditional mortgage. The contract for deed is unduly risky for the buyer, however, who builds no equity and has a higher risk of being forced out of their residence.

The contract itself may contain various terms for the use of the property during the period of repayment, many of which are particularly unfavorable for buyers. Contracts sold by corporate entities examined by journalists and advocates have noted several of these adverse terms (Battle, Mancini, Saunders, and Williamson, 2016; Goldstein and Stevenson, 2016). A forfeiture clause is a common element that allows the seller to take back the property for any breach of contract. In this scenario, the buyer loses any equity and investment made to improve the property as well as the property itself. The forfeiture scenario also allows the seller to avoid the purchaser’s equity of redemption, the foreclosure process, and other protections afforded by a traditional mortgage (Nelson, 1998).

Additionally, properties are also often sold as-is, without an inspection or appraisal. For example, the aforementioned corporate sellers bought many of their properties offered under contracts for deed from bulk foreclosure sales. Often, these properties were previously abandoned with untold condition issues that were not disclosed to the buyer. Certain corporate contracts require homebuyers to bring the property up to habitable condition within a given window of time, sometimes as little as a few months. Buyers are also responsible for insurance, property taxes, and all other maintenance expenses. Contracts may stipulate that failure to improve the property condition or to cover these expenses results in forfeiture.

Finally, properties sold with a contract for deed may also be plagued by clouded title issues and tax and home equity liens or rendered insecure by an existing mortgage on the property. In all

such situations, the contract buyer's inferior claim on the property produces the risk of eviction or foreclosure, such as if the seller neglects to make payments on a mortgage.

Contracts for deed are disproportionately found in low-income communities where houses are older, in substandard condition, and access to mortgage credit is limited, as well as in low-income immigrant communities such as the Texas colonias (Way, 2009). Historically, the practice gained notoriety in the 1960s and 1970s in Chicago, where redlining made contracts for deed the only alternative for many buyers of color in neighborhoods where property values had been deliberately depressed by blockbusting tactics (Satter, 2009). In Chicago communities like Lawndale, White sellers were convinced to sell their properties to avoid a price depreciation expected to accompany the arrival of African-American families. Speculators would then sell the homes at inflated prices with very high-interest rates using installment purchase contracts (McPherson, 1972). The contracts were designed to fail, allowing the seller to reclaim the property, a form of equity stripping.

As noted previously, many recent studies and articles have focused on corporate sellers using contracts for deed. Research focused on the reemergence of contracts for deed has established that properties offered by corporate sellers, specifically Harbour Portfolio Advisors LLC in Atlanta, are disproportionately located in majority African-American neighborhoods (Battle et al., 2016), even when controlling for levels of foreclosures (and thus available housing stock for resale) by area (Immergluck, 2018). A recent analysis by Seymour and Akers (2019) found that among seven large-scale contract sellers that acquired properties from Fannie Mae bulk sales, there was a clear relationship between the concentration of properties and the percentage of African-American residents at the regional level and, for the two largest sellers, at the census tract level.

In addition to the damages to individuals and families' finances and housing security, the practice of contract for deed sales has a destabilizing effect on communities. Neighborhoods that were hit hardest by the subprime lending and foreclosure crises are among those with the highest concentration of contract sales. Housing instability caused by the churn of mortgage and tax foreclosure, speculation, contract for deed sales, and failed contracts resulting in eviction has also been observed. In Detroit, this "accumulation by dispossession" continues to occur, virtually unchecked if not buttressed by local law and its selective enforcement (Akers and Seymour, 2018). In 2015, there were more contracts for deed than home mortgages in Detroit (Kurth, 2016).

Mortgage credit constraints have persisted into the economic recovery, particularly for low-cost properties priced \$70,000 or less, due in part to fixed origination costs and regulatory issues that make small-dollar loans economically unappetizing to lenders, appraisal gap problems, and poor property conditions (McCargo, Bai, George, and Stochak, 2018). Recent research has also shown that corporate-owned contract for deed properties tend to be located in neighborhoods with lower than average numbers of bank branches per capita, indicating a potential lack of access to the formal financial system and to mortgage credit (Carpenter et al., 2017).

While a full scan of state laws pertaining to contracts for deed is beyond the scope of this article, a Uniform Law Commission survey covering 25 states found that the majority of respondents (82 percent) stated that their home state has some form of remedy for default, including forfeiture

(Higer, 2017). Most (61 percent) also require some type of disclosure on contract for deed sales. Only 47 percent of respondents provide a right of redemption on foreclosure or forfeiture, however, and only 45 percent stated that contracts are recorded. Overall, only 35 percent felt that the law is functioning as intended, and most respondents felt legal reform was necessary.

In states such as Florida, Maryland, and Oklahoma, buyers enjoy relatively strong protections equal to those with traditional mortgages, such as the right to a foreclosure sale and receipt of surplus funds (Way, 2009). In states where the foreclosure process is more costly, such as Illinois, Ohio, and Texas, such protections are deferred until a given percent of the contract has been repaid (Way, 2009). Protection varies by state, however, and enforcement can be spotty. Furthermore, the onus is on the buyer to exercise his or her rights, and many buyers may lack the resources or knowledge to seek recourse. Given the recent attention to contract for deed sales, legislative efforts to address the predatory aspects of contracts for deed have included a proposed bill in the Georgia House of Representatives meant to provide greater consumer protections (H.B. 456) and a proposed bill in the Ohio House of Representatives that would require properties be brought up to code and require an appraisal prior to sale (Wier, 2018).

The state of Texas is among a handful of states that have passed reforms to protect contract for deed buyers, including a reporting requirement to better track contract for deed sales. A comprehensive study focused on contract for deed sales in the Texas colonias found that, while legislative reforms have curbed these sales in Texas, it remains a common practice in low-income, predominately Hispanic border communities (Ward, Way, and Wood, 2012). The authors found that most contract for deed buyers did not have success in obtaining a deed (less than one-fifth of all contracts recorded between 1989 and 2012 obtained a deed). An alarming 45 percent were canceled, signifying the likely loss of property and investment. In contrast, the peak foreclosure rate during this time was 6.4 percent nationwide and 11.9 percent for Hispanic homeowners. Based on survey data, many homesteaders (between 8 and 13.8 percent) in this area were found to have unrecorded contracts, generally because they were unaware of the reporting requirement in Texas.

At the local level, jurisdictions such as Toledo and Youngstown, Ohio, have focused on the impacts of substandard housing and code violations, including not only harm to residents but also public expenses incurred for lawn maintenance, trash removal, and failure to pay taxes and fines. For instance, in 2015, Toledo passed an ordinance requiring properties to pass a city inspection (and obtain a Certificate of Property Code Compliance) as well as recordation of the contract (see Toledo Municipal Code Section 1765). Cincinnati adopted similar regulations requiring a certificate of occupancy and recordation in 2018 (see Cincinnati Municipal Code Chapter 870). Cincinnati also settled a lawsuit with both Harbour Portfolio Advisors LLC and Vision Property Management, LLC over nuisance properties, the terms of which included fines, disclosures, and code compliance prior to sale, and an agreement to rehabilitate or forfeit vacant properties (Leggate, 2018).

As in Cincinnati, legal action has been taken in several municipalities and states against sellers such as Harbour Portfolio Advisors LLC and Vision Property Management, LLC. For example, the Wisconsin Department of Justice filed a lawsuit against Vision Property Management, LLC for “misleading and deceiving business practices to induce Wisconsin consumers to lease, rent, or purchase uninhabitable properties in violation of Wisconsin landlord-tenant and mortgage

banking laws” (Schimel, 2017b). While a settlement is pending as of January 2019, a temporary injunction against Vision Property Management, LLC was obtained (Schimel, 2017a). In 2017, a group of plaintiffs filed suit against Harbour Portfolio Advisors LLC in Georgia alleging fair housing violations and unfair and deceptive practices (*Horne v. Harbour Portfolio VII, LP, et al.*). Similarly, plaintiffs in Mahoning County (Youngstown), Ohio, filed suit against Vision Property Management, LLC in 2018 (*Bracetty et al. v. Vision Property Management, LLC et al.*). At the federal level, the Consumer Financial Protection Bureau subpoenaed Harbour Portfolio Advisors LLC in 2016 to better understand its business practices. While many of these cases are pending, they demonstrate that some contract buyers have been empowered to seek recourse through the work of legal aid services and other advocates.

In light of the recent attention to the issue and the need to craft policies that protect home buyers and communities, we used newly available national data to examine patterns and trends in recent contract for deed sales in the Midwest.

Data Overview and Descriptive Statistics

In 2017, private real estate vendor ATTOM Data Solutions announced the creation of a national transaction-level database of contract for deed transactions spanning 2005 to 2016. Given the need for an understanding of contract for deed activity and the impact of contracts for deed on communities and families, the Federal Reserve Banks of Atlanta, Chicago, and Cleveland jointly acquired this database with the intent of performing a national analysis.

Overall, our ATTOM database included 407,237 transaction records on residential properties with around 200 individual fields associated with the grantee, grantor, and property. While contracts in the database were recorded in 45 out of 50 states, the majority of those records (282,360 records, or 69 percent) were found in six Midwestern states: Michigan (which entailed 25 percent of all records), Ohio (13 percent), Wisconsin (11 percent), Minnesota (8 percent), Iowa (7 percent), and Indiana (6 percent). These contiguous states are among a handful with a requirement that some type of legal record must be generated when a contract for deed is made; either the contract itself or a memorandum must be recorded or a transfer tax form or electronic certificate of real estate value must be filed. Given the low numbers of contracts reported elsewhere (possibly signifying weak adherence) as well as market differences between regions, we chose to focus on these six states. Illinois passed a similar law requiring recordation, but it was not implemented until 2018.

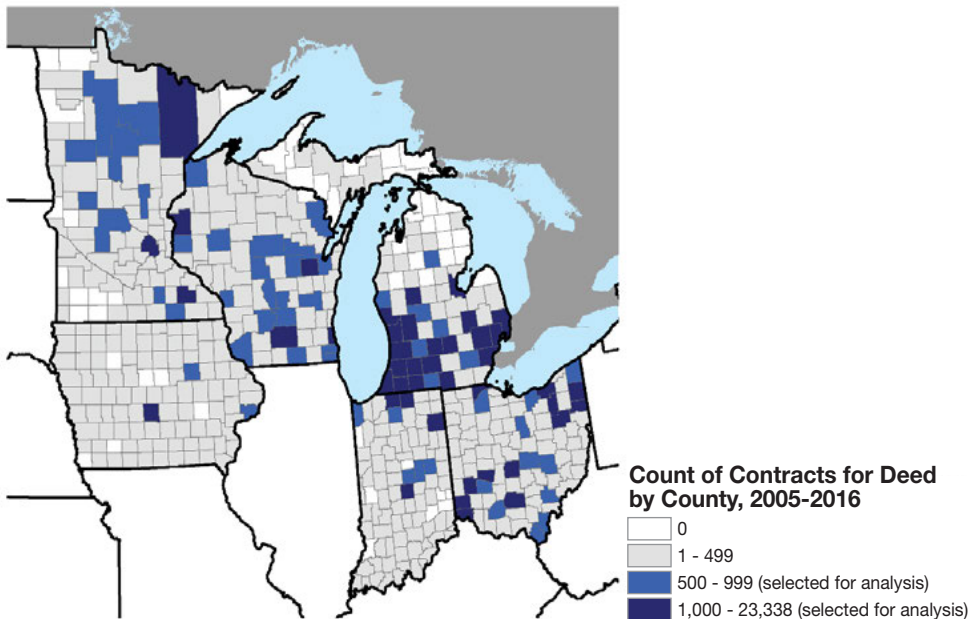
We geocoded each individual transaction record by the given property address. Of the 282,360 records in our six-state study area, 210,728 (75 percent) were geocoded to at least street level. An additional 1,837 records were geocoded using other available fields. Finally, 592 of the total records were removed due to unusual land use codes such as hotels and group homes. Thus, we were able to analyze 211,973 (75 percent) total transactions over a six-state area. We merged these records with CoreLogic, Inc. real estate data at the property level to provide additional property and transaction characteristics as well as tax assessment information.

The number of sales by county ranged from 0 to 23,338. It was clear from our geocoding that county-level adherence to reporting requirements was uneven as well, as the function is the

responsibility of the local registrar of deeds. In order to ensure our analysis included counties with reasonably sound enforcement and a level of activity sufficient to inform our analysis, we selected only those counties with at least 500 contracts recorded from 2005 to 2016 for further analysis including neighborhood characteristics. This selection included 99 counties in total (see exhibit 1). A full list can be found in the appendix.

Exhibit 1

Count of Contract for Deed Transactions by County in Six-State Study Area



Source: Authors' tabulations of ATTOM land contact data

In this section, we provide descriptive statistics where our data include a sufficient number of contract for deed records for analysis. In the following section, where sufficient data exist, we constructed a predictive model to examine potential drivers of contract for deed activity and impacts on communities.

It should be noted that local experts, such as legal aid representatives, believe that only around one-fourth to one-fifth of all contracts are recorded. We thus believe that our data represent only a subset of all contract for deed transactions. The ATTOM data set, however, is the only available data at such a large scale that includes both small, individual sellers as well as corporate sellers. Therefore, we feel that these data are uniquely able to provide a broader picture of which communities are most likely to produce contract for deed sales and what the potential impacts are.

Descriptive Data for All Transactions, Six-State Study Area

One benefit of the ATTOM data set is the ability to examine components of individual contracts, such as the interest rate and sales amount. Unfortunately, for many fields, data were missing or

appeared to have input errors. We were able to supplement missing information by matching 36 percent of the ATTOM transactions to a second data source, parcel-level CoreLogic, Inc. real estate deed records, by transaction date and amount, which provided additional interest rate and mortgage term information. Despite the suspected noise, we were able to use these data fields to better understand trends across the 282,360 transactions in the six-state area for several characteristics of the contracts for deed created between 2005 and 2016.

All transactions included a valid transaction date, including the year. The median and mean year of all contracts in the dataset was 2010. A small number of transactions (7,723, or 3 percent) were outside of the period of data shown in Exhibit 2. The number of contract for deed transactions peaked in 2010 and remained relatively high through 2012, after which it has steadily declined. Given the high number of transactions in 2005, an even larger volume prior to the data collection period is possible, although we cannot know from the ATTOM data set.

Exhibit 2

Number of Contract for Deed Transactions by Year in Six-State Study Area

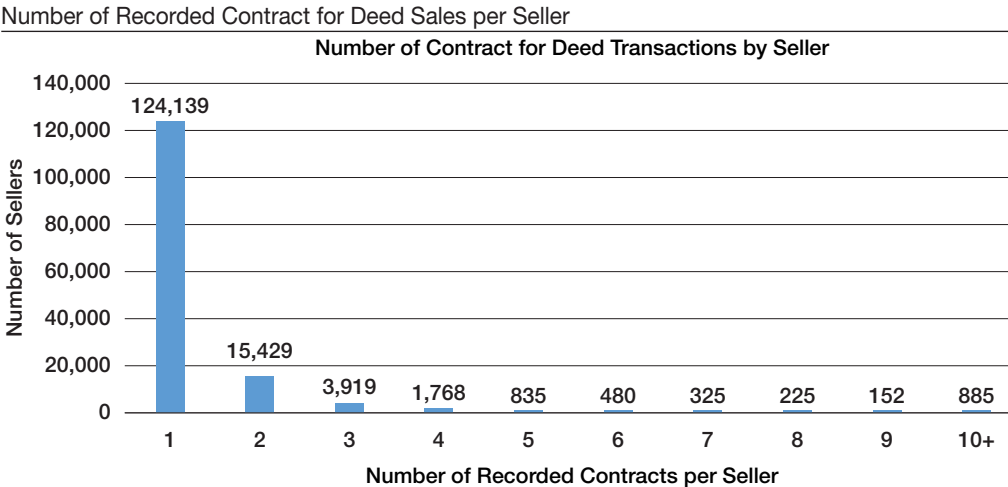


Source: Authors' tabulations of ATTOM land contract data

As previously noted, much of the literature on contracts for deed focuses on the large sellers of contracts for deed such as Harbour Portfolio Advisors LLC and Vision Property Management, LLC among others. Carpenter, Lueders, and Thayer (2017) found that these companies also sold properties in Jefferson County, Alabama, but, unlike the previous studies, the majority of contracts for deed sellers in their analysis sold only one property. After removing 339 records without a seller name, we also find that the majority of the contract for deed sellers sold only one property across the six states we examined (Exhibit 3). There were 124,139 one-time sellers of contracts for deed, comprising about 59 percent of all contract for deed sales and more than 15,000 sellers who sold two properties (comprising nearly 15 percent of all sales). There were 885 sellers who sold at least 10 properties from 2005 through 2016, accounting for 12 percent of all contract for deed sales.¹

¹ We standardized seller names by removing extraneous punctuation and correcting known name misspellings, particularly of corporate sellers, before grouping sellers by the number of sales.

Exhibit 3

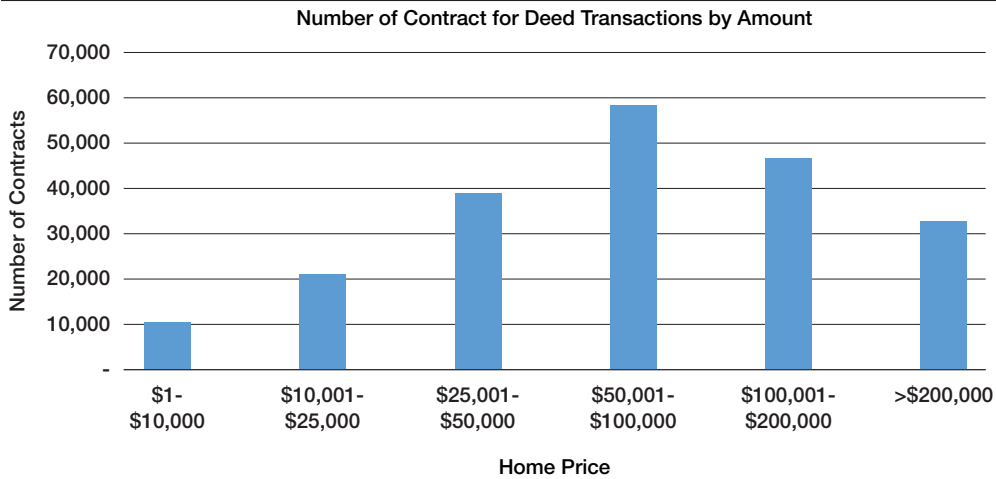


Source: Authors' tabulations of ATTOM land contact data

Transaction amount, or home price, data were available for 208,252 records (74 percent). The transaction amount varied between 0 and several million dollars. The median amount was \$74,900 and the mean was \$147,139. The majority of sales (70 percent) were less than \$100,000 in value. A large share of sales (22 percent) was between \$50,000 and \$100,000. A total of 39 transactions were greater than \$10 million and 2,408 transactions were more than \$1 million. Many of these very-high-value transactions are believed to be input errors and are indicative of the noisiness of these data. The contract documents for several transactions were purchased from a vendor and spot-checked. These contracts were all found to be valid, although this exercise was not exhaustive, therefore, invalid transaction amounts may be present.

Exhibit 4

Number of Contract for Deed Transactions by Amount in Six-State Study Area

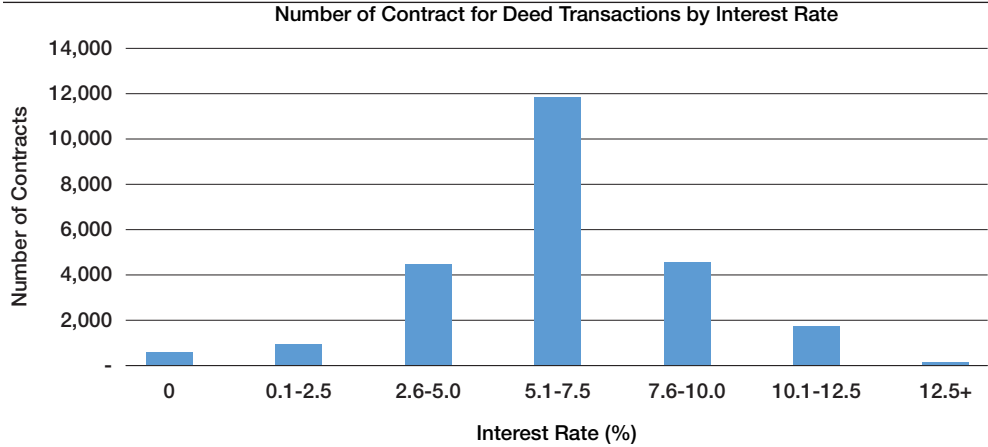


Source: Authors' tabulations of ATTOM land contract data

Interest rates were only available for 24,187 records (8 percent of total), therefore, it is difficult to know if the values reported are representative. We are not aware of any other data source that provides this information in a standardized format, however, making these data the most complete analysis of contract terms available. Interest rate information was found in records from within 91 out of 99 counties and from within all six states. Based on these data, the median interest rate was 6.0 percent, and the mean was 6.3 percent. Interest rates varied between 0 and 50 percent, with the largest share (49 percent) between 5 and 7.5 percent. The majority (63 percent) were above the current prime mortgage rate of 5.25 percent. This number is a conservative figure, given increases in the prime rate during the period observed, therefore, a larger share of contracts during the time period carried interest rates above the prime rate. Next, we compared interest rates with the transaction amounts in an effort to better understand the relationship between these two contract characteristics. We found that as interest rates declined transaction amounts increased, but this relationship was relatively weak (correlation coefficient of -0.21).

Exhibit 5

Number of Contract for Deed Transactions by Interest Rate in Six-State Study Area

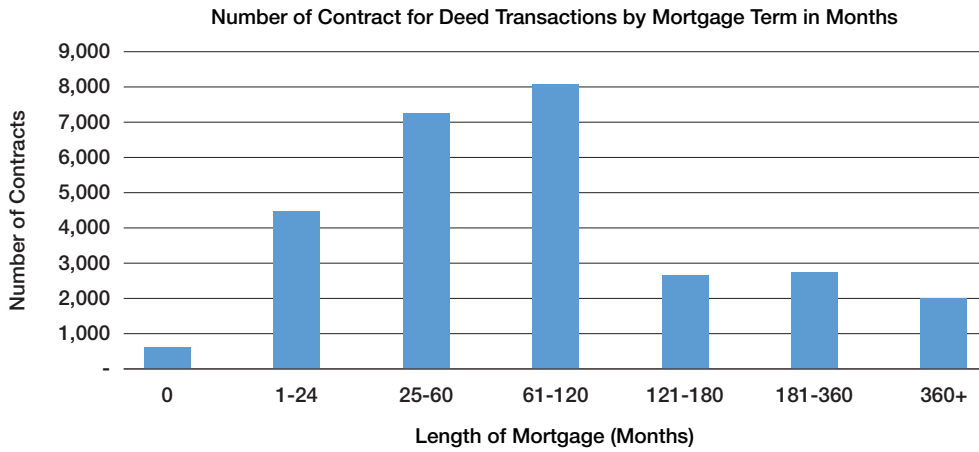


Source: Authors' tabulations of ATTOM land contact data

Similar to the interest rate data, values for the mortgage term were only available for 27,959 records (10 percent). Term information was found in records from within 88 out of 99 counties and from within all six states. The median term was 5 years, and the mean was 7.8 years. Mortgage terms varied between 0 and 1,224 months, with the largest share (29 percent) between 61 and 120 months. Most (73 percent) contracts were signed for terms of 10 years or less, although fairly sizable numbers of 15- and 30-year terms were also recorded. When assessing the relationship between the lengths of the mortgage terms and the size of the transactions, we found a positive but weak relationship between these two characteristics (correlation coefficient of 0.13).

Exhibit 6

Number of Contract for Deed Transactions by Mortgage-Term Months in Six-State Study Area

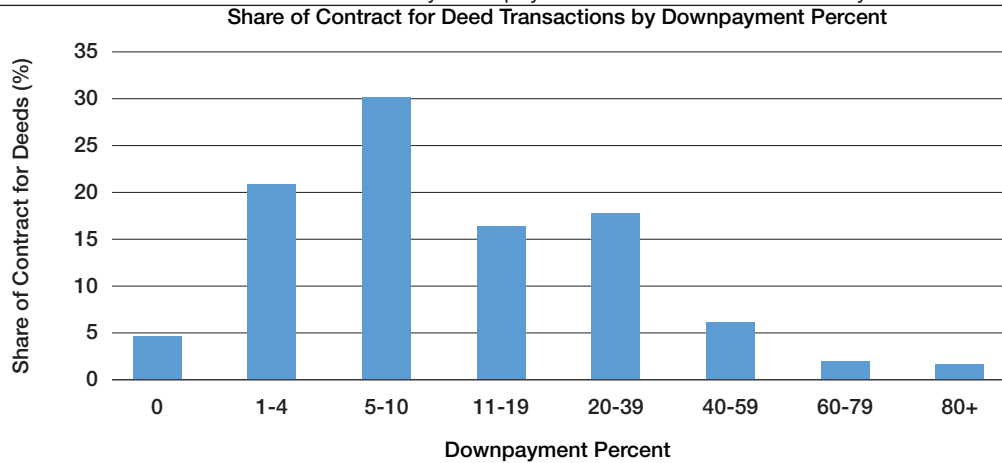


Source: Authors' tabulations of ATTOM land contract data

Values for the downpayment were only available for 14,828 records (7 percent). Downpayment information was found in records from within 79 out of 99 counties and from within all six states. To calculate a downpayment percent, we divided the downpayment amount by the transaction amount. Downpayment percent ranged from a low of zero percent to a high of 99 percent with a median of 10 percent down and an average downpayment of 17 percent. The majority of the contract for deed buyers (56 percent) provided a downpayment of 10 percent or less with more than 26 percent of the buyers putting less than 5 percent down. A weak, positive relationship existed between the percent down and the transaction amount (correlation of 0.09).

Exhibit 7

Share of Contract for Deed Transactions by Downpayment Percent in Six-State Study Area



Source: Authors' tabulations of ATTOM land contract data

Comparison of Contract for Deed Sales with Other Sales Transactions on Select Loan Characteristics

To get a sense of how contract for deed sales compare with other sales transactions, we examined select loan characteristics across these two groups. To identify our comparison group, we merged the contract for deed sales to CoreLogic, Inc. real estate deed records by parcel number and transaction date.² Properties from the CoreLogic, Inc. data that were not matched served as our comparison group. This analysis is limited to the aforementioned 99 counties with at least 500 contracts recorded from 2005 to 2016. Our comparative analysis covers 2005 to 2015, however, as 2016 CoreLogic, Inc. deeds data were not available. There were 148,695 geocoded contract for deed records in the years 2005 through 2015. Non-zero mortgage amounts were available for 29,214 contract for deed records (20 percent) and used to calculate loan-to-value rates.

Comparison of Loan-to-Value (LTV) Ratios

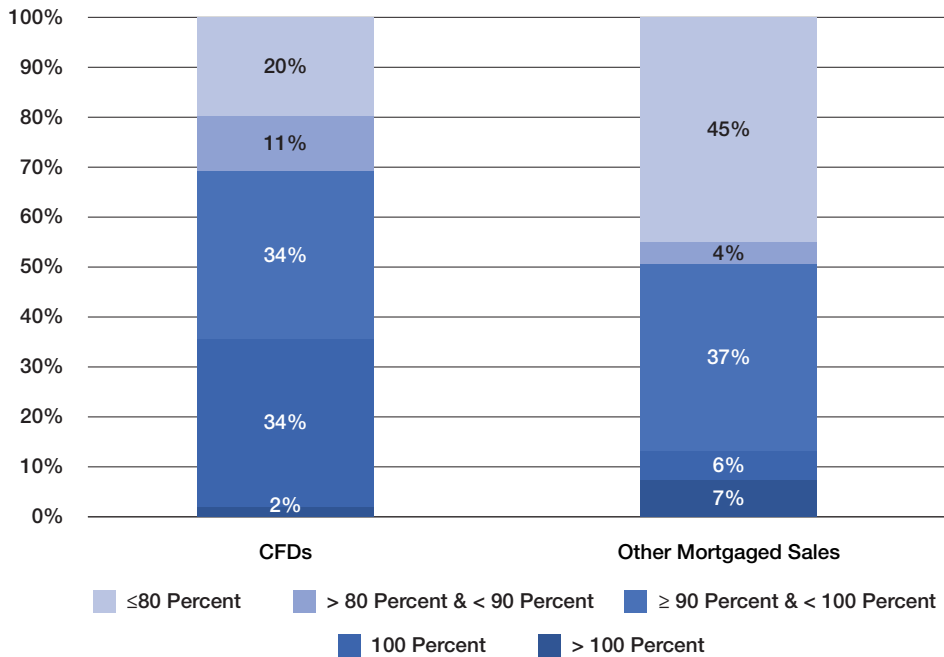
One assumed advantage of a contract for deed is the ability to finance a transaction at a very high loan-to-value (LTV) rate. In order to validate this assumption, we looked at the differences in the LTV ratios between contract for deed sales and mortgaged sales. We calculated the LTV by dividing the mortgage amount by the sales price. As illustrated in Exhibit 8, contract for deed sales had higher LTVs when compared with all other mortgaged homes. The majority of contract for deed sales (69 percent) had LTVs at or above 90 percent with about 36 percent entirely financed by the

² CoreLogic, Inc. real estate data were not available for all counties in all years and were only available through 2015. Of the 99 counties included in our analysis, CoreLogic, Inc. data coverage existed for 79 counties in 2005, 83 in 2006, 86 in 2007, 88 in 2010, 91 in 2011, 93 in 2012, 93 in 2013, 91 in 2014, and 96 in 2015. Thirty-six percent of the ATTOM contract for deed transactions were successfully matched to the CoreLogic, Inc. data by transaction date and amount in the six states.

borrower. By comparison, only 13 percent of the other mortgaged homes were wholly financed by the borrower with 51 percent of them with LTVs that equaled or exceeded 90 percent.

Exhibit 8

Share of Contracts for Deed and Other Mortgaged Sales by Loan to Value Ratio in 99-County Study Area



CFD = Contract for Deed.

Note: Numbers may not add to 100% due to rounding.

Source: Authors' tabulations of ATTOM land contact data

Comparison of Contract for Deed Sale Prices with Sale Prices of Other Home Sales

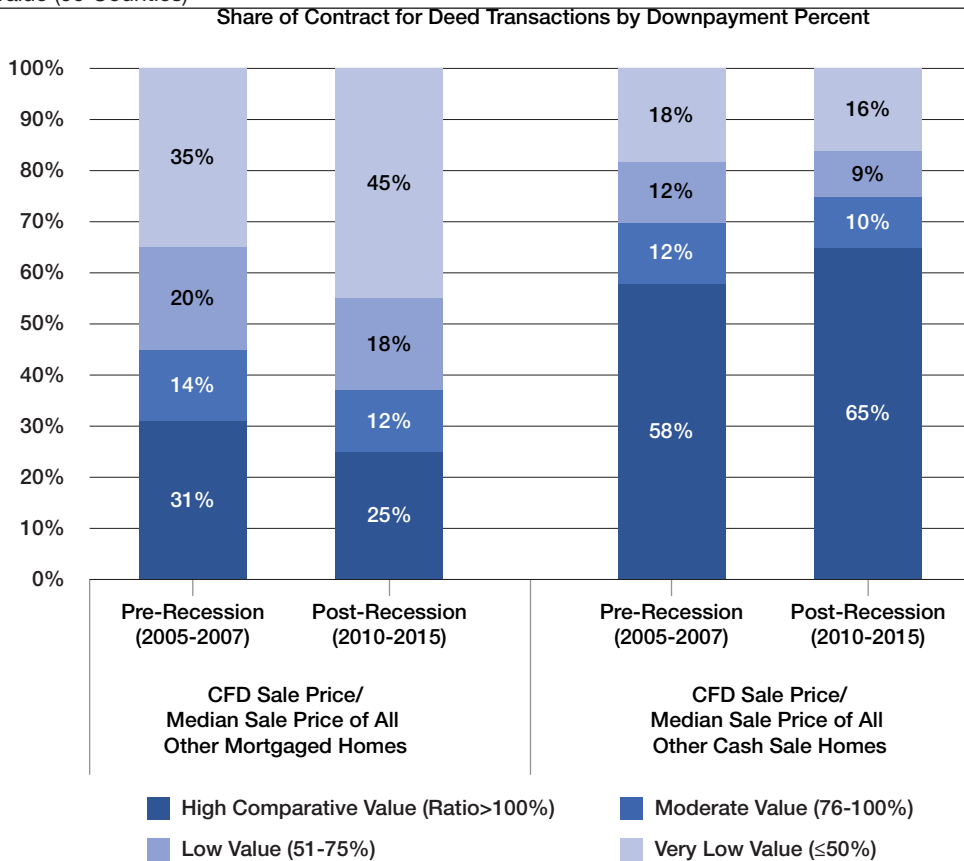
Another presumed reason for entering into a contract for deed is the low value of the property and consequent difficulty securing an appraisal for mortgage financing. Therefore, we examined the differences in sale prices between contracts for deed and all other home sales. Within the latter group, we identified mortgaged home sales and cash home sales for each county and year. To look at the differences in contracts for deed and these two other types of sales, we calculated a ratio of the individual contract for deed sale price in a given county and year over the median price of the other home sales in that same county and year. We grouped the ratios into four categories: very low value (less than or equal to 50 percent of county median); low value (between 50 and 75 percent of county median); moderate value (between 75 and 100 percent of county median); and high comparative value (greater than 100 percent of county median). We compared these ratios across the pre-recession (2005 to 2007) and post-recession (2010 to 2015) periods.

We found that the largest share of contract for deed sales fell into the very low-value category in both periods (exhibit 9). In the post-recession period, 45 percent of contract for deed sales were less than one-half the typical sales price of mortgaged homes, which was an increase of 10 percentage points in the share of very low-value contract for deed home sales compared with the pre-recession period. Nonetheless, as depicted in exhibit 9, 25 percent of contract for deed sales prices exceeded the typical sale price of other mortgaged homes in the post-recession period (down from 31 percent in the pre-recession period).

Looking at the sale price ratios between contract for deed sales and cash home sales, we again saw distinct differences. Here, we found the majority of the contracts for deed had sale prices that exceeded the typical sale price of home cash sales in both time periods. More than 65 percent of all contract for deed sale prices exceeded the home cash sales prices in the post-recession years, up from 58 percent in pre-recession years.

Exhibit 9

Share of Contracts for Deed by Ratio of Contract Sales Price to Median Mortgaged or Cash Sale Value (99 Counties)



Source: Authors' tabulations of ATTOM land contract data

Comparison of Contract for Deed Sale Prices with Home Mortgage Disclosure Act (HMDA) Loan Amounts

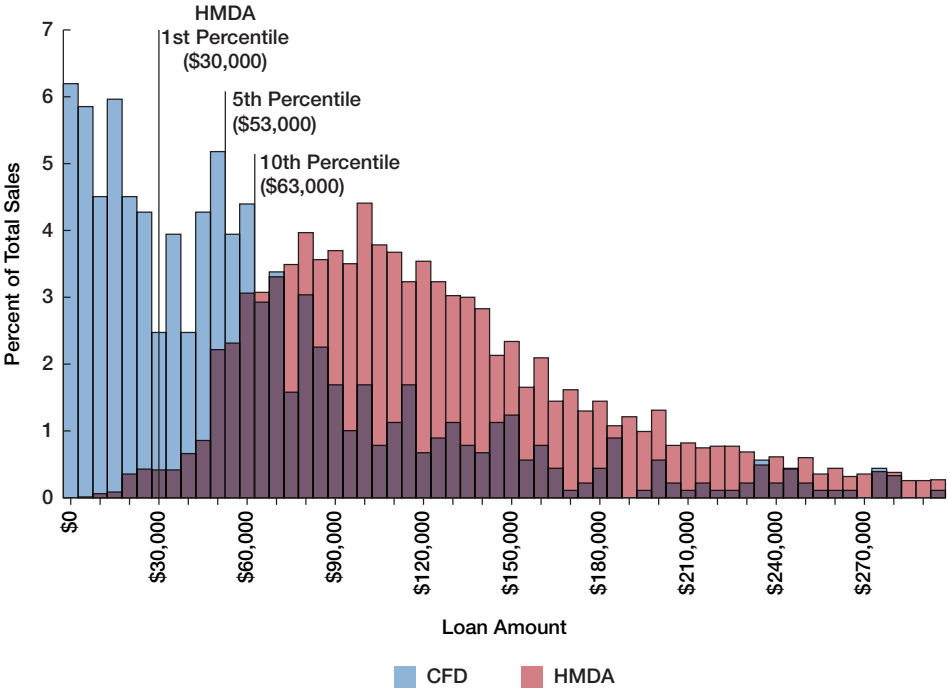
As noted previously in the paper, the difficulty in obtaining traditional mortgage credit for lower-cost properties has been documented in previous research. To gauge the extent to which credit accessibility based on sale price may be a factor for contract for deed sales, we compared contract for deed sale prices with the Home Mortgage Disclosure Act (HMDA) home purchase loan amounts, focusing on the overlap between contract for deed sales price and the HMDA loan amounts by year and county.³ Using histograms of Wayne County, Michigan, in 2005 and 2016 as examples of this exercise, we find that there is little overlap at lower sale prices, particularly

³ The comparison between contract for deed sale prices and HMDA loan amounts is an imperfect proxy, as HMDA data are based on the loan amount and not necessarily the sale price. If the actual sale price were available in HMDA, we would likely observe a shift further to the right in this histogram.

below the fifth percentile of HMDA loan amounts, highlighting the lack of mortgage activity among lower-cost properties. For example, nearly 49 percent of the contracts for deed in Wayne County sold at or below \$53,000 in 2005 (exhibit 10), and this number increased to 57 percent by 2016 (exhibit 11).

Exhibit 10

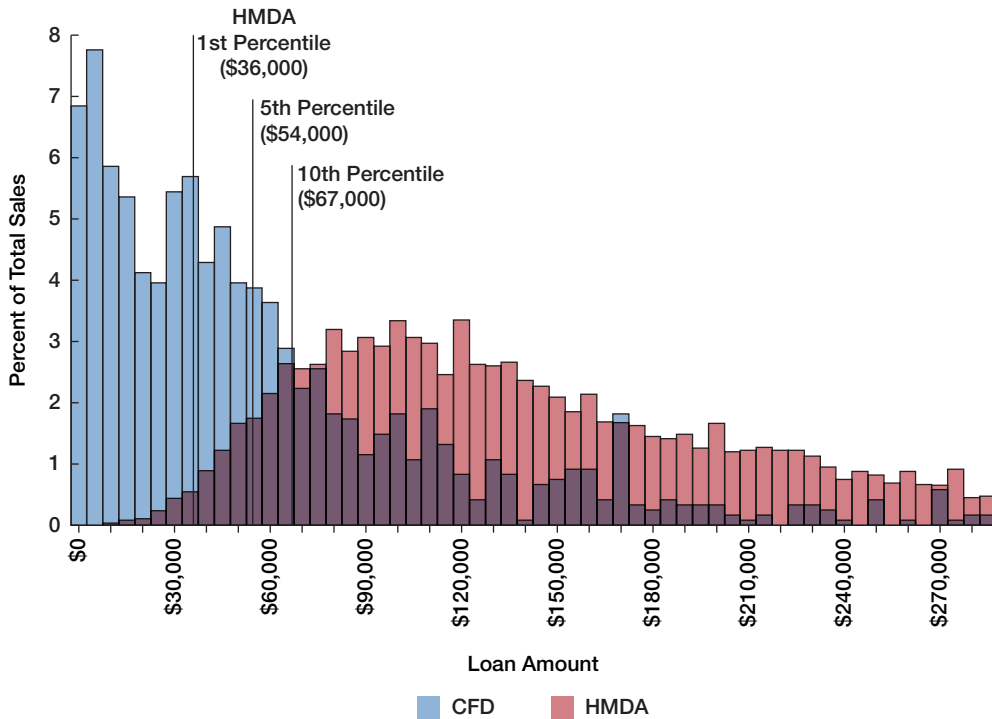
Comparison of Contract for Deed Sale Prices and HMDA Loan Amounts, Wayne County, Michigan, 2005



CFD = Contract for Deed.
HMDA = Home Mortgage Disclosure Act.
Source: Authors' tabulations of ATTOM land contact data

Exhibit 11

Comparison of Contract for Deed Sale Prices with HMDA Loan Amounts, Wayne County, Michigan, 2016

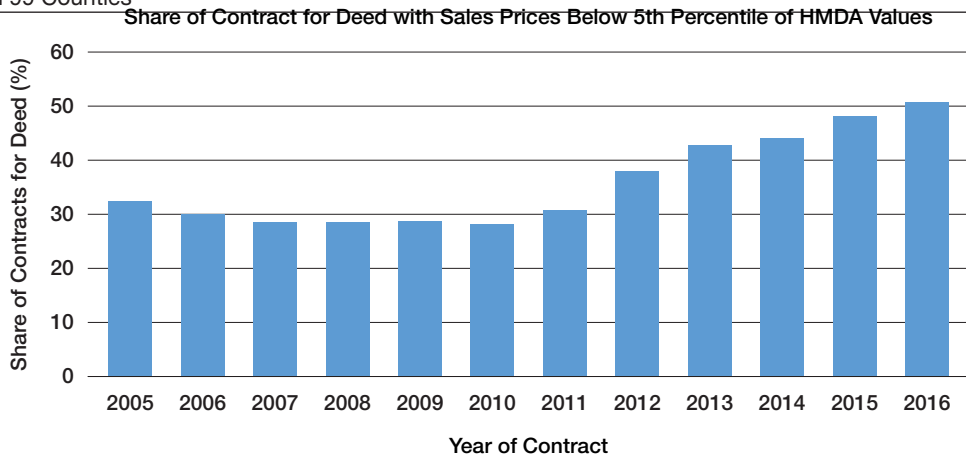


CFD = Contract for Deed.
 HMDA = Home Mortgage Disclosure Act.
 Source: Authors' tabulations of ATTOM land contact data

We replicated the Wayne County analysis for each of the 99 counties in our study area. Accordingly, for each county and year, we calculated the share of contracts for deed above the HMDA values at the first, fifth, and tenth percentiles. We then aggregated the shares of contracts for deed in each of these percentiles across all 99 counties by year (exhibit 12). Starting in 2011, we saw a continual increase in the share of contracts for deed with sale prices that fell below the fifth percentile of HMDA loan values (amounts slightly above \$50,000, a level at which traditional mortgage lending has been declining).

Exhibit 12

Share of Contracts for Deed with Sales Prices Below the Fifth Percentile of HMDA Values in 99 Counties



HMDA = Home Mortgage Disclosure Act.

Source: Authors' tabulations of ATTOM land contract data and HMDA data

Analytic Approach—Neighborhood Characteristics

In addition to describing transaction characteristics, we also examine differences in neighborhood characteristics between areas with relatively high contract for deed activity and areas with relatively low activity. We first assess the relationships between contract for deed activity and neighborhood socioeconomic and housing attributes at the census block group-level. We used block group level data in order to capture neighborhood-level impacts at the smallest level observable. Block groups within the 99 counties in the analysis area were ranked by the number of contract for deeds as a share of all owner-occupied housing units and classified into quartiles, and block groups in the top 10 percentile of contracts for deed concentration were additionally flagged. Median values of each independent variable were calculated for each quartile of block groups, the top 10 percentile, and for the full sample of block groups.

In order to test the strength of the relationship between the community characteristics and rates of contracts for deed, we employed a cross-sectional multivariate linear regression model using block groups in the selected 99 counties as the units of analysis. We used a stepwise Ordinary Least Squares (OLS) regression model, with demographic and socioeconomic factors included in Step One. In Step Two, housing and neighborhood factors were added to the Step One variables in order to disentangle the differences in the relationship between rates of contracts for deed and resident population characteristics and housing market conditions.

There were 19,134 block groups found in the 99 counties with 500 or more contract for deed records (see exhibit 1 for a map of counties). We removed block groups with a population of 50 or less, null median household income or home value, or zero HMDA purchase mortgage originations in the corresponding census tract between 2012 and 2016. Null values are reported by the Census

when there are too few sample observations to compute an estimate or the median estimate falls in the lowest or highest interval of an open-ended distribution. The total number of block groups included in our descriptive and regression analyses was thus 17,731. Block groups generally have between 600 and 3,000 people but can vary greatly in terms of housing tenure and physical size.

Dependent Variable

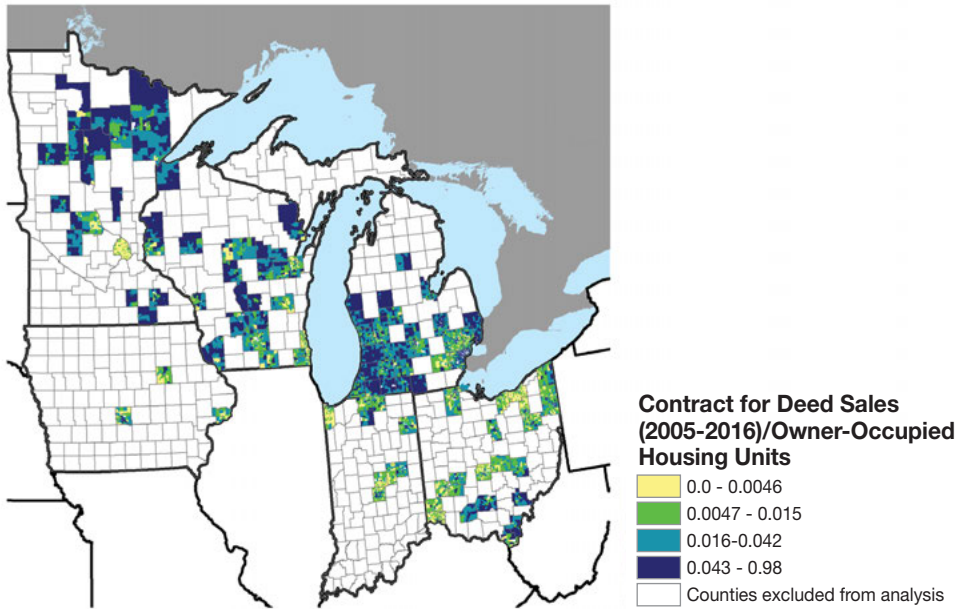
While we used 2012–2016 cross-sectional data for all other variables, the dependent variable used was the number of contract for deed sales between 2005 and 2016 as a share of all owner-occupied housing units.⁴ The number of contract for deed sales was derived from the ATTOM Data Solutions' database and the number of owner-occupied housing units from the 2016 Census American Community Survey (ACS) 5-year estimates. This ratio represents an estimate of homes potentially financed with a contract for deed as a percentage of all owner-occupied homes in each geography. The estimate of potential contracts for deed is the sum of all contracts by area during this 11-year period. This figure naturally does not include contracts signed prior to this period and still in repayment and may over-count contracts that have been repaid in full; however, it is the best representation possible of the number of homes financed by contract for deed at this scale of analysis. Considering that the median term of contracts in the database was 5 years, a majority of properties with recorded contracts are likely to be included.

Other metrics used in the literature were considered, such as land contracts as a percentage of all sales and land contracts as a percentage of all housing units, although model results did not differ significantly using these alternative measures. While each of the 99 counties selected for analysis each had 500 or more contracts reported in the database, individual block groups ranged from 0 to 265 contracts recorded between 2005 and 2016. A map depicting the dependent variable metric is shown in exhibit 13.

⁴ To test whether the varying time periods in the upper and lower half of the dependent variable ratio skewed our results, we created a separate dependent variable using only 2011–2016 contract for deed transaction data, more closely mimicking the American Community Survey 2012–2016 estimate window, rather than the full 2005–2016 transaction data. We found very similar results. We used the 2005–2016 transaction data in order to capture a greater number of homes with a potential contract currently in payment.

Exhibit 13

Contract for Deed Sales as a Share of Owner-Occupied Housing Units by Block Group, 99 Counties Selected for Analysis



Source: Authors' tabulations of ATTOM land contact data

Of the contract for deed records included in our neighborhood analysis and model, slightly more than one-half are in the state of Michigan, with the next highest concentrations in Ohio and Wisconsin. Iowa, Indiana, and Minnesota each account for less than 10 percent of the remaining records. We created individual models for each state and found little difference in the model results between states. Therefore, our model results contain all observations across these six states.

Exhibit 14

Contract for Deed Records by State, 99 Counties Selected for Analysis

State	Count	Share (%)
Iowa	5,146	3
Indiana	10,746	7
Michigan	80,150	52
Minnesota	12,508	8
Ohio	27,208	18
Wisconsin	18,096	12
All	153,854	100

Source: Authors' tabulations of ATTOM land contact data

Measures of Demographic, Socioeconomic, and Housing Characteristics

Seven independent variables were chosen to represent the demographic and socioeconomic characteristics of block groups. Based on the literature, contract for deed activity tends to concentrate in lower-income and lower-wealth communities, communities with higher concentrations of racial and ethnic minority households, and communities with lower educational attainment. Independent variables included median household income, race and ethnicity variables including the percent of the population that is African-American, Hispanic or Latinx, Asian or Pacific Islander, American Indian, and the percent of the population that is some other race or two or more races combined. Educational attainment was measured by the percent of the population with a 4-year college degree. All variables were derived from 2016 Census ACS 5-year estimates.

Five independent variables were chosen to represent the housing conditions of block groups. These variables included the percent of households that are owner-occupied, the number of originations in the HMDA database as a percent of owner-occupied housing units, the median age of the housing stock, the median value of the housing stock, and the percent of housing units that are vacant. All variables were derived from 2016 Census ACS 5-year estimates and 2012 to 2016 HMDA data. These measures speak to the type of housing tenure, characteristics of housing stock, signs of strength or distress in the housing market, and the demand and availability of purchase mortgage credit.

Descriptive Analysis

To show how contracts for deed were distributed across these groups, we included the median, total, and share of contracts for deed in each quartile (exhibit 15). This approach effectively distinguished high contract-for-deed activity areas from low- activity areas. The median block group in the sample had four contract for deed records, while the median of quartile 1 was zero records and the median for quartile 4 was 17 records. Sixty-three percent of the contract for deed records were concentrated in quartile 4 block groups, and 36 percent were in the top 10 percentile block groups. In this top 10 percentile group, the median value of the dependent variable (contract for deed sales as a share of owner-occupied properties) was 0.14, meaning that for every 100 owner-occupied households in a typical block group, there were 14 contract for deed records from 2005 to 2016.

Exhibit 15

Neighborhood Characteristics by Contract for Deed Presence (Neighborhoods Ranked by Ratio of Contract for Deed to Owner-Occupied Households)

	All	Quartile 1	Quartile 2	Quartile 3	Quartile 4	Top 10 Percentile
Contract for Deed Activity						
Median Number of CFDs	4	0	3	7	17	25
Total Number of CFDs	153,854	3,240	16,005	36,925	97,684	55,948
Share of CFDs	100%	2%	10%	24%	63%	36%
CFDs per 100 Owner-Occupied Households	1.5	0	0.9	2.4	7.6	13.9
Demographic and Socioeconomic Characteristics						
Households	443	494	490	444	370	343
Percent African-American	3.7	3.2	3.4	2.7	7.2	12.8
Percent Latinx	2.2	2.3	2.1	2.1	2.6	3.1
Percent Asian or Pacific Islander	0.0	1.3	0.6	0.0	0.0	0.0
Percent American Indian	0.0	0.0	0.0	0.0	0.0	0.0
Percent Other Race	2.5	2.4	2.5	2.3	3.1	3.8
Percent with a Bachelor's Degree or Higher	22.5	37.9	27.6	20.1	12.9	10.6
Median Household Income	51,353	66,042	56,944	49,688	37,115	31,736
Housing Characteristics						
Age of Housing Stock (Years)	55	50	52	55	64	67
Percent Vacant Housing	7.7	4.8	6.2	8.3	13.9	17.5
Percent Owner Households	72.0	80.0	75.4	72.8	59.3	52.0
Median Home Value	122,600	168,000	138,000	113,700	76,900	62,800
HMDA Originations per 100 Owner-Occupied Households	8	10	9	8	5	4

CFD = contract for deed. HMDA = Home Mortgage Disclosure Act.

Sources: American Community Survey 2012–2016 averages; Home Mortgage Disclosure Act 2012–2016 records; and ATTOM land contract data

Sharp differences emerged in neighborhood characteristics between high and low contract for deed activity areas. High contract for deed areas had lower population and household counts. The highest activity group (the top 10 percentile block groups) had a higher population density than block groups overall, suggesting that these places may be more urban than the sample on average.

Furthermore, the highest activity group has notable demographic differences from low activity areas and from the sample overall. The highest activity group is 12.8 percent African-American, compared with 4 percent in the sample overall, and has a slightly higher Latinx population share

of 3 percent, versus 2 percent overall. Notably, the percent of the block group that is African-American did not increase linearly across the quartiles as the contract for deed activity increased. The percent of the block group population that is African-American in quartiles 1, 2, and 3 was about 3 percent, while block groups in quartile 4 had a typical percent African-American of 7.2 percent, and 12.8 percent in the top 10 percentile block groups.

High contract for deed activity block groups also exhibited sharply lower educational attainment, with only 11 percent of adults having a bachelor's degree or higher in the top 10 percentile block groups, versus 38 percent in the low activity group and 23 percent overall. Given the large differences in educational attainment, it was not surprising that these groups also varied considerably in household income and poverty rate. The top 10 percentile group median household income of \$31,736 was 52 percent lower than the median household income of the first quartile, at \$66,042, and the poverty rate of the top 10 percentile group was four times that of the first quartile, indicating that economic distress is much higher in places where contract for deed activity is relatively common.

Noteworthy differences in housing market characteristics were apparent when comparing areas with high rates of contract for deed activity with low activity areas. High activity areas tended to have older housing stock, higher vacancy rates, lower homeownership rates, lower home values, and less mortgage origination activity. Comparing the top 10 percentile with quartile 1, the median age of the housing stock was 17 years older (67 years versus 50 years), the vacancy rate was more than three times higher (17.5 percent versus 4.8 percent), and the homeownership rate was 28 percentage points lower (52 percent versus 80 percent). The median home value was 63 percent lower in the top 10 percentile neighborhoods than the first quartile (\$62,800 versus \$168,000), and the frequency of new purchase mortgage originations was less than one-half of the frequency in first quartile neighborhoods (4 new mortgages per 100 households versus 10 new mortgages per 100 households).

Regression Analysis

In order to tease out the association between the community characteristics and rate of contracts for deed, we created a regression model to identify those characteristics that are most strongly correlated with elevated rates of contracts for deed. This procedure was an important exercise given the relationships that exist between the community characteristics themselves. Some of the relationships that were apparent in the descriptive analysis may, in fact, be explained by the variation of other factors that can be controlled in a multivariate analysis. A control variable of all owner-occupied housing units was used in the model to account for differences in block group composition. Due to a skewed distribution, a logarithmic transformation was used for the income variable and median housing value variable.

In addition to the variables mentioned previously, local fixed effects were represented by dummy variables for all 99 counties to account for differences in local housing markets as well as state and county level differences in regulation and enforcement. Of the 99 counties, Wayne County had the largest number of observations and was the reference county in the model.

The model in equation format is:

$$\text{Step 1: } Cfd_share_ownocc = \alpha + \beta_1 socecon + \gamma_{cty} + \varepsilon$$

$$\text{Step 2: } Cfd_share_ownocc = \alpha + \beta_1 socecon + \beta_2 housing + \gamma_{cty} + \varepsilon$$

The results are shown in exhibit 16. While both models displayed good explanatory power, the second model, which included both demographic and housing market characteristics, performed better based on adjusted r-square values. While collinearity was a concern, Variance Inflation Factor (VIF) collinearity statistics were generally low, with a high of 5.2 for the income variable in the second model.

Exhibit 16

OLS Model Results, Dependent Variable is Contract for Deed Sales Between 2005 and 2016 as a Share of All Owner-Occupied Housing Units

	Model 1			Model 2		
	Coefficient	Std. Error	Standardized Coefficient	Coefficient	Std. Error	Standardized Coefficient
(Constant)	0.365***	0.014	-0.117	0.274***	0.018	
Owner-Occupied Units	-3.092E-5***	0	-0.22	-9.405E-6***	0	-0.036
Log (Median Household Income)	-0.027***	0.001	0.036	0.003	0.002	0.021
Percent African-American	0.008***	0.002	0.084	-0.021***	0.002	-0.091
Percent Latinx	0.050***	0.006	0.005	0.029***	0.005	0.049
Percent Asian/Pacific Islander	0.006	0.008	0.005	-0.013*	0.008	-0.011
Percent American Indian	0.014	0.02	0.005	-0.01	0.019	-0.003
Percent Other Race	0.032***	0.008	0.034	0.017**	0.008	0.018
Percent With a Bachelor's Degree or Higher	-0.011***	0.003	-0.035	0.01***	0.003	0.031
Percent Owner-Occupied	--	--	--	-0.052***	0.003	-0.198
Originations per Owner-Occupied Unit	--	--	--	-0.221***	0.019	-0.145
Mean Housing Age	--	--	--	0.0002826***	3.06E-05	0.08
Log (Median Home Value)	--	--	--	-0.017***	0.001	-0.168
Vacancy Rate	--	--	--	0.08***	0.004	0.146

OLS = Ordinary Least Squares.
 Notes: Spatial Fixed Effect Coefficients for 98 County-Level Dummies not Shown.
 *** Significant at 1%, ** Significant at 5%, * Significant at 10% Confidence Interval
 R2 Model 1 = 0.325; R2 Model 2 = 0.365
 Adjusted R2 Model 1 = 0.321; Adjusted R2 Model 2 = 0.361
 N = 17,730

The model results point to a strong association between housing market characteristics and contract for deed activity. Though some of the demographic relationships uncovered by the models were unexpected based on the literature, it is important to note the relative strength of the relationship between the dependent variable and housing market variables versus demographic and socioeconomic variables. To assess the relative strength of these relationships, we used the standardized coefficients, which scales the coefficients in terms of the standard deviation of the dependent and independent variables and allows for the comparison of variables at differing scales. In other words, an independent variable with a standardized coefficient of 1 that is statistically significant indicates that a 1 standard deviation increase in that variable is associated with a 1 standard deviation increase in the dependent variable. In model 1, the first iteration with only demographic and socioeconomic variables included, the most significant variables in terms of the magnitude of effect in the model were income (associated with a strong negative impact on contract for deed activity) and percent Latinx (which had a strong positive impact). A 1 standard deviation decrease in the natural log of median income (a decrease of \$32,150) was associated with a 22 percent standard deviation increase in contracts for deed as a share of owner-occupied units (or 1.4 additional contracts per 100 owner-occupied housing units). Given that the mean number of contracts for deed per 100 owner-occupied housing units was 3.6, this number is a material increase. Percent African-American also had a positive impact, with a 1 standard deviation increase in percent African-American (27 percent) associated with an additional 0.22 contracts per 100 owner-occupied housing units. Similarly, percent of the population of other races had a significant positive impact. Percent with a college degree had a significant negative impact. The effects of percent Asian or Pacific Islander and percent Native American were not significant. These impacts are largely in line with the literature, which suggests that lower-income, African-American, Latinx, and lower-educational attainment populations are more likely to purchase a home with a contract for deed.

When housing market indicators are added to the model (model 2), these effects are quite different. Income has no statistically significant effect, while percent African-American has a small but significant negative relationship and percent with a college degree a significant positive relationship, unexpectedly. The magnitude of these relationships is relatively weak when compared with several housing market variables, including the percent of owner-occupied households, higher rates of HMDA lending, and higher median housing values, which had large negative effects on contract for deed activity. The effect of percent African-American becomes statistically insignificant when the rate of HMDA lending variable is omitted, and the two variables are correlated at a level of -0.51. This finding suggests that the addition of the HMDA lending variable may be mediating the relationship between race and contract for deed activity, with African-American neighborhoods experiencing higher contract for deed activity due to lower traditional mortgage credit. The percent of vacant housing units had a strong positive impact on contract for deed activity. The median age of the housing stock was also positively and significantly associated with contract for deed activity. These relationships were not surprising, given past findings. Most significant in the model was the impact of homeownership rate. A 1 standard deviation increase in the percent of households that own their home (a 24-percent increase) was associated with 1.2 fewer contracts per 100 owner-occupied housing units.

Statistically significant local fixed effects ranged from a standardized coefficient of -0.2 to 0.1 when compared with the excluded county dummy variable representing Wayne County, Michigan. The 9 counties with the strongest negative relationship to contract for deed sales as a share of owner-occupied housing were all in Indiana, while the 22 with the strongest positive relationship were all in Ohio, indicating potential statewide differences in housing markets or reporting adherence.

It should be noted that an additional analysis in which the dependent variable included only those contract for deed sales less than \$75,000 was conducted in order to determine whether higher-value transactions were skewing these results. The model effects displayed a strikingly similar pattern, however.

While this analysis provides a novel look at contracts for deed at a broader scale than has previously been examined for six states in the Midwest, results are limited by the data itself. This outcome is partly due to the limited number of years available, but also likely due to known underreporting and lack of adherence where reporting is required. It is impossible to know whether the ATTOM Data Solutions data are a representative sample or if data are systematically underreported by certain sellers or in certain geographies.

We also lack information about buyers, and we cannot assess how representative the block group level demographic and housing data are of contract buyers within those block groups. For instance, the share of contract buyers that are African-American might be higher than the total share of African-American households in the block group. Therefore, while model and descriptive results are inconclusive where race is concerned, it is not possible to determine with certainty from these results whether African-American buyers have been targeted by contract for deed sellers. Given the results of our first model, as well as previous research focused on corporate sellers and recent lawsuits, there is evidence that this issue is an area of concern that requires further inquiry. The strongest findings from this analysis indicate that contract for deed activity varies greatly by area and tends to concentrate in communities with weak housing market indicators, based on homeownership, home values, vacancy rates, and levels of mortgage lending. Therefore, as others have noted, distressed communities and those hit hardest by the foreclosure crisis are at risk of greater housing instability from a standpoint of the residents' physical, social, and financial security.

Discussion

Contracts for deed have garnered considerable attention in recent years. Concerns regarding the predatory nature of these contracts, their concentration in predominately African-American neighborhoods and in communities hardest hit by the foreclosure crisis is a focus of recent articles (Immergluck, 2018; Seymour and Akers, 2019). Particular attention is given to contracts for deed sold by large corporate sellers such as Harbour Portfolio Advisors LLC and Vision Property Management, LLC which have been sued by a number of local jurisdictions for deceptive business practices and selling properties in severe disrepair. Looking beyond a subset of corporate sellers, this research seeks to shed light on the contract for deed activity across a range of communities in the Midwest.

Similar to previous analyses, we find that contracts for deed tend to be more prevalent in lower-

income neighborhoods with higher vacancy rates, lower homeownership rates, older housing stock, lower home values, and lower rates of mortgage lending. We also find that block groups with the highest rates of contracts for deed tend to have the highest shares of African-American residents, based on descriptive (quantile) data. Our first model of socioeconomic and demographic indicators also showed a positive relationship to percent African-American residents and a negative relationship with median income and percent with a bachelor's degree. When controlling for a number of housing variables, however, the percent African-American coefficient was negative and significant while educational attainment was positive and income was insignificant, which is surprising given the previous literature. This finding is likely due to the wide array of income and demographic characteristics found in the 99 counties selected for analysis. The sample was roughly one-half metropolitan and one-half non-metropolitan based on U.S. Department of Agriculture Rural-Urban Continuum Codes. While metropolitan markets have been better represented in the literature, smaller cities and rural areas have been somewhat overlooked. Given the loss of rural bank branches, a future inquiry may examine contract for deed activity, which may not be limited to lower-income buyers.

Another potential explanation is a non-linear relationship between percent African-American and the number of contracts for deed. Our descriptive analysis shows that the percent African-American population is roughly equal for quartiles 1, 2, and 3 in the distribution of census blocks by the number of contracts for deed, and increases in quartile 4 and the top 10 percentile block groups.

Furthermore, our sample of contracts for deed is distinct from prior literature, which largely identifies contract for deed activity by flagging real estate transactions to which known corporate sellers are a party. In contrast, our data set of contract for deed sales was constructed without regard to the identity of the buyer or seller. Fifty-nine percent of the contract for deed records in our data set corresponded to a unique seller, and another 15 percent of records pertained to a seller that sold two contracts for deed. In other words, while our analysis likely includes some institutional investor activity, the majority of our contract for deed records are not associated with an institutional investor.

Despite their pitfalls, contracts for deed appear to be one of the few options for purchasing lower-cost properties given that traditional mortgage credit is hard to procure for many of these properties. This challenge is certainly evidenced by the near lack of HMDA loan originations in the price range of lower-priced contracts for deed. We find that the ratio of new mortgage originations to households is one of the strongest predictors of contract for deed activity. A number of factors are likely contributing to a lack of traditional mortgage credit in neighborhoods with high concentrations of contracts for deed. Buyers who cannot pay a downpayment cannot qualify for most mortgage products, whereas 36 percent of contract for deed sales in which loan-to-value (LTV) rates were reported had an LTV of 100 percent or higher. Appraisal gaps and the condition of properties, particularly in places still recovering from the housing crisis, can also impact credit access in the traditional mortgage market. These and other market factors can depress home prices to a point that lenders are not able to profitably make loans given the small balances, fixed origination costs, and loan officer incentive structures. Although we do not have information about the contract buyers, the creditworthiness of the buyers may be inhibiting their ability to acquire a loan through a financial institution.

While there is an apparent market for lower-value, seller-financed housing, there are better alternatives such as responsible lease-purchase programs initiated by nonprofit intermediaries, which provide both housing counseling and underwriting (Schaeffing and Immergluck, 2010). For seller financing to be a viable path to homeownership, state laws surrounding these contracts should provide protections similar to those afforded to those in the traditional mortgage market. The recording of these deeds, while required by law in a number of states, is not always adhered to nor enforced and leaves the buyer at risk of losing the home if one payment is missed, or if the seller fails to pay taxes or sells the home to someone else (Battle et al., 2016). Recording the deed in a timely manner after the execution of the contract is important to ensuring buyer protections. The National Consumer Law Center (NCLC) suggests the deed be recorded within 90 days (Battle et al., 2016). In addition to buyer protections, recordation of these deeds increases the available data about this financing instrument by capturing information about these deeds including the interest rates, loan terms, and sales prices. Other recommended protections include requiring the transfer of legal title at the outset of installment contract transaction, at which time sellers can secure equitable interest in the property with a seller-financed mortgage or deed of trust, a process more likely in states with streamlined foreclosure processes (Mancini and Saunders, 2017; Way, 2009).

Properties may also be sold as contracts for deed due to condition issues that limit the ability to secure traditional financing. Numerous depositions in recent court filings point to deeply concealed damage and even obfuscation by contract sellers, however, such as limiting access to the home. Other regulations that should be considered at the state level include a required inspection and disclosure document for buyers to fairly represent needed repairs. A third-party appraisal should be conducted to ensure that the property is sold at fair market value. Protections at the local level should also be considered, such as the requirement for a certificate of occupancy enacted in Toledo, Ohio.

Numerous examples of contract buyers unknowingly purchasing homes straddled with delinquent taxes and in dire need of significant structural repairs recently led Ohio lawmakers to draft legislation requiring the seller to take care of outstanding taxes and property repairs prior to the execution of the contract. The bipartisan legislation, to be introduced in the spring of 2019, also requires an inspection be completed to ensure the property meets the local jurisdiction's building codes. In addition, a property appraisal is required and must be provided to the buyer in advance of executing the land contract. Even with these safeguards in place, some advocates argue that the forfeiture clause, in itself, is reason enough to discourage the use of the land contracts because it may deprive the buyer of equity built up in the home (Mancini and Saunders, 2017).

Homeownership is still the “American Dream” for many families and the most typical path to building and transferring wealth, despite risks for lower-income and ethnic and racial minority buyers (Herbert, McCue, and Sanchez-Moyano, 2016). As noted in our analysis, mortgage lending for low-value properties is limited and contract for deed sales seem to supplant mortgaged sales in distressed markets. Therefore, programs that provide a secure and affordable path to homeownership are necessary to provide opportunities for wealth building in all communities. Downpayment assistance, credit and housing counseling, and greater capitalization of Community Development Financial Institutions (CDFIs) and other community-based lenders may help these

markets. For buyers currently in a contract, conversion to a mortgage and legal aid assistance for recourse should also be made available.

This work helps understand the varied landscape of contract for deed financing and poses additional questions for analysis. While we achieved mixed results when examining the effects of socioeconomic and demographic variables such as race and ethnicity, income, and educational attainment on contracts for deed, our descriptive analysis and partial model results indicate there is still concern for negative outcomes for disadvantaged and underrepresented communities and more inquiry is needed. The results unquestionably support the notion that contract for deed activity is disproportionately associated with distressed housing markets and markets with lower rates of mortgage lending. In short, this analysis supports the need for greater purchaser protections for a potentially very diverse array of buyers nationwide and stronger regulations and enforcement at the local and state level to prevent the further destabilization of communities that were hit hardest by the foreclosure crisis and have recovered most slowly. At a minimum, mandatory reporting should be instituted by every state in order to fully understand the impacts of contracts for deed.

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Appendix A: Additional Exhibits

Exhibit 17

List of Counties Chosen for Analysis (1 of 4)

County	State	Contract for Deed Count, 2005–2016	Housing Units (2016)	Owner Occupied Housing Units (2016)	Owner Occupied Housing Units with a Mortgage (2016)
Allen	Indiana	2,300	154,525	96,795	64,677
Delaware	Indiana	843	52,406	29,461	18,336
Elkhart	Indiana	1,242	77,932	48,680	32,405
Hamilton	Indiana	559	116,900	86,624	69,274
Lake	Indiana	828	210,391	126,609	83,465
Madison	Indiana	513	58,808	35,677	22,823
Marion	Indiana	3,171	419,514	195,824	141,699
Marshall	Indiana	546	19,952	12,964	8,070
St. Joseph	Indiana	1,108	115,569	68,638	44,100
Black Hawk	Iowa	635	56,804	35,004	22,110
Polk	Iowa	4,013	190,705	119,927	85,917
Scott	Iowa	664	73,064	46,252	31,635
Allegan	Michigan	2,191	49,841	34,161	20,513
Barry	Michigan	782	27,071	18,557	11,701
Bay	Michigan	1,482	48,038	34,047	18,387
Berrien	Michigan	2,070	76,842	43,542	26,619
Branch	Michigan	842	20,625	12,381	7,422
Calhoun	Michigan	1,396	60,667	36,955	22,026
Cass	Michigan	1,237	25,921	16,417	9,703
Clinton	Michigan	897	30,974	23,083	14,802
Eaton	Michigan	1,200	47,057	31,195	20,604
Genesee	Michigan	10,358	191,033	115,243	68,758
Hillsdale	Michigan	1,185	21,686	13,710	8,003
Ingham	Michigan	2,484	121,962	64,169	42,879
Kalamazoo	Michigan	2,606	110,622	64,827	42,002
Kent	Michigan	6,028	249,029	161,125	107,181
Macomb	Michigan	4,678	361,158	247,442	160,089
Mecosta	Michigan	1,239	21,105	11,345	6,308
Montcalm	Michigan	792	28,113	18,057	10,933

Exhibit 17 (cont.)

List of Counties Chosen for Analysis (2 of 4)

County	State	Contract for Deed Count, 2005–2016	Housing Units (2016)	Owner Occupied Housing Units (2016)	Owner Occupied Housing Units with a Mortgage (2016)
Muskegon	Michigan	3,577	73,385	48,072	28,580
Oakland	Michigan	6,683	533,097	348,976	240,493
Oceana	Michigan	936	15,945	8,029	4,165
Ottawa	Michigan	2,511	104,755	75,408	48,971
Roscommon	Michigan	607	24,370	9,165	4,772
St. Clair	Michigan	3,005	71,874	48,786	31,144
St. Joseph	Michigan	1,473	27,638	17,027	10,329
Van Buren	Michigan	1,840	36,700	22,192	13,129
Washtenaw	Michigan	915	149,284	82,693	56,825
Wayne	Michigan	23,338	816,398	415,477	232,105
Becker	Minnesota	801	19,117	10,662	6,138
Beltrami	Minnesota	839	20,834	11,647	6,577
Cass	Minnesota	920	25,106	10,334	5,730
Douglas	Minnesota	676	20,514	12,080	7,565
Hennepin	Minnesota	1,040	520,683	307,266	221,614
Hubbard	Minnesota	576	14,616	7,129	4,197
Itasca	Minnesota	724	27,224	15,337	8,877
Kandiyohi	Minnesota	573	19,621	12,152	7,613
Mille Lacs	Minnesota	596	12,717	7,418	4,778
Mower	Minnesota	700	16,993	11,216	6,558
Olmsted	Minnesota	1,947	62,046	43,310	29,693
St. Louis	Minnesota	2,147	103,357	60,174	35,293
Stearns	Minnesota	528	62,911	39,719	25,234
Steele	Minnesota	619	15,411	10,916	7,022
Ashtabula	Ohio	644	45,850	27,737	16,278
Athens	Ohio	814	26,370	12,516	6,631
Butler	Ohio	1,166	149,418	92,855	65,677
Clark	Ohio	1,142	61,143	35,768	21,501
Cuyahoga	Ohio	1,763	618,673	315,085	201,021
Franklin	Ohio	2,383	540,779	260,835	193,178
Gallia	Ohio	636	13,727	8,598	3,768

Exhibit 17 (cont.)

List of Counties Chosen for Analysis (3 of 4)

County	State	Contract for Deed Count, 2005–2016	Housing Units (2016)	Owner Occupied Housing Units (2016)	Owner Occupied Housing Units with a Mortgage (2016)
Greene	Ohio	592	69,139	42,968	28,718
Hamilton	Ohio	1,579	377,268	193,350	134,876
Highland	Ohio	894	19,167	11,702	7,295
Lawrence	Ohio	627	27,313	17,109	8,502
Licking	Ohio	587	69,927	45,865	31,775
Lorain	Ohio	945	128,766	83,884	54,150
Lucas	Ohio	1,954	202,307	107,459	69,345
Mahoning	Ohio	1,636	111,275	66,569	37,885
Montgomery	Ohio	1,733	254,383	135,392	87,670
Muskingum	Ohio	651	37,774	22,913	13,603
Richland	Ohio	928	54,210	32,518	18,551
Ross	Ohio	1,124	31,807	20,068	11,657
Stark	Ohio	2,314	165,524	103,854	66,363
Summit	Ohio	2,255	245,164	145,616	95,530
Trumbull	Ohio	1,772	95,466	60,787	33,451
Wood	Ohio	501	53,406	33,290	21,662
Adams	Wisconsin	540	17,419	6,806	3,491
Brown	Wisconsin	777	107,224	66,424	45,537
Chippewa	Wisconsin	964	27,689	18,100	10,937
Columbia	Wisconsin	554	26,256	17,179	11,777
Dane	Wisconsin	1,949	222,808	124,505	89,982
Douglas	Wisconsin	561	22,901	12,527	7,565
Fond du Lac	Wisconsin	533	44,505	29,416	18,662
Grant	Wisconsin	588	21,783	13,654	7,578
Kenosha	Wisconsin	552	69,627	41,316	27,900
La Crosse	Wisconsin	647	49,247	30,048	18,976
Marathon	Wisconsin	898	58,358	39,239	24,106
Marinette	Wisconsin	824	30,384	13,794	7,565
Marquette	Wisconsin	511	9,866	5,075	2,885
Milwaukee	Wisconsin	1,342	417,371	189,161	128,168
Outagamie	Wisconsin	1,208	75,136	50,480	33,771

Exhibit 17 (cont.)

List of Counties Chosen for Analysis (4 of 4)

County	State	Contract for Deed Count, 2005–2016	Housing Units (2016)	Owner Occupied Housing Units (2016)	Owner Occupied Housing Units with a Mortgage (2016)
Polk	Wisconsin	1,064	24,283	14,141	9,206
Racine	Wisconsin	640	82,333	52,065	34,810
Rock	Wisconsin	783	68,463	44,028	29,543
Sauk	Wisconsin	844	29,864	17,321	11,058
Shawano	Wisconsin	622	20,714	12,853	7,266
St. Croix	Wisconsin	551	34,695	24,830	18,475
Waupaca	Wisconsin	747	25,456	16,073	10,236
Wood	Wisconsin	912	34,413	23,456	13,769

Sources: American Community Survey 2012–2016 averages and ATTOM land contract data

Exhibit 18

Table of Means

Label	Mean	Median	Std Dev	Minimum	Maximum	Sum
CFDs as a Share of All Owner-Occupied Housing Units	0.04	0.01	0.06	0.00	1.36	633
Population	1,289.00	1,114.00	755.00	106.00	17,906.00	22,862,744
Households	512.00	443.00	283.00	18.00	5,670.00	9,074,992
Percent African-American	0.17	0.04	0.27	0.00	1.00	2,943
Percent Latinx	0.06	0.02	0.10	0.00	0.94	1,036
Percent Asian or Pacific Islander	0.02	0.00	0.05	0.00	0.97	439
Percent American Indian	0.00	0.00	0.02	0.00	0.66	81
Percent Other Race	0.05	0.02	0.07	0.00	0.79	813
Percent with a Bachelor's Degree or Higher	0.28	0.23	0.20	0.00	1.00	4,933
Median Household Income	55,878.00	51,353.00	28,061.00	4,621.00	247,500.00	990,774,150
Age of Housing (Years)	54.27	55.00	17.56	8.00	79.00	960,306
Percent Vacant Housing	0.11	0.08	0.11	0.00	0.83	1,890
Percent Owner Households	0.67	0.72	0.24	0.03	1.00	11,948
Median Home Value	140,793.00	122,600.00	90,038.00	10,200.00	1,078,700.00	2,496,392,600
CFD Count	8.68	4.00	13.09	0.00	265.00	153,854
HMDA Originations per Owner-Occupied Household	0.08	0.08	0.04	0.00	0.44	1,399

CFD = Contract for Deed.

HMDA = Home Mortgage Disclosure Act.

Sources: American Community Survey 2012–2016 averages; Home Mortgage Disclosure Act 2012–2016 records; and ATTOM land contract data

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Institutions and Geographic Concentration in VA Mortgage Lending

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Disclaimer: The views expressed here are those of the authors and not necessarily those of the Federal Reserve Bank of Philadelphia, the Federal Reserve System, or Baystate Health.

Abstract

The U.S. Department of Veterans Affairs (VA) home loan guaranty program lowers the cost of homeownership for veterans and their families by removing the barriers of a downpayment and private mortgage insurance. Even with the recent growth in the program and the attractive terms, many veteran homeowners have not used it. As a consequence, some areas of the country with large numbers of veterans have disproportionately few VA loan originations, even after controlling for area housing market conditions. We explore the role of institutions in explaining the disproportionate concentration of loan originations in county-level Home Mortgage Disclosure Act (HMDA) data, and we test whether the presence of military installations, VA facilities, and veterans service organization (VSO) posts within each county contributes to lending patterns. We find that close proximity to a military site is a strong positive predictor of county-level rates of VA mortgage lending, even after controlling for the number of veterans and servicemembers living in the area.

The U.S. Department of Veterans Affairs (VA) home loan guaranty is one of the benefits for veterans that were established under the Servicemen's Readjustment Act of 1944, commonly known as the GI Bill. The VA home loan program is among the first federal programs designed to increase rates of homeownership and assist veterans and their families in reintegration to civilian life (Retsinas and Belsky, 2002). Today, veterans are less likely than the general public to face a housing cost burden and more likely to be homeowners (Arnold, Bolton, and Crowley, 2013). Nonetheless, there are large numbers of veterans, particularly younger veterans and those in single-parent

households, who face extreme housing cost burdens. For example, 32 percent of all post-9/11 veteran families face a housing cost burden, and half of single-parent, post-9/11 veteran families are housing cost-burdened (Hanson and Woods, 2016).

Through the VA home loan program, the federal government lowers the effective cost of homeownership for hundreds of thousands of veterans and servicemembers annually. While it is unknown how many families are able to move from being renters to homeowners because of this program, it is popular among veterans because it helps to lower the initial and ongoing cost of homeownership. In the 2010 National Survey of Veterans, 66 percent of veterans who ever had a mortgage reported that they had used the program and about half of those who had used it cited the no-downpayment option as driving their decision (Westat, 2010). A more recent study from the Consumer Financial Protection Bureau (CFPB) found that servicemembers (including both active-duty servicemembers and veterans) who are first-time homebuyers have been increasingly turning to VA mortgages rather than conventional loans (Clarkberg and Lapid, 2019).

While the share of the population that has served in the military is declining, VA lending has been on the rise since the last recession. The number of VA purchase-mortgage originations in 2017 was over triple the volume in 2005, while conventional loan originations were at 51 percent of the 2005 peak. Use of the program also varies geographically; it is underused in high-cost, coastal areas that are home to many veterans. This article examines recent VA mortgage use and whether the presence of military and veterans' institutions can help explain its uneven distribution across the United States.

Research from a variety of disciplines has documented patterns between the presence of certain institutions in a community and the economic and social outcomes of residents and neighborhoods. In the case of our study, institutions can directly contribute to the use of VA loans by counseling prospective borrowers on how to use their benefits, a service that is often collocated with VA medical centers. In addition, institutions such as military bases, veterans' centers, medical centers, clinics, and veterans service organizations (VSOs) may have an indirect impact by facilitating communication between prospective borrowers and those who have knowledge of the program.

We hypothesize that close proximity to military and veterans' facilities can serve as a positive predictor of VA mortgage use, assuming these institutions directly or indirectly increase awareness of the program. We create a county-level panel data set that includes measures of the number of home loan originations by type of mortgage (conventional, VA, and Federal Housing Administration [FHA] loans), distances to VA facilities and military installations, and counts of the largest VSO posts. Because the relationship between community institutions and lending patterns could be confounded by other factors, we include controls for county-level demographics and housing market conditions.

Using a multilevel, longitudinal model, we find that proximity to military bases is a strong positive predictor of VA loan use, even controlling for the approximate size of the population that is eligible to borrow using the program. The share of VA loans decreases in areas with higher housing costs, although there are more VA loans per eligible borrower in higher-cost areas and places that have experienced more rapid house price appreciation. This suggests that in high-

cost areas veterans either use alternative types of mortgages that allow greater loan amounts and require fewer administrative hurdles, or they are priced out of homeownership because they lack sufficient income to buy, relative to nonveteran homebuyers in these high-cost markets. Overall, veteran homeownership rates and incomes are higher than their non-veteran counterparts, but the relationship between income, homeownership, and veteran status is complicated, as the effects of military service appear to vary both across eras of service and across race and gender (Angrist, Chen, and Song, 2011; Conley and Heerwig, 2011; Vick and Fontanella, 2017).

Literature

There are numerous examples in the literature of how community institutions and amenities affect individuals' behavior.¹ For example, Card (1993) documents the relationship between proximity to colleges and individuals' schooling and earnings outcomes. Mikhed and Scholnick (2014) find that facing higher travel costs to visit a bankruptcy trustee makes it less likely that Canadian consumers will file for bankruptcy. Peterson, Krivo, and Harris (2000) show that neighborhood crime rates in Columbus, Ohio in 1990 were negatively correlated with proximity to recreation centers but positively correlated with proximity to bars. Although the institutions that are present in a community may, in some cases, be spuriously related to individual and neighborhood outcomes, they may also have a causal impact on communities. Matsaganis (2008) explains how institutions such as churches provide settings for communication, specifically information-sharing about public health issues, improving health literacy and access to care.

Despite their large geographic footprint and role in local employment markets, there are few studies that explore the relationship between military bases and individual outcomes (Meadows et al., 2013). Military installations, VA facilities, and the density of VSOs may increase the social capital of veterans and, in turn, increase knowledge and use of the VA home loan guaranty program. While our data do not allow us to observe individual behavior or neighborhood-level characteristics, we hope it will help lay the groundwork for future research about the VA home loan program and the effects of military bases on local communities and housing markets.

The existing literature on the VA home loan guaranty program debates the impact the program has on housing markets and the shape of the urban landscape following World War II (Altschuler and Blumin, 2009; Bennett, 1996; Humes, 2006). Minority and female veterans, while formally eligible, were historically unable to use the program due to racist and sexist lending practices of the times (Altschuler and Blumin, 2009; Mettler, 2005). More recently, Fischer and Rugh (2018) examine Home Mortgage Disclosure Act (HMDA) data from 1990 to 2015 and find that VA lending has contributed to the integration of residential neighborhoods.

Fetter (2013) finds that the VA loan guaranty program increased rates of homeownership primarily through lowering the age at which many Americans bought their first homes. Vigdor (2006) finds that removing liquidity constraints, in the case of the VA loan guaranty by removing the need for a downpayment, may have the unintended consequence of increasing home prices for those who do not use the program. Quigley (2006) shows that, in recent decades, the credit quality of VA

¹ See Sampson, Morenoff, and Gannon-Rowley (2002) for a thorough discussion of how institutions and competing factors influence social processes in a community.

borrowers has generally been riskier than that of other types of borrowers, but rates of foreclosure have been only slightly higher than conventional loans and lower than FHA loans. Goodman, Seidman, and Zhu (2014) compare FHA and VA loan performance and find that VA loans perform better after controlling for borrower characteristics. They attribute this to differences in lending rules that govern each program.

There has been little recent analysis on which veteran consumers choose VA mortgages, with the exception of a novel analysis by the CFPB. In that study, Clarkberg and Lapid (2019) use a data set of consumer credit records matched to the Servicemembers Civil Relief Act² data—provided by the Department of Defense (DoD)—to track changes in the use of VA loans among first-time homebuying servicemembers. They find that under 40 percent of these first-time homebuyers used VA mortgages to purchase in 2006–2007, as compared to nearly 80 percent by 2016. The uptick in VA use was similar for prime and nonprime servicemembers.

To our knowledge, no studies have explored explanations for geographic disparities in utilization, the focus of this article. The most relevant work focuses on use of the FHA loan program, which has a number of parallels with the VA program: low downpayments, many first-time homebuyers, and a surge in use during and after the mortgage crisis.

The FHA and VA programs play a key role in stabilizing the mortgage market when credit from other sources contracts, ensuring the availability of credit, particularly to those without the ability to make large downpayments (Passmore and Sherlund, 2018). Duca and Rosenthal (1991) explain that FHA mortgage originations rise when the overall default risk in an area increases. While FHA mortgages have standard underwriting rules across geographic areas, conventional mortgage lenders are free to ration credit by using more stringent underwriting in areas where default risk is more prevalent (Ambrose, Pennington-Cross, and Yezer, 2002).

Immergluck (2011) demonstrates that even after controlling for numerous loan-, borrower-, neighborhood-, and MSA-level characteristics, there is considerable variation in the use of FHA mortgages across different metropolitan areas. He points out that areas heavily reliant on FHA financing would be particularly affected by any policy changes that reduced the availability or generosity of the FHA program. The VA program, although a smaller percentage of loans, should have a similar stabilizing effect on area housing markets. Interestingly, FHA and VA lending might actually be particularly sensitive to the next financial crisis. Kim et al. (2018) document that as of 2016, three-quarters of FHA and VA loans were originated by nonbanks, which are not as well capitalized as depository institutions and may be particularly vulnerable to liquidity pressures in times of economic stress.

In the remainder of this article, we first offer a brief history of the VA program, describe its current characteristics, and document the disparity in the use of VA mortgages across geographies. We then turn to a multivariate analysis of this disparity and its changing characteristics over time. Finally, we discuss these results and conclude.

² The Servicemembers Civil Relief Act provides legal and financial protections for servicemembers while on active duty and during the transition home. The intent of the law was to allow those who serve to focus on their mission.

VA Lending Program

Brief History and Description of the Modern VA Lending Program

As with the other provisions of the GI Bill, the VA loan program was originally designed to assist World War II veterans with their readjustment to civilian life (Frydl, 2009). To be eligible, a borrower must be a current active-duty servicemember or a veteran who provided a minimum threshold period of service, which can range from 90 days to 24 continuous months.³

The main components of the VA loan program are the purchase and refinance mortgage guaranty benefits. During federal fiscal year (FY) 2017 (October 2016–September 2017), 740,389 VA purchase and refinance loans were guaranteed, with 49 percent being refinancings (VA, 2018: 190–192). The remaining 51 percent were mortgages for the purchase or construction of homes. Of the latter, 41 percent of borrowers were first-time homebuyers. In this article, we focus on the purchase mortgages since their origination volume is not as sporadic as refinance mortgages, and as Quigley (2006) argues, purchase mortgages more directly promote homeownership.

The VA loan program facilitates homeownership for qualified veterans and active-duty servicemembers by lowering costs for borrowers. Since the VA provides a guaranty of a portion of the principal balance, the borrower does not have to purchase private mortgage insurance, helping to substantially reduce a borrower's monthly payments. Also, the program requires no downpayment, resulting in lower upfront costs for homebuyers. In fact, 80 percent of VA purchase loans made during FY 2017 involved no downpayment (VA, 2018: 192).⁴

Substitutes for VA Loans

The main substitutes for VA loans are FHA loans and conventional mortgages. As with VA loans, FHA purchase loans allow borrowers to put little money down, currently just 3.5 percent. The borrower pays for mortgage insurance provided by the FHA. Because of this government insurance, lenders are willing to provide lower interest rates and allow greater flexibility in borrower credit standards, relative to conventional loans with low downpayments. Like the FHA program, VA loans are restricted to owner-occupants.

Borrowers who do not use VA or FHA mortgages will generally take out conventional loans. Conventional borrowers who make downpayments of less than 20 percent of the purchase price must generally buy private mortgage insurance. Mortgage insurance can be costly. Borrowers must continue to pay private mortgage insurance until they have established the 20-percent equity threshold. Conventional loans have no particular loan limit, although in order to be securitized by the government sponsored enterprises Fannie Mae and Freddie Mac (Fannie/Freddie), they must

³ A detailed description of current eligibility rules can be found at http://www.benefits.va.gov/HOMELOANS/purchaseco_eligibility.asp. Rules differ for veterans who served during different periods.

⁴ Most borrowers incur a VA funding fee, which can be paid up front by the borrower, rolled into the mortgage principal, or paid by the seller. The amount of the funding fee is a function of the size of the downpayment, whether the borrower is taking cash out, the borrower's type of military service (regular vs. Reserves or National Guard), whether this is the borrower's first or a subsequent VA loan, and other factors. Fees commonly range from 1.25 to 3.3 percent of the loan amount, although they can be waived for certain veterans with service-related disabilities. Current fees are posted at https://www.benefits.va.gov/homeloans/purchaseco_loan_fee.asp.

be at or below the “conforming” loan limit, which was \$417,000 in most parts of the country until 2017 when it was increased to \$424,100.

Because VA mortgages allow borrowers to put no money down, and do not require payment of mortgage insurance fees, they are usually the most cost-effective option for qualified borrowers. In some instances, FHA interest rates may be below the rates of comparable VA loan products for a particular borrower, which may provide an incentive for using the FHA program instead. A veteran would need to supply the necessary downpayment, however, and the interest rate difference would have to be large enough to offset the cost of the FHA mortgage insurance premiums. Finally, a veteran cannot use multiple VA loans concurrently, which may also influence the decision of whether to choose an FHA or VA mortgage for a particular purchase.

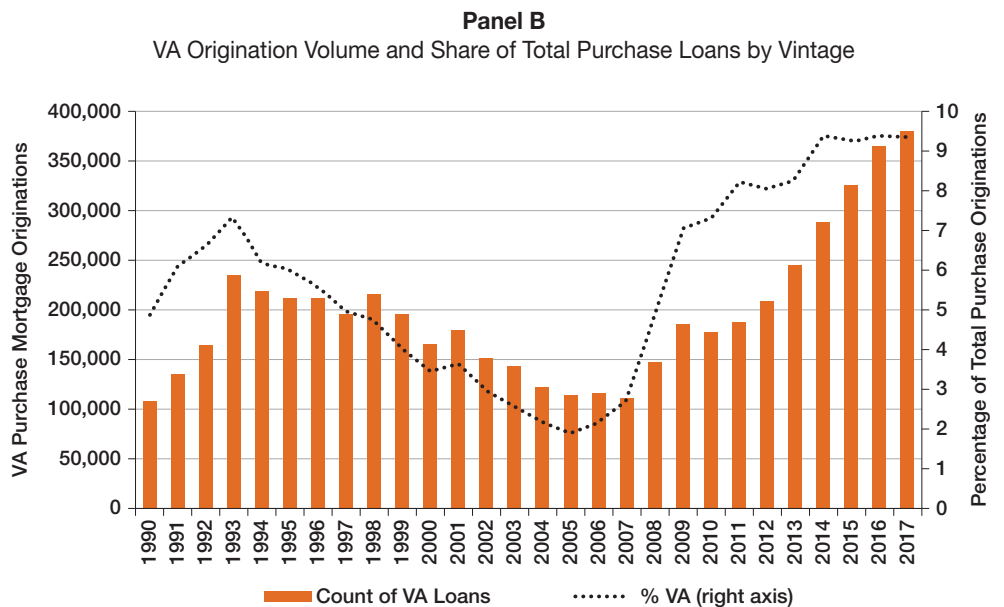
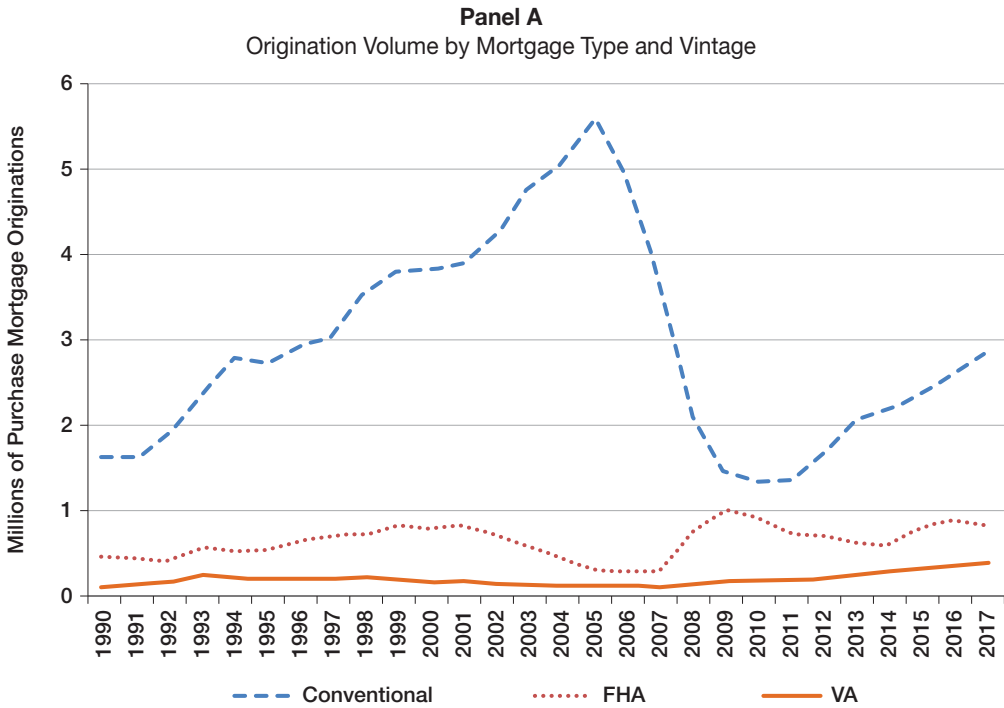
VA loans do not have loan limits per se, but there are maximum guaranty amounts, and the VA publishes the maximum loan amounts that can be originated in each county with zero downpayment. In recent years, these “loan limits” were set to the same values as the Fannie/Freddie conforming loan limits for single-family residences, including the feature that higher cost areas receive commensurately higher loan limits. Unlike with the Fannie/Freddie limits, however, VA loans may be originated in excess of the threshold, although this triggers a downpayment requirement. For 2017, we find that the origination amount for about 3 percent of nationally originated VA loans exceeded this published zero-down-payment “loan limit,” but in high-cost counties 6 percent exceeded the threshold.

Use of the VA Program Since 1990

According to HMDA data, each year since 1990, between about 125,000 and 380,000 VA purchase mortgages have been originated. As a percentage of all VA, conventional, and FHA mortgages, VA mortgage originations tend to be counter-cyclical. VA lending made up just 1.9 percent of purchase mortgages at the market’s height in 2005 with 113,000 loans, but as conventional lending shrunk in the housing market recovery, VA lending increased dramatically—both in levels and as a percentage of all lending (exhibit 1). By 2017, VA loans made up 9.4 percent of all mortgages, with 380,000 originations—more than three times the 2005–2007 annual volume and the highest number of VA purchase originations since HMDA data collection began. It is worth noting that although the housing market has recovered in most areas and conventional purchase mortgages have increased, VA lending has continued its surge, perhaps owing to the absence of zero downpayment alternatives and general tightness of the credit box in the conventional mortgage market (Goodman, 2017).

Exhibit 1

Purchase Mortgage Originations, 1990–2017



FHA = Federal Housing Administration. VA = U.S. Department of Veterans Affairs.

Notes: Only purchase mortgages are included, with loans limited to first liens beginning in 2004, when lien information was first reported in Home Mortgage Disclosure Act (HMDA). Farm Service Agency and Rural Housing Service loans are excluded from the analysis.

Source: HMDA data

Disparities in Use of VA Program

VA lending is most prevalent in the mid-Atlantic, southeast, west coast, and Rocky Mountain states (exhibit 2). We consider veterans aged 64 or younger and active-duty servicemembers to constitute the population most likely to use VA mortgages to purchase homes, so we focus on this group. We refer to them as the “eligible” population, since this count is the best available proxy for the number of qualified residents who could use the program to buy a home.

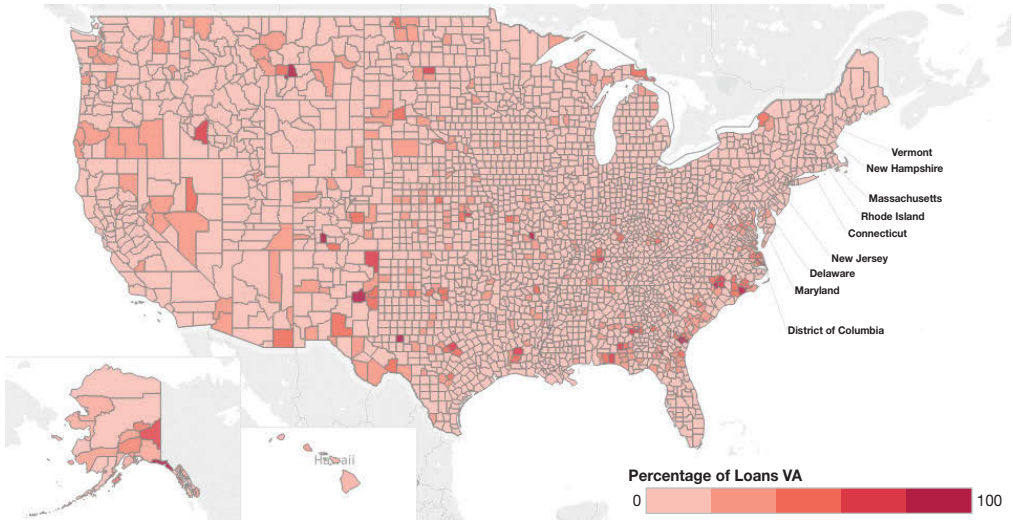
A considerable number of counties with large numbers of veterans and active servicemembers have relatively low volumes of VA mortgages originated, particularly before the mortgage crisis (exhibit 3). Most of these are areas with higher home values, as indicated by the concentration of blue circles in lower right corner of each chart. In 2017, most of the low-VA outliers contained high-cost coastal cities in New York, New Jersey, Massachusetts, and California (exhibit 4). Higher house prices could also serve as a barrier for first-time homebuyers. For this reason, we control in our analysis below for house price levels, rates of house price appreciation, and rates of homeownership over time.

On the other hand, some counties appear to have considerably more VA mortgage originations than we would expect, given the relative numbers of eligible residents (toward the corner in the upper left quadrant of each plot in exhibits 3 and 4). The objective of this paper is also to help explain why those places have seen such a large share of VA lending.

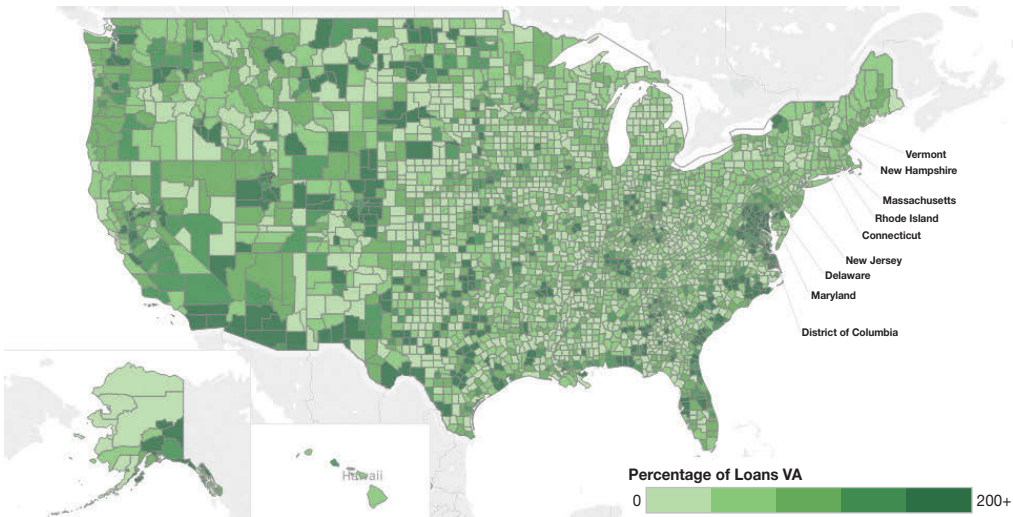
Exhibit 2

VA Loans Originated in 2011

Panel A
VA Loans as a Percentage of All Mortgages Originated



Panel B
VA Loans Originated Per 10,000 Eligible



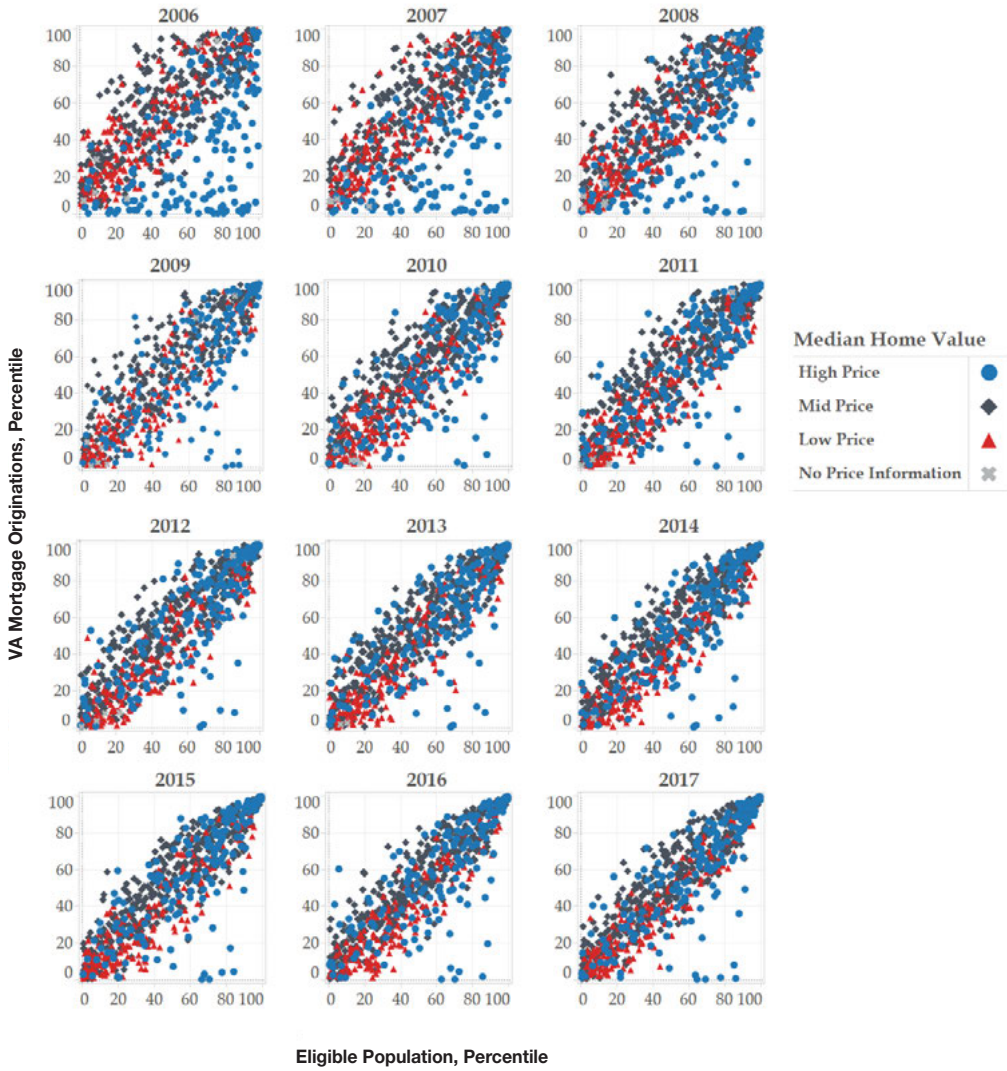
VA = U.S. Department of Veteran Affairs.

Notes: "Eligible" population includes veterans aged 18–64 and active-duty servicemembers, according to the 2011 5-year American Community Survey. First-lien purchase mortgages only are included.

Sources: Home Mortgage Disclosure Act; U.S. Census Bureau data

Exhibit 3

Counties Ranked by Eligible Population and Volume of VA Loans Originated, 2006–2017



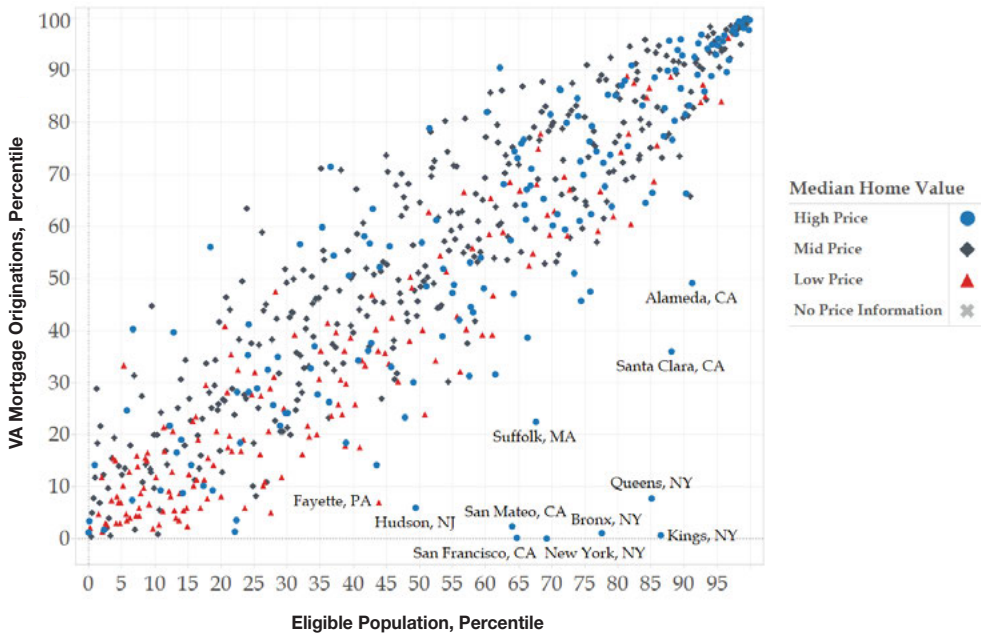
VA = U.S. Department of Veteran Affairs.

Note: For each calendar year counties are ranked by eligible population (number of VA mortgage originations) and assigned a percentile value which is displayed along the x (y) axis.

Sources: Authors' analysis of U.S. Census Bureau, Home Mortgage Disclosure Act, and Zillow data.

Exhibit 4

Counties Ranked by Eligible Population and Volume of VA Loans Originated, 2017



VA = U.S. Department of Veteran Affairs.

Note: Counties are ranked by eligible population (number of VA mortgage originations) and assigned a percentile value which is displayed along the x (y) axis.

Sources: Authors' analysis of U.S. Census Bureau, Home Mortgage Disclosure Act, and Zillow data

Data

We create a unique dataset from several sources. To measure volumes of loan originations at the county level we use HMDA data from 2006 to 2017. In addition, we obtained county-level demographics from the American Community Survey (ACS). To measure home price levels and changes, we use county-level home value indices provided by Zillow. We also use data on the locations of military installations and veterans' services facilities from DoD and VA, respectively. Finally, we collected post location data from four large national VSOs. We conduct our analysis at the county level—the finest level of geography at which each type of data is available.⁵

Home Mortgage Disclosure Act

HMDA data are reported by depository institutions and certain for-profit, nondepository institutions. The data are compiled each year by the Federal Financial Institutions Examination Council. We restrict the sample to first-lien, owner-occupied purchase mortgages that are VA, conventional, or FHA loans. We total the number of originations each year by county. Exhibit 5 presents summary statistics.

⁵ We are primarily constrained by the availability of annual U.S. Census Bureau data, which is difficult to obtain for many areas below a county level. Similarly, while Zillow does provide house price indices at the ZIP Code level, these are not available for as many areas of the country as their county-level series.

Exhibit 5

Summary Statistics of County Loan Origination Volumes, Demographics, and Housing Market Characteristics

Median Values	2006-2007	2008-2011	2012-2014	2015-2017	All Years
HMDA Variables					
VA Originations	51	91	148	226	118
Conventional Originations	2,111	718	956	1,378	1,109
FHA Originations	169	527	423	550	428
% Originations VA	2.1	5.9	8.4	9.3	6.8
% Originations FHA	7.1	38.1	26.4	26.0	27.2
VA Originations Per 10,000 Eligible	50	91	180	313	143
FHA Originations Per 10,000 Adults	15	42	32	44	35
Ratio of VA to FHA Originations	0.3	0.16	0.33	0.38	0.27
ACS Variables					
Population	176,821	182,700	190,083	195,734	185,890
Number of Veterans	15,781	15,342	13,986	13,077	14,449
% Veterans [Civil Population Only]	11.1	10.2	9.0	8.1	9.5
Number of Veterans Aged 18-64	9,747	8,917	7,423	6,458	8,106
% Veterans [Civil Population Aged 18-64 Only]	8.1	7.2	5.8	5.0	6.5
Number in Armed Forces	179	219	147	148	176
% in Armed Forces	0.1	0.1	0.1	0.1	0.1
% Eligible	8.3	7.4	5.9	5.1	6.7
Ratio Veteran to Non-Veteran Income [Males Only]	1.12	1.14	1.13	1.12	1.13
% Housing Units Owner-Occupied	70.2	68.7	67.0	66.8	68.0
Zillow Variables					
Zillow Home Value Index [Nominal \$]	\$165,650	\$146,300	\$139,900	\$160,700	\$150,200
Year-Over-Year % Change in Zillow Home Value Index	3.6	-3.8	1.7	5.1	1.2

ACS = American Community Survey; FHA = Federal Housing Administration; HMDA = Home Mortgage Disclosure Act; VA = U.S. Department of Veteran Affairs.
 Note: Counties are included here if they were included in the 1-year ACS from 2006-2017 and had Zillow county-level house price data for each year 2006-2017 (including backward-looking measures of house price change).
 Source: Authors' analysis of U.S. Census Bureau, HMDA, and Zillow data

U.S. Census Bureau American Community Survey

We include several measures from the 1-year ACS for the years 2006–2017, as displayed in exhibit 5. To capture the veteran population that may be eligible for and most likely to use the program, we include the civilian population aged 18 to 64 who are veterans and the population over 18 who are in the armed services.

Zillow

We use data from Zillow to measure county home values. Unlike self-reported estimates of home values from sources such as the ACS, Zillow data are calculated based on home price transactions and are adjusted using hedonic characteristics.⁶

Veterans Affairs Facilities

We hypothesize that VA hospitals, clinics, and veterans' centers might encourage the dissemination of information about the loan program and have a positive relationship with program use. VA hospitals may act as a hub of activity for veterans and share their campuses with organizations that provide non-medical services to veterans, such as Disabled American Veterans offices. We include VA cemeteries as an initial falsification test. If cemeteries were correlated with more VA loans, we might suspect that simply having a greater historical presence of veterans, and therefore VA facilities, would be the true explanation for our findings. We found no evidence of such a relationship, however.

To test whether proximity to VA facilities is associated with higher use of VA loans, we obtained a shapefile of VA facility locations as of March 31, 2012, from the National Center for Veterans Analysis and Statistics.⁷ Because this is a snapshot of facilities, it may overstate (understate) the proximity of some counties to VA facilities in areas where there have been closures (openings) of VA facilities over the period we examine. We measure the distance from the center of each county to the nearest VA hospital, clinic, veterans center, and VA cemetery. The mean and median distance from the center of a county to each facility is reported in exhibit 6.

Military Installations

We hypothesize that proximity to a DoD site—particularly, one that employs a large number of people—will have a positive relationship with VA loan originations. Lenders and borrowers located near bases may have greater awareness of the program, which could result in a greater incidence of VA lending, even after accounting for the size of the eligible population living near bases. We obtained the locations of 818 military installations from the DoD.⁸ In order to focus on installations that employ a large number of people and are likely to have an effect on the use of VA loans, we

⁶ For more information on how the Zillow index is calculated or to obtain the data, visit <https://www.zillow.com/research/data/>. Data acquired from this site on December 19, 2018; we downloaded data for the market segment “all homes” for all available counties. Aggregated data on this page is made freely available by Zillow for non-commercial use.

⁷ Files are available at http://www.va.gov/VETDATA/docs/Maps/VA_Facilities.zip.

⁸ Files are available at <https://explore.data.gov/download/wcc7-57p3/ESRI>.

matched the DoD files to the Defense Manpower Data Center (DMDC) personnel data for 2009.⁹ We used this file to exclude installations with fewer than 100 DoD personnel. We then measured the distance from the center of each county to the nearest major DoD site.¹⁰

Exhibit 6

Summary Statistics of County Proximity to Facilities

	Mean	Median	SD
Distance in Miles to Nearest...			
VA Hospital	48	33	102
VA Clinic	18	14	14
Veterans' Center	27	23	21
VA Cemetery	42	35	33
Military Base or Other Major Installation	28	20	34
% with Bases or Installations in County	38		
# VSO Posts Per 1,000 sq Miles	34	17	68

*SD = standard deviation. VA = U.S. Department of Veteran Affairs. VSO = veterans service organization.
 Note: Counties are included here if they were included in the 1-year American Community Surveys from 2006–2017 and had Zillow house price data for each year 2006–2017 (including backward-looking measures of house price change).
 Source: Authors' analysis of data from the U.S. Department of Defense (DoD), American Legion, American Veterans (AMVETS), Military Officers Association of America (MOAA), and Veterans of Foreign Wars (VFW)*

Large numbers of military families live near DoD sites, and active-duty servicemembers may use the program to buy a home after 90 continuous days of service. Further, retired military servicemembers enjoy select privileges at bases even after separating from the military, and as a result, they may be likely to purchase homes near bases in order to continue to benefit from both the social connections and the amenities available on the base. We attempt to account for these facts by controlling our models for the number of active-duty servicemembers and veterans under age 65 living in a county. Unfortunately, the U.S. Census Bureau’s estimates of servicemembers living in a county exclude those deployed overseas at the time of data collection. Thus, to the extent that servicemembers and their families purchase homes while stationed elsewhere, the data will underestimate the “eligible population,” and the presence of a DoD site may be a proxy for the presence of military families of deployed servicemembers. Because the majority of borrowers who use the program do so after active-duty service, we do not expect that miscounts in the number of active-duty servicemembers drive our results.¹¹

⁹ Files are available at <https://www.dmdc.osd.mil/appj/dwp/getfile.do?fileNm=M02.zip&filePathNm=pubSelectedLocations>.

¹⁰ We also compared the DMDC data to the ACS measure of active-duty servicemembers. We found a very strong correlation between DMDC counts of personnel by location of employment and the ACS measure of active-duty servicemembers by residence, suggesting that many servicemembers employed at domestic bases live in the county where they work and that the ACS data are a comparable measure of active-duty servicemembers.

¹¹ According to the National Survey of Veterans, 81.4 percent of veterans who used the program did so after service (Westat, 2010).

Veterans Service Organizations

We collected post locations from four major VSOs: the American Legion, Veterans of Foreign Wars of the United States (VFW), American Veterans (AMVETS), and Military Officers Association of America (MOAA). These four organizations are among the largest membership organizations listed in 2012/2013 Directory of Veterans and Military Service Organizations published by the VA.

All four VSOs we study state as part of their mission advocating at the local and federal level for the interests of veterans and their families. In addition, the organizations sponsor community programs that are intended to increase patriotism and support for American troops. The organizations differ in their size and in their membership criteria. In order to estimate the effect of VSOs, we geocoded the address of each post. We count the number of posts within each county and calculate their density, using the county land area.

Sample

We restricted our sample to counties that were included in the 1-year ACS for all years from 2006 through 2017, each of these has a population of 65,000 or more. We limit the sample in this way in order to reduce noise in estimates coming from sparsely populated areas and to allow us to capture annual variation in the control variables. We further restrict the sample to the 657 counties for which Zillow county-level home value indices were available for the entire study period.

Our sample of 657 counties includes counties from all 50 states and the District of Columbia. In 2017, our sample of counties had a total population of 258 million individuals and a veteran population of 13.7 million. This represented roughly 81 percent of the total population and 72 percent of the veteran population in 2017.

Within our sample, the median number of VA mortgages originated in a county annually was just 118, with the median ranging from a low of 51 in 2006 and a high of 238 in 2016. When VA lending was at its lowest, conventional lending was near its height for the period, and as conventional lending fell throughout the housing bust, VA lending was on the rise (exhibit 1). FHA lending resembles VA lending in this regard, although the median level of FHA lending peaked in our sample counties in 2009.

From 2006 to 2017, VA mortgages as a percentage of all loans originated rose dramatically, from under 2 percent of loans to over 9 percent.¹² This is striking, because the share of young adults serving in the military has declined over time, and the veteran population has decreased and aged. Roughly 10 percent of adult residents in the typical county in our sample were veterans, and most of these were veterans aged 64 or younger. In half of the sample counties, only 0.1 percent or fewer of the adult residents over time were active servicemembers (exhibit 5).

¹² The Veterans Benefits Improvement Act of 2004 significantly increased the standard guaranty amount, which would be expected to increase demand for the program. As shown in exhibit 1 panel B, however, the number of VA loans originated did not dramatically increase until 2008. Beginning in 2008, high-cost areas in the continental United States also qualified for greater guaranty amounts, which should also have increased VA demand, although during the same period, FHA and conventional loans—VA substitutes—were experiencing similar loan limit increases in these high-cost areas.

Estimation Strategy

We use a mixed-effects or multi-level model in order to estimate the effect of time-invariant variables (for example, proximity to major military installations) on both the initial levels and change over time in the use of the VA loan program.¹³ The mixed-effects model allows each county to have a unique trajectory of VA lending over the sample period. The model allows us to account for the clustering of county lending levels over time. The model has two levels: the first level represents the “within-county” change in VA lending over time, while the second level allows us to estimate the change in VA lending attributable to “between-county” differences.

We estimate two sets of these models. In the first, the dependent variable is the percentage of all purchase loans originated in a county that are VA mortgages. In the second set of models, the dependent variable is the VA loan origination rate, which we specify as the number of VA loans originated per 10,000 eligible residents (veterans aged 18 to 64 and servicemembers).

Beginning with the first set, PCT_{ij} is the percentage of loan originations that are VA loans, in county i during year j , and the general form of the model is:

$$\begin{aligned} PCT_{ij} = & \gamma_{00} + \gamma_{10}YEAR_{ij} + \gamma_{20}PCTELIG_{ij} \\ & + \gamma_{01}DIST_i + \gamma_{02}VSODENSITY_i \\ & + \gamma_{30}HSGMKT_{ij} + \gamma_{40}INCRATIO_{ij} + \gamma_{03}STATE_i + (\varepsilon_{ij} + \zeta_{0i} + \zeta_{1i}YEAR_{ij}). \end{aligned}$$

in which $PCTELIG$ is our estimate of the percentage of a county’s adult population that is either in the military or a veteran between ages 18 and 64. $DIST_i$ is a vector of time-invariant variables indicating distance from the county center to the key military and VA sites, which we hypothesize may be associated with greater utilization of the VA loan program. For military installations, the distance measure is set to zero if a major installation is located within the county, otherwise it is equal to the natural log of the number of miles from the county center to the nearest major installation. For VA sites we include the natural log of the distance from the county center to the nearest VA hospital, VA clinic, veterans’ center, and VA cemetery. Note that we include VA cemeteries to test for a spurious relationship between the siting of VA facilities and variation in VA lending. $VSODENSITY_i$ is the time-invariant natural log of the number of VSOs per thousand square miles in each county.

$HSGMKT_{ij}$ is a vector of three variables related to the conditions of the local housing market. We include the percentage of housing units in a county that are owner-occupied, the natural log of the Zillow median home value in the county, and the year-over-year percentage change in the median value.

We include a measure of the median income of veteran males relative to nonveteran males, $INCRATIO_{ij}$, to control for variations in the relative purchasing power of veterans across-counties. Although on average in our sample the median income of veterans was higher than nonveterans (a

¹³ For more information on mixed-effects models, we recommend Singer and Willett (2003). Note that because several of our main question predictors are time-invariant, it is not possible to estimate our models using a simple linear model with county-specific fixed effects.

ratio of 1.18). In certain areas, veterans may have considerably less purchasing power; for example, in San Francisco in 2017, the ratio was 0.76.

Finally, we include a set of state fixed effects, $STATE_i$, to control for time-invariant characteristics of states that may influence utilization of the VA home loan program. For example, several states provide additional incentives to veteran homebuyers.

In the second set of models the dependent variable is the number of VA loans per 10,000 potentially eligible adults ($RATE$):

$$RATE_{ij} = \gamma_{00} + \gamma_{10}YEAR_{ij} + \gamma_{20}PCTELIG_{ij} + \gamma_{01}DIST_i + \gamma_{02}VSODENSITY_i + \gamma_{30}HSGMKT_{ij} + \gamma_{40}INCRATIO_{ij} + \gamma_{03}STATE_i + (\varepsilon_{ij} + \zeta_{0i} + \zeta_{1i}YEAR_{ij}).$$

The independent variables are the same in both models.

Results

We find a strong relationship between VA loan originations and home values. Higher home values are associated with a lower percentage of VA loans but more VA loans per 10,000 eligible adults. In addition, we find that proximity to major military installations is associated with greater use of the program, both in terms of the percentage of all loan originations and when measured as a rate. We do not find evidence that VA facilities are associated with utilization of the program. We find mixed evidence for an association between VA lending and the density of VSOs—VSO density is not associated with the percentage of VA loans but is negatively associated with the rate of VA lending. We interpret this result to suggest that VSOs are not causally linked to VA borrowing. VSO densities are high in the Midwest and Great Plains states, where unobserved macroeconomic conditions (population shifts, local economic factors) may be driving lower rates of VA loan originations.

VA Loans as a Percentage of All Originations

The first model (1) includes our key independent variables, including measures of proximity to military installations, VA facilities, and VSOs. In addition, it includes controls for housing market conditions and state fixed effects. Distance to the nearest major military installation is strongly negatively correlated with the share of originated VA mortgage loans, despite including a control for the share of the adult population (aged 18–64) that are veterans or active servicemembers, which should be a fairly accurate proxy for the population eligible for borrowing through the VA program.

Interestingly, other measures of proximity to institutions show no relationship. We find no support for an association between the density of VSOs and VA loan program utilization. We also find no evidence that proximity to the VA facilities matters: the coefficients on distances to VA clinics, hospitals, veterans' centers, and cemeteries are all near zero. While we find it reassuring that proximity to VA cemeteries was not significant, there were reasons to expect, a priori, that VSOs and other types of facilities might have a measurable, though small, impact.

Intuitively, VA lending is less common in counties where house prices are higher and where appreciation is greater. As previously discussed, larger loan values are permitted with no

Exhibit 7

VA Loans as a Percentage of All County Mortgage Originations (1 of 2)

	VA Mortgages as Percent of All Originations		FHA Mortgages as Percent of All Originations
	(1)	(2)	(3)
Constant	81.825*** (4.081)	79.193*** (3.291)	247.322*** (7.319)
Year (0=2006)	0.845*** (0.019)	0.845*** (0.019)	1.017*** (0.043)
% of Population VA Eligible	0.192*** (0.025)	0.193*** (0.025)	-0.220*** (0.055)
In Miles to Nearest...			
Major DoD Installation	-1.242*** (0.148)	-1.224*** (0.142)	-0.277 (0.149)
VA Clinic	0.143 (0.299)		
VA Hospital	0.251 (0.337)		
Veterans' Center	-0.182 (0.308)		
VA Cemetery	-0.610 (0.322)		
VSO Density	-0.503 (0.386)		
% of Housing Units Owner Occupied	-0.085*** (0.013)	-0.082*** (0.013)	-0.025 (0.029)
Ratio of Veteran to Non-Veteran Income	1.083*** (0.194)	1.084*** (0.194)	1.097 (0.718)
Zillow House Price...			
In Median Home Value	-5.737*** (0.237)	-5.751*** (0.234)	-18.549*** (0.575)
Year-Over-Year Percentage Change	-0.072*** (0.004)	-0.072*** (0.004)	-0.866*** (0.016)

Exhibit 7 (cont.)

VA Loans as a Percentage of All County Mortgage Originations (2 of 2)

	VA Mortgages as Percent of All Originations		FHA Mortgages as Percent of All Originations
	(1)	(2)	(3)
Observations	7,884	7,884	7,884
Deviance	38,285.3	38,290.9	58,481.7

*DoD = U.S. Department of Defense. FHA = Federal Housing Administration. VA = Department of Veterans Affairs. VSO = veterans service organization. Notes: ***, **, and * represent statistical significance at 0.1, 1, and 5 percent levels, respectively. Standard errors are displayed in parentheses. Counties are included here if they had 1-year ACS estimates and Zillow house price data for each year 2006–2017 (including backward-looking measures of house price change). "Eligible population" is the count of residents aged 18–64 who are veterans or armed forces servicemembers. "Percentage eligible" captures the share of adults aged 18–64 who fit this description of eligibility. VSO density is calculated as ln (veteran service organization posts per 1,000 square miles). "Major DoD Installations" refer to DoD sites catalogued by the Defense Manpower Data Center (DMDC) in the 2009 personnel report that have 100 or more personnel. State fixed effects are included in each model. Source: Authors' analysis of U.S. Census Bureau, Home Mortgage Disclosure Act, DoD, Zillow, American Legion, American Veterans (AMVETS), Military Officers Association of America (MOAA), and Veterans of Foreign Wars (VFW) data*

downpayment in designated high-cost areas, but even those loan limits may be binding for some borrowers. In high-cost areas, 6 percent of borrowers in 2017 exceeded the loan limit for a loan with zero downpayment, and another 9 percent of borrowers took out a loan below but near (within 5 percent) the loan limit. In areas not designated as high-cost, borrowers did not seem as affected by these limits: 3 percent of borrowers exceeded the limit and 5 percent took out a loan near the limit.

In addition to loan limit considerations, veterans may have less purchasing power relative to nonveterans in high cost areas. For this reason, we include the ratio of veteran to nonveteran median income as a control in the models. The result is intuitive: there is a significant and positive association between veteran-to-nonveteran income and the share of VA loans in a county. In counties where male veterans' income outpaces the income of other male residents, it makes sense that VA loans would make up a greater share of the loan originations. Interestingly, the rate of owner occupancy in a county is negatively associated with VA loan use. This is surprising since the VA program is intended for owner occupants.

Our preferred model (2) eliminates variables that did not have a significant association with the share of VA loans in a county. The upper plots in exhibit 8 present the associated effects of moving from the .25 quantile, to the median, and the .75 quantile levels of two key variables, distance to DoD installation and Zillow home value index, on the share of loans that are VA. Counties with a major military installation have a 3.7-percentage-point larger share of VA loans, on average, than counties that are the median distance from an installation (20 miles). This is economically significant, as the county median VA share has ranged from 1.8 to 9.4 percent during our sample period.

The measures of housing market conditions are all statistically significant, but the most substantive finding is that as house prices increase, the percentage of VA loans decreases. Moving from a

county with the median Zillow home value, \$150,200, to a county with home values of \$214,925 (the .75 quantile level) is associated with a 2.1-percentage point decrease in the share of VA loans.

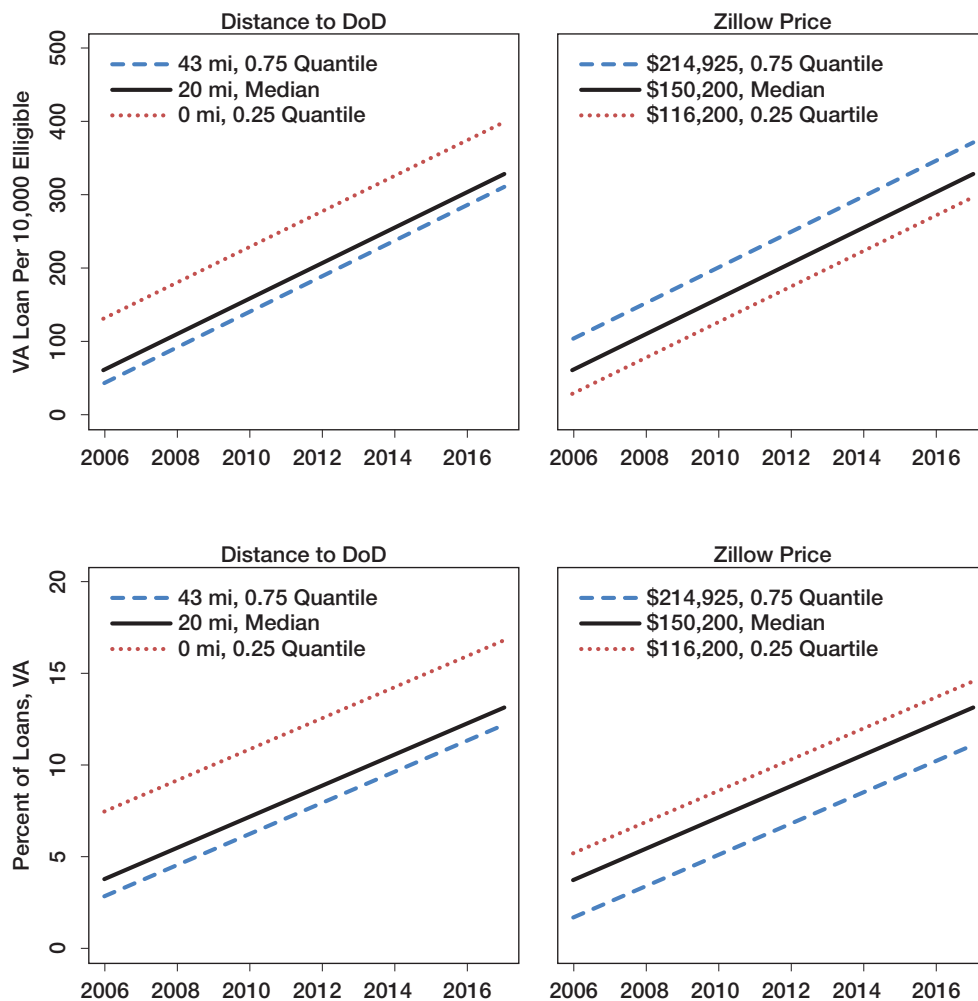
Robustness Checks

We estimate a model (3) to test whether our findings also apply to the percentage of FHA loans. We anticipate that the distance to major DoD sites should have no relationship with FHA loans, except in that FHA mortgages are a substitute for VA loans. The coefficient on PCTELIG remains significant, but negative, suggesting an inverse relationship between FHA loans and the presence of veterans. This is consistent with FHA and VA loans being similar loan products and, holding other factors constant, increasing the percentage of veterans and military servicemembers reduces utilization of FHA loans. In areas with more veterans, demand for FHA loans may be lower due to a higher percentage of the population being eligible for a more attractive loan product.

The key finding from our third model is that the coefficient on the distance to major DoD installations approaches zero and becomes statistically insignificant. This supports the conclusion that proximity to major DoD installations, rather than simply low downpayment, government-insured lending, is a meaningful predictor of VA loan demand.

Exhibit 8

Relationships Between County Characteristics and Predicted Use of VA Loans



DoD = U.S. Department of Defense. VA = U.S. Department of Veteran Affairs.
 Notes: Based on Model 2, all control variables other than year and those displayed are set to median levels. Distance to DoD captures log distance in miles from county center to nearest major DoD installation.
 Sources: Authors' analysis of U.S. Census Bureau, Home Mortgage Disclosure Act, DoD, VA, and Zillow data

VA Originations per 10,000 Eligible Residents

Results from the models where the outcome variable is the number of VA loan originations per 10,000 eligible adults (veterans and servicemembers aged 18–64) tell a similar story to the percentage VA models (exhibit 9). We find that house values in a county remain a strong predictor of VA loan utilization and that proximity to major DoD installations is associated with higher rates of VA loan originations. We find evidence that the density of VSOs is negatively associated with the rate of VA loan originations. We again find no evidence that VA facilities are associated with

VA lending, and the veteran-to-nonveteran median income ratio measure remains positive but becomes statistically insignificant.

Exhibit 9

VA Loan Originations in County per 10,000 Eligible Residents (1 of 2)

	VA Mortgages Per 10,000 Eligible Residents under Age 65		FHA Mortgages Per 10,000 Eligible Residents under Age 65
	(1)	(2)	(3)
Constant	-1247.283*** (76.774)	-1205.305*** (64.616)	102.106*** (12.478)
Year (0=2006)	21.112*** (0.567)	24.144*** (0.567)	2.209*** (0.080)
% of Population VA Eligible	-13.857*** (0.533)	-13.779*** (0.532)	0.356*** (0.099)
In Miles to Nearest...			
Major DoD Installation	-23.263*** (2.510)	-23.112*** (2.488)	-0.262 (0.305)
VA Clinic	1.122 (5.034)		
VA Hospital	5.079 (5.662)		
Veterans' Center	7.735 (5.184)		
VA Cemetery	-7.157 (5.415)		
VSO Density	-37.837*** (6.524)	-42.426*** (5.235)	2.897*** (0.654)
% of Housing Units Owner Occupied	1.446*** (0.274)	1.472*** (0.272)	0.288*** (0.054)
Ratio of Veteran to Non-Veteran Income	4.649 (4.154)		
Zillow House Price...			
In Median Home Value	122.144*** (4.967)	121.426*** (4.946)	-8.559*** (1.041)
Year-Over-Year Percentage Change	1.248*** (0.088)	1.246*** (0.088)	-0.730*** (0.023)

Exhibit 9

VA Loan Originations in County per 10,000 Eligible Residents (2 of 2)

	VA Mortgages Per 10,000 Eligible Residents under Age 65		FHA Mortgages Per 10,000 Eligible Residents under Age 65
	(1)	(2)	(3)
Observations	7,884	7,884	7,884
Deviance	86,715.8	86,721.6	64,628.8

*DoD = U.S. Department of Defense. FHA = Federal Housing Administration. VA = U.S. Department of Veterans Affairs. VSO = veterans service organizations. Notes: ***, **, and * represent statistical significance at 0.1, 1, and 5 percent levels, respectively. Standard errors are displayed in parentheses. Counties are included here if they had 1-year ACS estimates and Zillow house price data for each year 2006–2017 (including backward-looking measures of house price change). "Eligible population" is the count of residents aged 18–64 who are veterans or armed forces servicemembers. "Percentage eligible" captures the share of adults aged 18–64 who fit this description of eligibility. VSO density is calculated as ln (veteran service organization posts per 1,000 square miles). "Major DoD Installations" refer to DoD sites catalogued by Defense Manpower Data Center (DMDC) in the 2009 personnel report that have 100 or more personnel. State fixed effects are included in each model. Source: Authors' analysis of U.S. Census Bureau, Home Mortgage Disclosure Act, DoD, Zillow, American Legion, AMVETS, Military Officers Association of America (MOAA), and Veterans of Foreign Wars (VFW) data*

There is an association between proximity to a military installation and VA home loans that is statistically significant and meaningful. Moving from a county with a military installation to a county the median distance from an installation (20 miles) is associated with a 70-loan decrease in the number of loan originations per 10,000 eligible residents (exhibit 8). This is a substantive effect given that over our sample period the median number of VA loans per 10,000 eligible in a county is 143.

Most control variables have intuitive signs. An increase in the Zillow home value from the median level (\$150,200) to the .75 quantile level (\$214,925) is associated with a 43.5-loan increase in the number of VA loans per 10,000 eligible residents. Again, this is economically and statistically significant. The rate of owner occupancy remains significant but is positive. This seems intuitive in that in areas where homeownership is higher, we see more VA loans among those eligible.

Counter to our hypothesis, in this model VSO density is negative and significant. We interpret this finding to suggest that some unobserved factors are driving the results, not that VSOs dampen VA lending. There is also a negative relationship between the percentage of the population that is VA eligible and the amount of VA lending that occurs per eligible member of the population. VSO density and the overall presence of veterans could be associated with other demographic or economic factors that are negatively associated with VA lending.

Robustness Checks

In our final model (3) we change the outcome variable from the rate of loan originations per 10,000 veterans under age 65 and servicemembers to the rate of FHA loan originations per 10,000 adults under 65. The association with distance to the nearest major military installation is insignificant and approaches zero. We also estimate the main models on a subset of the sample,

excluding the counties at or above the 95th percentile with respect to land area. The results were strongly robust.¹⁴

Discussion

Our finding of a positive relationship between VA borrowing and proximity to DoD installations is robust to alternative specifications and cannot be explained away by the share of the population that is eligible to participate, the relative economic status of veterans to nonveterans, area house prices, or the level of demand for general low downpayment lending in the area (as evidenced by FHA borrowing). The robustness of these results provides strong support for the hypothesis that institutions matter and help influence VA lending patterns. More research is necessary to explore the mechanisms.

Our analysis is limited by the type of data available on facilities and veterans. For example, we are constrained by the scale we have chosen. Choosing the county as the unit of analysis enables the creation of a panel dataset but limits us because distances from the county center to the nearest VA facility and major DoD installation are an imperfect measure of accessibility for individuals. Another limitation is the available data on veterans themselves. Using the ACS data does not allow us to identify the actual eligible population. As a result, we use a proxy measure: the U.S. Census Bureau's count of all active servicemembers and veterans aged 18–64. The fact that most military servicemembers do not use the VA home loan program until after service increases our confidence in using this proxy measure.

While we recognize these data limitations, we have no reason to suspect that they lead us to systematically over- or under-estimate distances or numbers of veterans. Measurement error, however, can lead us to estimate less precise effects, which are also biased toward zero. In other words, this measurement error could bias us against finding significant results. Finally, we caution that the 1-year ACS and Zillow data are available for only certain counties, so our findings may not be generalizable outside of our sample, particularly low-density areas.

Some important questions are whether there are differences in lender supply between areas with and without major DoD installations, and whether these differences pose potential risks to communities. For example, Kim et al. (2018) explain that nonbanks are largely reliant on warehouse lines of credit provided by large banks and are not capitalized to the extent of depository institutions, which makes them more susceptible to failure in the event of another economic downturn. This is particularly true since nonbanks have greater FHA exposure, which the authors explain carries greater financial risk than originating and servicing other types of loans. Areas with greater VA exposure, such as areas near bases, may be more reliant on nonbanks and may be more sensitive to possible future failure of some of these less capitalized institutions.

We find that *within* the VA market, lending patterns are similar, on average, in these two types of counties. In 2017, nonbanks originated 65 percent of the VA loans in the counties with major DoD installations and 65 percent of VA loans in counties without major DoD installations. The top seven lenders in terms of 2017 loan volume in counties with DoD installations were the same

¹⁴ Full results are available from the authors upon request.

institutions that made up the top seven in non-DoD counties.¹⁵ In DoD counties these firms made 33 percent of the loans originated that year, and in non-DoD counties they made 31 percent of the loans. The mean Herfindahl-Hirschman Index (HHI) value for VA lenders in DoD counties was 632, and the mean HHI in non-DoD counties was 652, indicating that both groups of counties have unconcentrated VA lending markets on average, which helps mitigate concerns about how the failure of a small number of VA lenders might affect communities near DoD installations.¹⁶

Conclusion

The VA program is a powerful tool for encouraging affordable, sustainable homeownership for veterans. The program allows buyers to purchase with no downpayment, and although higher loan-to-value loans are usually at greater risk of default, recent research from the CFPB finds that VA loans perform similarly to conventional mortgages held by military servicemembers, which require larger downpayments (Clarkberg and Lapid, 2019).

In recent years, the VA home loan guaranty program has grown both as a share of all mortgage originations and in the total number of originations. The growth of the program partly reflects the increasing appeal and availability of these loans relative to conventional mortgages. It remains to be seen if the program will continue to grow or stabilize if the housing market continues to improve and credit requirements loosen further. Fannie Mae and Freddie Mac have been offering loans with downpayments as low as 3 percent since late 2014, but most buyers using VA loans put zero down. The appeal of VA mortgages may be compromised if no-money-down loans return in large numbers to the conventional mortgage market.

We find that use of the program has been strongest in areas near major military installations and VA lending as a share of all mortgages has increased faster in places where a higher share of the population are veterans or active-duty military. Many of these counties had disproportionately low VA utilization at the peak of the housing market, when eligible borrowers were presumably using alternative forms of low downpayment lending. The strong positive association between VA lending and military installations—but not VA facilities—suggests that there is something unique about housing markets around bases. More research is needed to understand why this is. One possibility is that lenders, real estate brokers, and buyers and sellers are more willing around military installations than in other areas to engage in the process of financing a home purchase with a VA loan, which can be perceived as more burdensome because it requires specialized appraisals and inspections. This could be due to greater familiarity with the program or a desire to assist veterans and members of the military community.

Stakeholders who wish to increase veterans' access to homeownership may want to look to VA and military institutions to help provide outreach to veterans, lenders, and real estate brokers.

¹⁵ Each HMDA respondent is treated as a separate lender in this analysis. The top three lenders in both counties (in identical order) were Mortgage Research Center, USAA Federal Savings Bank, and Navy Federal Credit Union. The remaining four lenders were Caliber Home Loans, Wells Fargo, Quicken, and Fairway Independent Mortgage Corporation.

¹⁶ Importantly, the upper tail of the HHI distribution is thin: fewer than a dozen counties in our sample have HHIs in excess of 1500, and just four of these counties have military installations. The U.S. Department of Justice considers HHI values of 1500–2500 to be “moderately concentrated” (U.S. Department of Justice, 2018).

The assistance provided by the VA home loan guaranty is effective at lowering the cost of homeownership, and, arguably, it is in areas with high housing costs that assistance is most needed. In tight housing markets, where sellers often have multiple offers, the added administrative burden of the program may be enough to discourage its use. Moreover, survey evidence has documented that many veterans are simply unaware that the program exists.

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Homeownership Experiences Following Criminal Justice Contact

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Abstract

Recent work has highlighted the significance of incarceration for wealth accrual and African-American-White gaps in homeownership, but the monetary sanctions and disruptions to employment that often accompany even low-level criminal justice contact may also have important consequences for individual homeownership and racial disparities in homeownership. Using data from the National Longitudinal Survey of Youth 1997 (NLSY97), this article considers the potential of a broad variety of criminal justice system interactions to shape homeownership experiences among young adults. Using a variety of models to address concerns of unobserved confounding, I investigate how arrest, criminal charges, conviction, and incarceration relate to (1) probability of homeownership, (2) age of entry into first homeownership, and (3) homeownership duration. Results indicate that, like incarceration, these lower level forms of criminal justice contact are independently associated with lower levels of homeownership, delayed entry into homeownership, and shorter duration of homeownership among respondents who succeed in becoming homeowners. Given the importance of homeownership for individual wealth accumulation and racial wealth gaps, as well as sizable racial disparities in criminal justice contact in the United States, these findings illuminate a potentially important pathway through which racial disparities in socioeconomic well-being are reinforced.

Introduction

A notable amount of both scholarly and political attention has been devoted to the consequences of mass incarceration in the United States in recent years. Researchers and advocates alike have pointed to the sharp increase in national incarceration rates over the last four decades and the consequently large population of former prisoners as cause for concern (Charles Koch Institute, 2019; National Research Council, 2014). According to recent estimates, there were 5 million former prisoners in the American population in 2010, up from a historic average of about 1 million throughout most of the 20th century (Shannon et al., 2017).

A sizable research literature reveals that the consequences of incarceration do not stop at the prison gate. Incarceration appears to lead to greater disadvantage and marginalization in individuals' lives along almost every dimension, from health to socioeconomic outcomes, extending even to their children's well-being (Adams, 2018; Bryan, 2017; Massoglia and Pridemore, 2015; Western et al., 2015). Much of this research suggests that the link between incarceration and these various forms of marginalization and disadvantage is not driven purely by selection into incarceration but is causal. Moreover, in addition to exacerbating disadvantage in the individual life course, the fact that incarceration is unequally distributed in the population—concentrated among racial minorities and the less educated—has led researchers to highlight incarceration as a driver of both the production and reproduction of poverty and inequality in American society (National Research Council, 2014; Wakefield and Uggen, 2010; Western and Pettit, 2010). Recent work by Schneider and Turney (2015), for example, suggests that incarceration contributes to the African-American-White homeownership gap in aggregate, which, in turn, has important implications for African-American-White wealth disparities given that homeownership is an important contributor to individual wealth (Killewald and Bryan, 2016).

The research literature to date has largely overlooked the implications of the broader criminal justice system, however. Incarceration marks the most intensive form of criminal justice system contact, but the reach of criminal justice extends far beyond prisons and jails, touching the millions of Americans who are arrested, charged, and convicted of crimes in any given year. While 2.2 million adults were incarcerated in American prisons and jails in 2016, an additional 4.5 million were under community supervision (that is, on parole or probation), and 10.6 million were arrested over the course of 2016 (FBI, n.d.; Kaeble and Cowhig, 2018).

Recent research highlights how these less intensive but far more common forms of criminal justice contact affect individual mental health (Sugie and Turney, 2017), but relatively little is known about how these experiences shape socioeconomic well-being or opportunity (but see Maroto and Sykes, 2019). Using nationally representative data from the National Longitudinal Survey of Youth 1997 (NLSY97), I explore the consequences of these broad varieties of criminal justice contact for individual socioeconomic well-being by examining how individual histories of arrest, criminal charges, conviction, and incarceration relate to homeownership, age of entry into first homeownership, and duration of homeownership. I find robust evidence that not just incarceration but also arrest, criminal charges, and conviction are associated with lower probability of homeownership, later entry into homeownership, and shortened duration of homeownership. In the conclusion, I discuss the implications of these findings for racial disparities in homeownership and wealth.

Background

Homeownership in the United States

Principal residence makes up the largest share of household wealth—more than 60 percent of total assets—for the vast majority of Americans (Wolff, 2016). Moreover, homeownership is a wealth-generating status. Recent estimates indicate that each year of homeownership increases wealth in mid-life by about \$6,800, on average (Killewald and Bryan, 2016). Homeownership may also facilitate entry into other wealth-generating investments, like entrepreneurial activity (Adelino, Schoar, and Severino, 2015; Black, de Meza, and Jeffreys, 1996). Additionally, homeownership is associated with a variety of other benefits, including better health outcomes for homeowners and higher cognitive scores and educational achievement for the children of homeowners (Dietz and Haurin, 2003).

However, racial disparities in homeownership are vast (Kuebler and Rugh, 2013; U.S. Census Bureau, 2018), and asset returns to homeownership are racially graded, with White homeowners receiving annual wealth returns to homeownership twice as large as those received by African-American homeowners and 60 percent larger than those received by Hispanic homeowners (Killewald and Bryan, 2016). Thus, racial disparities in homeownership and the returns to homeownership are major contributors to the African-American-White and Hispanic-White wealth gaps in the United States (Killewald and Bryan, 2016).

Exposure to Criminal Justice System Contact

A vast literature has documented the dramatic growth in the scale of incarceration in the United States, racial disparities in this growth, and the often deleterious consequences of incarceration for individuals, families, and communities (National Research Council, 2014). Relatively little is known, however, about the lower level but more common forms of criminal justice contact that precede incarceration. While just 5 percent of White men and 27 percent of African-American men have been imprisoned at some point in time by their early-30s (Western and Pettit, 2010), more than one-third (38 percent) of White men and one-half (49 percent) of African-American men have already been arrested at least once by age 23 (Brame et al., 2014). Despite the markedly higher prevalence of arrest and conviction (Lerman and Weaver, 2014) relative to incarceration, researchers have paid far greater attention to the implications of incarceration, rather than of arrest or conviction, for individual well-being (Sugie and Turney, 2017).

This prior research has linked incarceration to labor market discrimination (Pager, 2003; Pager, Western, and Bonikowski, 2009), lower wages (Apel and Sweeten, 2010; Western, 2002), decreased employment levels (Holzer, 2009), diminished earnings (Western, Kling, and Weiman, 2001), and very low upward economic mobility (The Pew Charitable Trusts, 2010). Another vein of research connects prior incarceration to poorer mental health (Schnittker, Massoglia, and Uggen, 2012; Turney, Wildeman, and Schnittker, 2012), diminished physical health (Massoglia, 2008a, 2008b; Schnittker and John, 2007), and poorer health behaviors (Porter, 2014) among formerly incarcerated adults. While health and employment-related outcomes have received the bulk of scholarly attention in the area of individual-level consequences of incarceration, additional research

suggests that incarceration leads to subsequent relationship dissolution (Lopoo and Western, 2005; Turney and Wildeman, 2013), housing instability (Geller and Curtis, 2011; Harding, Morenoff, and Herbert, 2013; Warner, 2015), and diminished civic participation (Lerman and Weaver, 2014; Weaver and Lerman, 2010).

More recent work has explored the relationship between incarceration, wealth, and homeownership. Although individuals who will eventually be incarcerated typically have lower asset levels than the general population even prior to their incarceration (Zaw, Hamilton, and Darity, 2016), these studies find that asset levels, as well as ownership of assets (that is, homes, bank accounts, vehicles), decrease markedly following incarceration (Maroto, 2015; Turney and Schneider, 2016). Turney and Schneider (2016) find that recent incarceration is associated with lower likelihood of owning a vehicle or having a bank account, while Maroto (2015) finds that the probability of homeownership decreases by 28 percentage points and individual net worth decreases by \$42,000, on average, following incarceration.

Moreover, the wealth effects of incarceration appear to spill over to family members and close relations. Research indicates that the incarceration of a household member is associated with decreases in both assets and debts (Sykes and Maroto, 2016), while the incarceration of a romantic partner is associated with decreased asset ownership among women who share children with recently incarcerated men (Turney and Schneider, 2016). Recent work by Bruce Western (2018) that highlights the extensive amount of financial and in-kind support that family members (who maintain relationships with formerly incarcerated individuals) provide in the wake of incarceration helps to explain why incarceration may be detrimental to the assets of not just incarcerated individuals but also their close relations.

Most of the prior research on the consequences of criminal justice contact relies upon nationally representative survey data sets (for example, the National Longitudinal Survey of Youth 1979, the Fragile Families and Child Wellbeing Study), however, that have collected information only on incarceration. As a result, the literature on consequences of other forms of justice system contact is far more limited. Evidence exists, however, that arrest decreases probability of high school completion and may have minor labor market implications in early adulthood (Bushway, 1998; Sweeten, 2006). Moreover, recent studies using the same data set I utilize here (NLSY97) find that arrest, independent of conviction or incarceration, is associated with deleterious mental health outcomes, as well as asset and debt declines in early adulthood (Maroto and Sykes, 2019; Sugie and Turney, 2017). In fact, Sugie and Turney (2017) find that accounting for earlier criminal justice contact in the form of arrest may explain a large proportion of the negative relationship between incarceration and mental health observed in prior studies. And while Maroto and Sykes (2019) find that incarceration is more disruptive to the wealth profiles of young adults than arrest, they find that arrest also has independent direct and indirect effects on both assets and debt.

This study, thus, contributes to the existing literature on the consequences of criminal justice contact for wealth by taking advantage of the more granular information about justice system interactions available in the NLSY97 to consider how a broader set of criminal justice system encounters relate to subsequent homeownership experiences. Moreover, where previous studies have considered the implications of incarceration for current homeownership, I extend the

literature by considering novel outcomes that characterize trajectories of homeownership careers (that is, age of first entry into homeownership and duration of homeownership).

Potential Pathways from Criminal Justice Contact to Homeownership Outcomes

The most immediate way in which criminal justice contact is likely to influence homeownership outcomes is through its potential effect on financial resources. While the prior research literature has primarily considered the implications of incarceration or felon status for employment outcomes, the ease with which potential employers can access criminal background checks that include even arrest records means that lower level justice contact may also affect an individual's ability to gain employment (Lageson, 2016; Uggen et al., 2014). Moreover, time lost to arrest processing, pretrial detention, court appearances, or probation and parole meetings may cause justice-system-involved individuals to miss out on work shifts or even lose their jobs entirely. The direct financial costs of criminal justice system interaction in the form of fines, fees, restitution orders, and other financial obligations to the court system and other criminal justice agencies (Harris, 2016; Harris, Evans, and Beckett, 2010) are also likely to affect an individual's ability to save enough to enter homeownership, as well as to be able to maintain mortgage payments on already purchased homes.

Prior research on the consequences of incarceration also highlights the potential of criminal justice contact to destabilize and dissolve romantic partner relationships (Lopoo and Western, 2005; Turney, 2015). Research on the relationship implications of lower level justice system contact is limited, but ethnographic work by Goffman (2009) highlights how justice system involvement may promote unpredictable behavior among young men, which can destabilize their romantic relationships. Thus, the potentially deleterious consequences of criminal justice system contact for relationship formation and maintenance may inhibit justice-system-involved individuals' ability to pool financial resources with a partner in order to enter homeownership or to maintain monthly mortgage payments.

Alternatively, it is possible that criminal justice contact could incentivize entry into homeownership, conditional on financial resources, given that landlords may legally discriminate against prospective tenants based on prior criminal history (Delgado, 2005; Helfgott, 1997; Leasure and Martin, 2017; Thacher, 2008). Thus, homeownership may be especially attractive to individuals with criminal histories as a means of avoiding the scrutiny and restricted options available to them in the rental market.

Data & Methods

I use data from NLSY97, which has collected detailed information on employment, education, assets, criminal activity, household characteristics, and more from a nationally representative sample of 8,984 American men and women since 1997, when they were ages 12–16.¹ From 1997 to 2011, the NLSY97 surveys were conducted annually; as of 2013 data collection is biennial. The

¹ To be eligible for the sample, respondents must have been 12 to 16 years old on December 31, 1996. Because the latest interviews for the first survey round were completed in March through May 1998, some respondents were 17 and 18 years old at the time of their first survey (that is, “survey year” 1997) (Bureau of Labor Statistics, 2019e).

most recent survey year for which data are available is 2015, at which point sample members were 30–36 years old;² 79 percent of original sample members participated (Bureau of Labor Statistics, 2019d).

Although NLSY97 respondents are still relatively young as of the most recent survey year, they are at peak age for entry into homeownership. As of 2018, the median age for first-time homebuyers was 32 (NAR, 2018). Moreover, the NLSY97 data provide a rare opportunity to assess how criminal justice system contact may be affecting the ability of millennials to enter and maintain homeownership. Compared to other nationally representative, longitudinal surveys, NLSY97 is exceptional for the depth and breadth of information it collects about criminal justice system contact. Whereas other surveys neglect criminal justice encounters or collect data only on incarceration history, NLSY97 collects self-reported data on all arrests, charges, convictions, and incarceration spells since age 12.³

NLSY97 has collected data on homeownership intermittently since 1998 and at each survey wave since 2007. In 1998 and 1999, respondents who were 18 or older or living independently were asked whether they owned their current place of residence and, if so, when they purchased it. In 2000–2006, respondents were asked about homeownership if they either (1) were newly independent or (2) had turned 18, 20, or 25 years old since their last interview (Bureau of Labor Statistics, 2019b). Since 2007, all respondents have been asked about homeownership at each survey. Because of the collection strategy, missingness on homeownership information is a function primarily of respondent age.⁴ Therefore, I include all person-years in which respondents were 18 or older with non-missing homeownership data in the following analyses (N=72,923 person-years covering 8,792 respondents), always controlling for respondent age.⁵ I exclude 470 person-years in which respondents were living overseas from the analysis.

Outcome Measures

I first examine current homeownership at each survey wave. I consider respondents to be homeowners if they report that they (1) own their current residence independently or jointly with a spouse/partner or (2) continue to own a prior residence, even if they no longer live in it. I do not consider respondents who report living in a residence that is owned entirely by their spouse/partner to be homeowners, as the goal of this article is to understand how an individual's prior criminal justice contact influences his or her ability to transition into homeownership and accrue the wealth benefits of homeownership.

Next, I consider age at first homeownership for the 3,843 respondents who report ever owning

² Interviews for the 2015 “survey year” were completed between October 2015 and August 2016.

³ Minor traffic violations are excluded from NLSY97 data collection on criminal justice contact. Major traffic offenses (for example, vehicular manslaughter) are included in data collection.

⁴ Homeownership status is known for 57 percent of all non-missing person-years in NLSY97. At least 97 percent of respondents asked homeownership questions in any given survey year provided valid responses. See table A1 in the Joint Center for Housing Studies working paper (Bryan, 2019) for the proportion of respondents who were asked about homeownership and the share of those respondents who provided valid responses at each survey wave.

⁵ Some respondents who were living independently prior to age 18 responded to questions about homeownership, but I exclude these person-years (N=1,943) from the analysis.

a home by 2015. I calculate age at first homeownership based on respondent's age at the first reported date of home purchase.⁶ In the rare event that respondents report a date of purchase that is earlier than their 18th birthday, I bottom code age at first homeownership to 18.

In cases where respondents do not report the purchase date of their first owned home—for example, respondents who inherit homes are not asked to report a purchase date—I code age at first homeownership as current age minus the number of years the respondent has lived in the same unit that they now report owning without moving, bottom coded at age 18.⁷ Results are consistent if I instead use current age at the first survey date in which the respondent reports owning a home in cases where purchase date of first home is not reported.

Finally, I examine total years of homeownership to date at each survey, conditional on age of first home purchase, for respondents who ever own homes. For each reported homeownership spell, I calculate duration of homeownership as the difference between the date the unit was sold, when reported, or the last survey date at which the respondent was observed to own that unit and the respondent-reported purchase date.⁸ If respondents do not report a purchase date, I calculate homeownership spell duration as the number of years that the respondent lived in the same unit.⁹ If respondents report a date of purchase that is earlier than their 18th birthday and consistent homeownership since, I top code duration to number of years since the respondent turned 18. I then sum up duration of all reported homeownership spells to create the total years of homeownership variable.

Criminal Justice Contact Measures

In the following analyses I use time-varying indicator variables identifying whether respondents report having ever been *arrested*,¹⁰ *charged* with a crime, *convicted*, and/or *incarcerated* by each interview date. I also include an indicator variable identifying whether respondents are *currently incarcerated* (that is, residing in detention facility at the time of the interview) in any given survey year to ensure that the *previously incarcerated* variable captures prior incarceration.¹¹

It is important to note that the measures of criminal justice contact I use are not mutually exclusive. Thus, given that individuals who have been convicted of a crime have necessarily also been charged with one and, typically, arrested as well, the coefficients in the models presented below represent the separate, usually additive, relationships between each of these forms of

⁶ For respondents who previously reported that their spouse/partner owned the home entirely and then later report that they jointly, or independently, own that same home, I pull purchase date from prior reports of the spouse's/partner's purchase date for that unit, when available.

⁷ Purchase date is missing in 7 percent of person-years in which respondents are homeowners. Respondents report at each wave whether they have moved residences since the date of their last interview.

⁸ As with age at first homeownership, I use spouse's/partner's purchase date for the unit when respondents report jointly or independently owning a home that they originally reported as owned entirely by their spouse/partner.

⁹ Because purchase date is rarely missing, results are consistent when I instead calculate homeownership spell start date using the date of interview when homeownership was first reported.

¹⁰ Throughout the article I indicate variable names with italics.

¹¹ In contrast to many surveys, the National Longitudinal Survey of Youth has made concerted efforts to continue interviewing sample members even when they are incarcerated, which has contributed to their high retention rates (Bureau of Labor Statistics, 2019c, 2019d).

criminal justice contact and homeownership. I have also run the analyses on the following set of mutually exclusive criminal justice contact variables: arrested, never charged; charged, never convicted; convicted, never incarcerated; previously incarcerated (and convicted); and ever detained pretrial. Because the reference group in these models becomes individuals who have never been arrested, the coefficients grow accordingly—particularly for higher levels of criminal justice contact, like incarceration and conviction—but the results are substantively consistent with those presented below. These results are available upon request.

Control Variables

In all models I control for demographic characteristics, individual achieved characteristics, family background characteristics, and contextual characteristics that are likely to affect both probability of criminal justice system interaction and homeownership experiences. I include *age* as a linear term and gender as an indicator variable set equal to one if the respondent is *female*. Respondents' *race and ethnicity* are captured in the following four discrete categories: White non-Hispanic, African-American non-Hispanic, Hispanic, and other. White non-Hispanic is the reference category.

I also include an indicator variable for respondent's *cohabitation* status, as cohabitation may enable cost savings and resource sharing that could bolster an individual's ability to transition into or maintain homeownership. Moreover, stable relationships promote desistance from delinquent behaviors and crime and, therefore, should be associated with lower probability of criminal justice contact (Laub and Sampson, 2001, 1993). Only romantic domestic partners or married respondents who currently reside with their spouse are coded as cohabiting. I account for respondents' financial resources and recent employment history by including a measure of total *wages and salary in the prior year*. I also include a measure of respondent's spouse's or partner's *wages and salary in the prior year* for cohabiting individuals. Respondents without a cohabiting partner are coded as having zero spouse/partner income. Both income variables are adjusted for inflation to 2014 dollars.

I further account for respondent's financial resources with a measure of respondent's net worth. NLSY97 collects data on the assets and debts of respondents and, if applicable, their spouse or partner in the first interview during or after the calendar year in which they turn 20, 25, 30, and 35. I subtract out the value of assets and debts that respondents report their spouses or partners do not share with them and adjust values for inflation to 2014 dollars. Because individual asset levels may be endogenous with both criminal justice contact and, especially, homeownership, I only include *net worth at age 20* in the models. Results are substantively consistent, however, when I instead control for assets with a 1-year lagged measure of individual net worth with multiply imputed values for years in which asset data were not collected.

Given the association between education level and both criminal justice contact and homeownership (Western, 2006; Young, 2017), I also account for respondent's *highest degree completed* to date among the following five categories: none (reference category), high school diploma or GED, Associate's or some college, Bachelor's, or graduate or professional degree. I also include an indicator variable to identify *current students*.

I attempt to control for respondents' criminal activity and/or proclivity by including indicator variables set equal to one if the respondent reports *ever using marijuana since the last interview, ever using hard drugs since the last interview, or ever carrying a gun since the last interview*. Ideally, I would include a much fuller set of behavioral controls to account for differences in criminal activity and/or likelihood of entering the criminal justice system. While NLSY97 collects self-reported data on a range of other criminal behaviors (for example, assault, drug sales, theft) across multiple survey waves, starting in 2004, NLSY97 restricts these questions to respondents who report having previously been arrested and a small subsample of other randomly selected respondents.¹² Only gun carrying, hard-drug usage, and marijuana usage are asked of all respondents at each survey round since 1998. Although this is a limited set of behaviors, these variables should provide some information about the extent to which respondents are engaging in activities that could draw the attention of legal authorities.

In addition to these time-varying individual characteristics, I also include several family background characteristics that could influence both probability of interacting with the criminal justice system and likelihood of entering homeownership in early adulthood. I control for respondent's *household structure in 1997*, measured as a categorical variable containing the following four categories: lived with both biological parents (reference category), lived with one biological parent and one stepparent, lived with one biological parent only, and some other living arrangement. I also include parents' education, coded as the highest degree completed by either of the respondent's resident parents (biological, step, adoptive, or foster) in 1997. To make coding comparable to that used for respondent education, highest grade level completed is translated into highest degree received using standard assumptions about length of time to degree. Parents who reported fewer than 12 years of completed education are coded as having no diploma or degree (reference category), those with exactly 12 years are coded as having a high school diploma, those with 13–15 years are coded as having completed some college, those with exactly 16 years are coded as college graduates, and those reporting more than 16 years are coded as having a graduate or professional degree. Additionally, I also account for parents' net worth in 1997, adjusted for inflation to 2014 dollars.

Finally, because prevalence of criminal justice contact and home costs vary by region and urbanicity, I include time-varying measures of each. Region is captured by indicator variables identifying residence in each of the four census *regions*: Northeast, Midwest, South (reference category), and West. Finally, I include a variable indicating rural versus urban (reference category) residence, according to U.S. Census Bureau standards (Bureau of Labor Statistics, 2019a). Respondents whose ZIP Code includes both urban and rural areas are coded as *unknown*. Urban

¹² In supplementary analyses I control for respondent behavior with a measure of respondent's average standardized criminal activity score across the 1998 to 2003 survey years, using responses to questions about gun carrying, property destruction, theft, property crimes, assault, marijuana sales, hard-drug sales, marijuana usage, and hard drug usage. Because respondents' ages during this period ranged from 12 to 24, I create an age-adjusted standardized score of average self-reported criminal activity over this period, standardizing respondent's behavior within the total distribution of self-reported criminal activity at each age before creating a multiyear average score. Results from models that use this alternative control for criminal behavior are substantively consistent with the main model results reported here.

residence is the reference category.¹³ I use chained multiple imputation to fill in missing values for control variables (Acock, 2005; Davey, Shanahan, and Schafer, 2001; Little and Rubin, 2019). I do not impute missing values for criminal justice contact or outcome (that is, homeownership) variables.¹⁴

Analytic Strategy

In considering each of the outcomes noted above, I first run a model that considers incarceration only, modeling the approach typically seen in papers assessing the implications of criminal justice contact for individual outcomes. The second model includes all forms of criminal justice contact noted previously. By comparing the coefficient on *previously incarcerated* across these first two models, I can get a sense of how much the prior incarceration variable in Model 1 is picking up some of the partial effects of lower level criminal justice involvement. Doing so will highlight the extent to which prior research that only considers incarceration may have conflated the direct effect of incarceration with the separate effects of other forms of justice system contact.

Because there may be concerns about whether the covariates I include in the models fully capture selection into criminal justice contact, I next run a difference-in-differences-inspired model (Model 3) in order to test whether homeownership patterns between individuals who will eventually have contact with the criminal justice system and those who will not differ significantly even before initial justice system contact. A traditional difference-in-difference model includes a treatment group indicator to identify individuals who will eventually be exposed to the treatment of interest, a time dummy, which identifies observations before versus after exposure to treatment (for the treated group), and an interaction term of these two variables. Because of the inclusion of this interaction term, which denotes how exposure to treatment has changed the outcome trajectories of the treated group, the coefficient on the treatment group indicator variable represents the average difference in outcomes between the treatment group and the control group *prior to* treatment. Thus, this coefficient allows researchers to test the “common trends assumption”—that is, the assumption that, but for exposure to treatment, treatment group members and control group members would have similar outcomes on average—by testing whether the two groups significantly differ from each other before treatment exposure (Angrist and Pischke, 2009).

In this case, exposure to “treatment” (that is, criminal justice contact) does not occur at a single point in time for all respondents who have contact with the criminal justice system. However, by adding “treatment group” variables—that is, indicator variables that identify individuals who will eventually have contact with the criminal justice system—to the model and interacting them with

¹³ I also tried models that controlled for respondent residence in a census-designated Metropolitan Statistical Area or Core-Based Statistical Areas but found that adding these measures sometimes caused problems with model convergence and did not markedly alter coefficients or improve model fit.

¹⁴ Multiple imputation by chained equations involves estimating a model for each covariate with at least one missing value to fill in missing values based on values of other covariates. The type of model used to fill in each missing value is determined based on the structure of the variable. For example, ordinal variables, like highest degree completed, are filled in using ordered logit models, while binary variables (for example, current student status) are imputed using logit models and continuous variables (for example, net worth at age 20) are imputed by ordinary least squares (OLS) regression. Uncertainty about imputed values is factored into final estimates by creating multiple imputed data sets and combining results from them, accounting for the variance of imputed values across data sets. I use 10 imputed data sets.

the time-varying criminal justice contact variables I noted previously above (for example, *previously arrested*), I can attempt to test the “common trends assumption” in a similar way to a traditional difference-in-differences model. As with a traditional difference-in-differences setup, because of the inclusion of the interaction term, the coefficients on the treatment group dummy variables (for example, *will ever be arrested*) will indicate whether the homeownership experiences of respondents who eventually interact with the criminal justice system differ significantly from those of respondents who never encounter the justice system even prior to first criminal justice contact, conditional on covariates included in the model. Thus, this difference-in-differences-style model allows me to test whether my covariates successfully control for pre-treatment differences relevant to homeownership outcomes between NLSY97 respondents who will eventually have some form of criminal justice contact by 2015 and those who will not.

At the same time, because of the inclusion of the “treatment group” indicator variables in this difference-in-differences-inspired model, the coefficients on the prior criminal justice contact multiplied by the treatment group dummy interaction terms in this model represent the post-criminal-justice-exposure difference in homeownership outcomes among respondents in the “treatment” group—for example, the difference in homeownership following conviction for individuals who will ever be convicted.¹⁵ In this way, the difference-in-differences-inspired model estimates function in a manner somewhat similar to a fixed effects model, in that estimates of the “treatment effect” are based off of variation in homeownership outcomes only among individuals who will be “treated” at some point in time and who may, thus, differ in important unobservable ways from individuals who never interact with the criminal justice system. Yet, because comparisons are not restricted within person—only within treatment group—the difference-in-difference-style model does not drop individuals who never differ in their criminal justice contact over the observation period (for example, respondents who have already been arrested by age 18) from the model as fixed effects models do.

Finally, I run an individual fixed effect model (Model 4), which addresses concerns of unobserved confounding due to time-invariant, individual-level characteristics (for example, self-control) by comparing individuals’ homeownership patterns following criminal justice system contact with their own homeownership patterns prior to justice system contact. Because fixed effects models rely on within-person comparisons, individuals without any criminal justice system interaction and those whose criminal justice contact does not vary after age 18 (for example, individuals first arrested by age 18 but never charged, convicted, or incarcerated after that) necessarily drop out of these models and do not contribute to the estimation of coefficients. As a result, the results of these models may be less generalizable to the population as a whole, but they represent the strongest test of the relationship between justice system contact and homeownership for individuals who interact with the criminal justice system during early adulthood. Thus, if readers are willing to accept the assumption that there are no time-varying confounding variables not accounted for in this model, then the coefficients produced by the fixed effect models can be interpreted as the causal effects of

¹⁵ The uninteracted time-varying treatment indicators (for example, *previously arrested*) necessarily drop out of the model because they are perfectly collinear with the treatment group indicator multiplied by the post-treatment indicator interaction term.

each form of criminal justice contact on homeownership outcomes.¹⁶

I use logistic regression for models predicting current homeownership and ordinary least squares (OLS) regression for models of age at first homeownership and total homeownership duration to date. In models predicting current homeownership and duration, which are pooled across years, I cluster standard errors at the individual level to account for repeated observation of respondents. For models of age at first homeownership, I use covariate values from the survey wave prior to homeownership entry to predict age of entry into homeownership. Rather than controlling for age in this model, as age is the outcome of interest, I control for how many years prior to homeownership entry covariates were observed to account for differing amounts of time between prior survey response and entry into first homeownership across respondents. Mean number of years between prior survey wave and entry into homeownership is 1.25.

Results

Descriptive Characteristics¹⁷

Exhibit 1 displays exposure to criminal justice contact by age for the 8,792 analytic sample members. At age 18, less than 2 percent of sample members have been incarcerated, but 8 percent have been convicted of a crime, 13 percent have ever been charged, and 19 percent have ever been arrested. By age 30, 9 percent of sample members have ever been incarcerated, but more than one-third (34 percent) have ever been arrested.¹⁸ Criminal justice contact is not evenly distributed across race/ethnicity, however. By age 30, 40 percent of African-American (non-Hispanic) sample members report ever having been arrested, compared to just 33 percent of White (non-Hispanic) sample members and 36 percent of Hispanic sample members. The same disparity can be seen across all forms of criminal justice contact, with Whites reporting lower rates of contact than African-American and Hispanic sample members falling somewhere between the two (see exhibit 2).

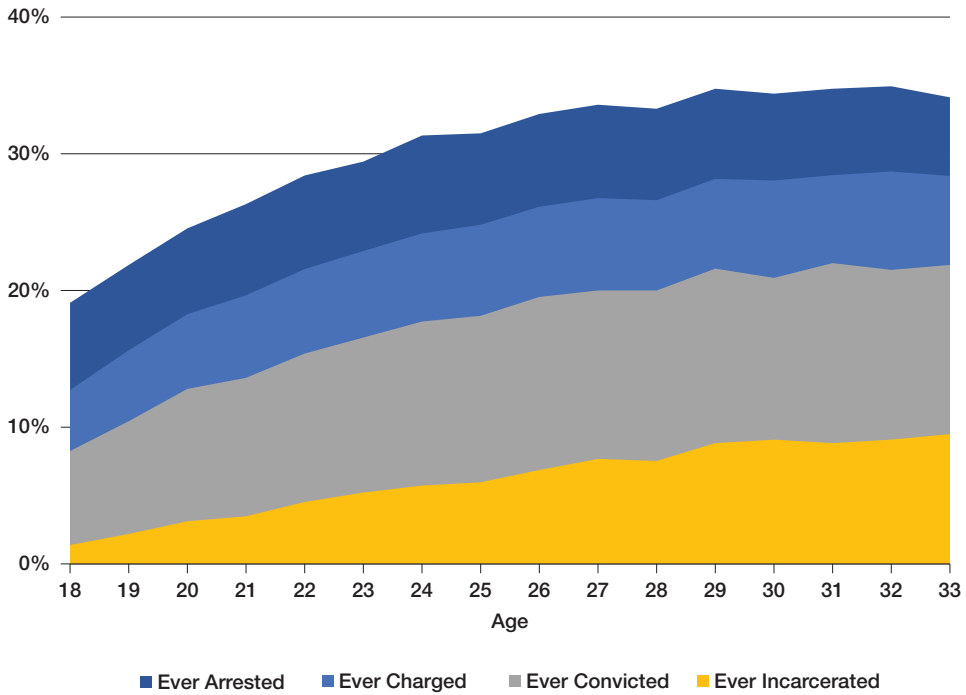
¹⁶ In the case of this analysis, it is possible that in the intervening period between interview dates a respondent may enter into homeownership and subsequently have their first (potential) interaction with the criminal justice system. In such a case, if homeownership affects one's probability of being arrested, charged, etc. then the relationship between homeownership and criminal justice contact may be endogenous. Unfortunately, to my knowledge no researchers have yet addressed this question or the broader question of whether wealth affects criminal justice outcomes independent of the many confounding variables correlated with both wealth and probability of criminal justice contact. A descriptive analysis by Zaw, Hamilton, and Darity (2016) finds that probability of future incarceration is lower among higher wealth individuals, but the authors do not account for any confounding factors other than race.

¹⁷ I apply sample weights for the 8,792 respondents in my analytical sample—that is, those who ever report valid homeownership data—to the descriptive statistics presented in exhibits 1, 2, 3, and 4 but not to the models. Results of weighted models are consistent with those presented here and are available upon request.

¹⁸ Exhibit 1 displays cumulative contact history by age for all sample members who were observed at that age, but because data collection became biennial starting in 2013 (when respondents were 28 to 34 years old), respondents are not observed at every age. Thus, the proportion of sample members who have ever been arrested drops from .35 at age 32 to .341 at age 33 in exhibit 1 because a slightly different subset of respondents was observed at each of these ages.

Exhibit 1

Criminal Justice Contact History by Age



Source: National Longitudinal Survey of Youth 1997

Exhibit 2

Criminal Justice Contact by Age 30, by Race

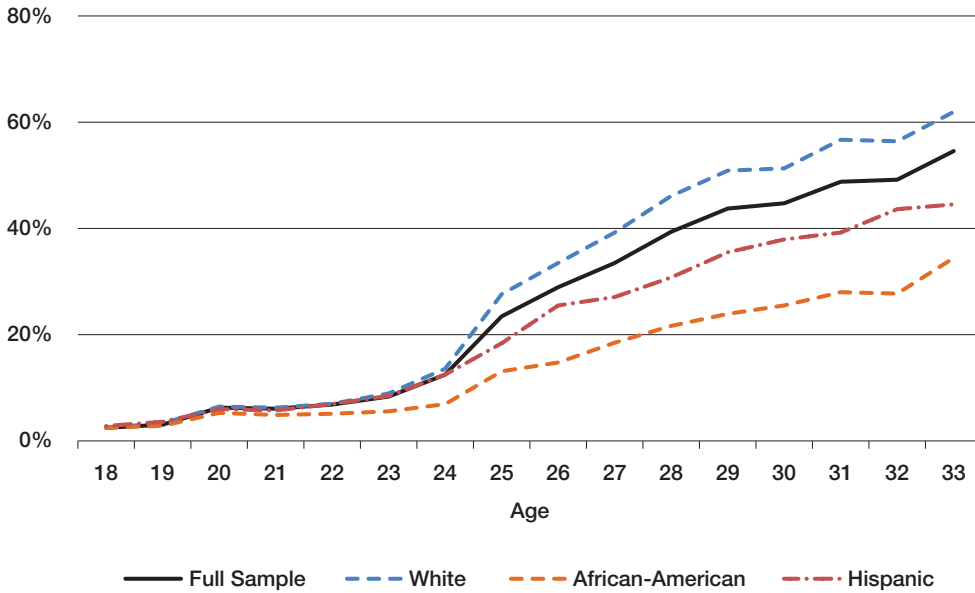
	Full Sample	White (Non-Hispanic)	African-American (Non-Hispanic)	Hispanic
Ever Arrested (%)	34.6	33.2	39.6	35.5
Ever Charged (%)	28.2	27.8	30.4	29.0
Ever Convicted (%)	21.1	20.7	23.3	21.9
Ever Incarcerated (%)	9.1	8.0	12.9	9.7

Note: Weighted values for analytic sample members (8,792 respondents; 72,923 person-years).
 Source: Author's calculations from NLSY97 data

Exhibit 3 displays the percent of NLSY97 sample members who have ever reported owning a home at any time by age and race. At age 18, homeownership levels are similar across all racial/ethnic groups, but by the early 30s White respondents have taken the lead in homeownership rates. At age 30, 51 percent of White NLSY97 respondents have ever owned a home, compared with 38 percent of Hispanic respondents and only 26 percent of African-American respondents.

Exhibit 3

Ever Yet Owned a Home by Race



Source: National Longitudinal Survey of Youth 1997

Exhibit 4 displays descriptive statistics for all homeownership, criminal justice contact, and control variables described previously. The top panel of the table shows percentages, means, and standard deviations for time-varying characteristics, and the bottom panel displays descriptive statistics for fixed characteristics, like race and age at first homeownership. As prior literature suggests, respondents who have interacted with the criminal justice system show higher levels of disadvantage across every outcome. Educational attainment, income, and net worth are all lower among justice-system-involved individuals, particularly ever-incarcerated individuals, relative to the full sample. Respondents with any level of contact with the justice system also come from more disadvantaged families: their parents report lower education levels and lower net worth, and they are far less likely to have lived in two-parent households in adolescence than other NLSY97 sample members. Justice-system-involved individuals also report higher levels of drug use and gun carrying than the full sample members, though these behaviors are still relatively uncommon.

Exhibit 4**Descriptive Statistics (1 of 3)**

Time-Varying	Full Sample	Ever Arrested	Ever Charged	Ever Convicted	Ever Incarcerated
<i>Outcome Variables</i>					
Currently Own Home	22.2%	16.6%	16.3%	15.1%	11.2%
Years of Homeownership	1.13 (2.78)	0.91 (2.65)	0.89 (2.55)	0.82 (2.55)	0.77 (3.02)
<i>Criminal Justice Contact</i>					
Ever Arrested	30.6%	100.0%	99.4%	99.6%	99.0%
Ever Charged	24.0%	77.9%	100.0%	100.0%	97.6%
Ever Convicted	17.7%	57.7%	72.5%	100.0%	98.1%
Ever Incarcerated	6.5%	21.0%	26.4%	35.9%	100.0%
<i>Control Variables</i>					
Age	25.7 (4.7)	26.5 (4.4)	26.7 (4.3)	26.9 (4.3)	27.6 (4.0)
Cohabiting	43.2%	42.7%	42.9%	42.9%	39.4%
Own Labor Income Last Year	\$23,829 (27,244)	\$21,407 (25,492)	\$21,441 (25,354)	\$20,910 (24,697)	\$15,576 (20,775)
Spouse/Partner Labor Income Last Year	\$29,471 (33,084)	\$21,520 (27,214)	\$21,287 (26,906)	\$20,278 (25,872)	\$15,728 (21,672)
<i>Highest Degree Completed</i>					
None	13.4%	21.5%	21.6%	22.9%	30.1%
High School	59.9%	63.9%	63.7%	64.3%	64.0%
Associate's, Some College	5.6%	4.4%	4.4%	4.4%	3.1%
Bachelor's	16.9%	8.6%	8.8%	7.0%	2.4%
Graduate or Professional Degree	4.2%	1.6%	1.6%	1.3%	0.4%

Exhibit 4 (cont.)

Descriptive Statistics (2 of 3)

	Full Sample	Ever Arrested	Ever Charged	Ever Convicted	Ever Incarcerated
Current Student	22.3%	13.1%	12.4%	10.9%	6.4%
Ever Used Marijuana Since Last Interview	20.9%	31.1%	32.8%	33.5%	32.0%
Ever Used Hard Drugs Since Last Interview	5.1%	9.0%	9.8%	10.6%	10.5%
Ever Carried Gun Since Last Interview	5.3%	7.0%	6.6%	6.8%	6.9%
Region					
Northeast	16.6%	15.5%	15.6%	14.9%	11.6%
Midwest	24.7%	25.2%	26.2%	28.2%	27.6%
South	37.0%	38.2%	37.4%	36.8%	40.1%
West	21.7%	21.1%	20.8%	20.1%	20.7%
Urbanicity					
Rural	21.7%	20.5%	20.9%	22.2%	25.4%
Urban	75.3%	76.8%	76.5%	75.3%	72.0%
Unknown (Urban or Rural)	3.1%	2.7%	2.6%	2.4%	2.6%
<i>N (Person-Years)</i>	72,923	22,674	17,571	12,840	4,867
Fixed Characteristics					
<i>Outcome Variables</i>					
Age at 1st Homeownership	25.4 (3.9)	25.6 (4.2)	25.6 (4.2)	25.8 (4.3)	25.5 (4.6)
<i>Control Variables</i>					
Female	48.7%	32.8%	30.8%	28.5%	21.8%
Race/Ethnicity					
White (Non-Hispanic)	66.7%	63.3%	65.0%	65.5%	58.3%
African-American (Non-Hispanic)	15.4%	19.2%	18.2%	17.9%	24.2%

Exhibit 4 (cont.)

Descriptive Statistics (3 of 3)

	Full Sample	Ever Arrested	Ever Charged	Ever Convicted	Ever Incarcerated
Hispanic	12.8%	13.3%	12.9%	12.6%	13.3%
Other (Non-Hispanic)	5.1%	4.3%	3.9%	4.0%	4.3%
Individual Net Worth at 20	\$14,155 (32,226)	\$11,811 (26,847)	\$11,509 (26,368)	\$10,548 (24,207)	\$8,239 (17,360)
Household Structure, 1997					
Both Biological Parents Present	53.0%	41.1%	41.3%	39.4%	31.3%
One Biological Parent, one Stepparent	14.5%	17.5%	17.8%	18.4%	20.6%
One Biological Parent Only	27.6%	34.9%	34.0%	34.7%	37.9%
Other (No Biological Parents Present)	4.9%	6.5%	7.0%	7.4%	10.3%
Parents' Education					
None	13.4%	17.9%	17.6%	18.5%	22.6%
High School	30.3%	32.6%	32.5%	33.8%	39.8%
Associate's, Some College	26.7%	25.6%	25.9%	24.8%	21.0%
Bachelor's	15.6%	13.8%	13.3%	13.3%	10.3%
Graduate or Professional Degree	14.1%	10.2%	10.7%	9.7%	6.3%
Parents' Net Worth, 1997	\$109,910 (150,641)	\$88,487 (140,314)	\$87,085 (138,955)	\$82,542 (132,735)	\$68,241 (133,093)
N (respondents)	8,792	3,088	2,494	1,897	844

Note: Descriptives are based on weighted, non-imputed person-years. Standard deviations in parentheses.

In terms of homeownership outcomes, homeownership in any given year is increasingly less common and total years of homeownership to date decreases with each form of criminal justice contact. A similar pattern holds with regard to average age at first homeownership—with age at first homeownership generally increasing with each additional form of justice system contact—but differences are relatively small. As is apparent from the other covariates in exhibit 4, however, individuals involved with the justice system differ from non-justice-system-involved individuals in a variety of important ways that may confound any bivariate relationship between justice system contact and homeownership outcomes. Thus, exhibits 5–8 display results from multivariate models of the relationship between justice system contact and homeownership outcomes.

Current Homeownership

Exhibit 5 displays the results from logistic regression models predicting current homeownership at each survey wave conditional on criminal justice contact and the covariates described above. Coefficients are in log-odds form. For ease of interpretation, exhibit 6 displays the coefficients on the previous criminal justice contact variables from linear probability models of current homeownership.^{19,20}

The first model replicates the approach used in much of the prior literature on the consequences of criminal justice contact by including incarceration as the only form of justice system contact. In this model, prior incarceration is strongly and negatively associated with probability of current homeownership. The coefficients in exhibit 5 indicate that, all else held equal, odds of homeownership are 40 percent lower among respondents who have ever been incarcerated than among otherwise similar never-incarcerated respondents ($1 - \exp[-.497] = .392$). Results from the linear probability model, displayed in exhibit 6, indicate that the probability of homeownership in any given year is 5.5 percentage points lower among formerly incarcerated individuals relative to observably similar never-incarcerated individuals.

¹⁹ Because marginal predicted probabilities cannot be calculated in the same way for difference-in-difference and fixed effect logit models as for standard logit models, linear probability models (LPMs) offer a more interpretable approach that can be used for all four models in exhibit 5. The LPM coefficients for Models 1 and 2 are very similar to the marginal predicted probability differences (with all other covariates at their mean values) for Models 1 and 2. For example, the marginal difference in predicted probability for *previously incarcerated* in Model 2 is -.025, while the LPM coefficient on *previously incarcerated* in Model 2 is -.021. Likewise, the predicted probability marginal difference for *previously convicted* in Model 2 is -.022, while the LPM coefficient in Model 2 is -.029.

²⁰ See table A2 in Joint Center for Housing Studies working paper (Bryan, 2019) for full coefficients from the linear probability model version of exhibit 5.

Exhibit 5

Logistic Regression Models Predicting Current Homeownership (1 of 4)

	(1) Incarceration Only	(2) Full Criminal Justice Contact	(3) Difference-In- Differences	(4) Fixed Effects
Previously Arrested		- 0.123 (0.0871)		- 0.107 (0.220)
Will Ever Be Arrested (Not Yet Arrested)			- 0.143 (0.199)	
Will Ever Be Arrested (Previously Arrested)			- 0.127 (0.0911)	
Previously Charged		0.0218 (0.113)		- 0.724** (0.241)
Will Ever Be Charged (Not Yet Charged)			0.231 (0.205)	
Will Ever Be Charged (Previously Charged)			0.0420 (0.117)	
Previously Convicted		- 0.227* (0.102)		- 0.120 (0.214)
Will Ever Be Convicted (Not Yet Convicted)			- 0.234 (0.175)	
Will Ever Be Convicted (Previously Convicted)			- 0.236* (0.106)	
Previously Incarcerated		- 0.260* (0.115)		- 1.009*** (0.202)
Will Ever Be Incarcerated (Not Yet Incarcerated)			- 0.146 (0.139)	
Will Ever Be Incarcerated (Previously Incarcerated)			- 0.274* (0.118)	

Exhibit 5 (cont.)

Logistic Regression Models Predicting Current Homeownership (2 of 4)

	(1)	(2)	(3)	(4)
	Incarceration Only	Full Criminal Justice Contact	Difference-In-Differences	Fixed Effects
Currently Incarcerated	- 1.183*** (0.312)	- 1.204*** (0.311)	- 1.207*** (0.311)	- 0.885* (0.386)
Age	0.103*** (0.00428)	0.105*** (0.00432)	0.104*** (0.00437)	0.242*** (0.00603)
Female	0.00825 (0.0460)	- 0.0269 (0.0465)	- 0.0319 (0.0467)	
Race/Ethnicity				
African-American (Non-Hispanic)	- 0.554*** (0.0625)	- 0.565*** (0.0626)	- 0.564*** (0.0626)	
Hispanic	- 0.227*** (0.0641)	- 0.236*** (0.0643)	- 0.236*** (0.0642)	
Other (Non-Hispanic)	- 0.402** (0.139)	- 0.403** (0.138)	- 0.401** (0.138)	
Cohabiting	1.494*** (0.0419)	1.495*** (0.0420)	1.494*** (0.0420)	1.362*** (0.0495)
Own Labor Income Last Year (in 10,000s)	0.176*** (0.00833)	0.175*** (0.00833)	0.174*** (0.00834)	0.148*** (0.0101)
Spouse/Partner Labor Income Last Year (in 10,000s)	0.114*** (0.00691)	0.114*** (0.00691)	0.114*** (0.00691)	0.0972*** (0.00914)
Individual Net Worth at 20 (in 10,000s)	0.0439*** (0.00668)	0.0432*** (0.00668)	0.0431*** (0.00667)	
Highest Degree Completed				
High School	0.334*** (0.0792)	0.306*** (0.0792)	0.300*** (0.0795)	- 0.505*** (0.117)

Exhibit 5 (cont.)**Logistic Regression Models Predicting Current Homeownership (3 of 4)**

	(1)	(2)	(3)	(4)
	Incarceration Only	Full Criminal Justice Contact	Difference-in-Differences	Fixed Effects
Associate's, Some College	0.740*** (0.106)	0.696*** (0.106)	0.689*** (0.106)	- 0.212 (0.175)
Bachelor's	0.647*** (0.0958)	0.589*** (0.0964)	0.581*** (0.0966)	- 0.0125 (0.170)
Graduate or Professional Degree	0.714*** (0.121)	0.651*** (0.122)	0.645*** (0.122)	0.645** (0.237)
Current Student	- 0.193*** (0.0460)	- 0.202*** (0.0462)	- 0.206*** (0.0463)	- 0.221*** (0.0602)
Ever Used Marijuana Since Last Interview	- 0.359*** (0.0529)	- 0.326*** (0.0533)	- 0.322*** (0.0534)	- 0.0133 (0.0692)
Ever Used Hard Drugs Since Last Interview	- 0.376*** (0.0997)	- 0.340*** (0.0999)	- 0.330*** (0.0997)	- 0.348** (0.123)
Ever Carried a Gun Since Last Interview	0.445*** (0.0739)	0.441*** (0.0741)	0.442*** (0.0742)	0.270** (0.0951)
Household Structure in 1997				
One Biological Parent, One Stepparent	- 0.203** (0.0651)	- 0.193** (0.0654)	- 0.190** (0.0654)	
One Biological Parent Only	- 0.230*** (0.0555)	- 0.216*** (0.0558)	- 0.214*** (0.0558)	
Other (No Biological Parents Present)	- 0.471*** (0.111)	- 0.460*** (0.112)	- 0.456*** (0.112)	
Parents' Education				
High School	- 0.0514 (0.0670)	- 0.0554 (0.0670)	- 0.0570 (0.0670)	

Exhibit 5 (cont.)

Logistic Regression Models Predicting Current Homeownership (4 of 4)

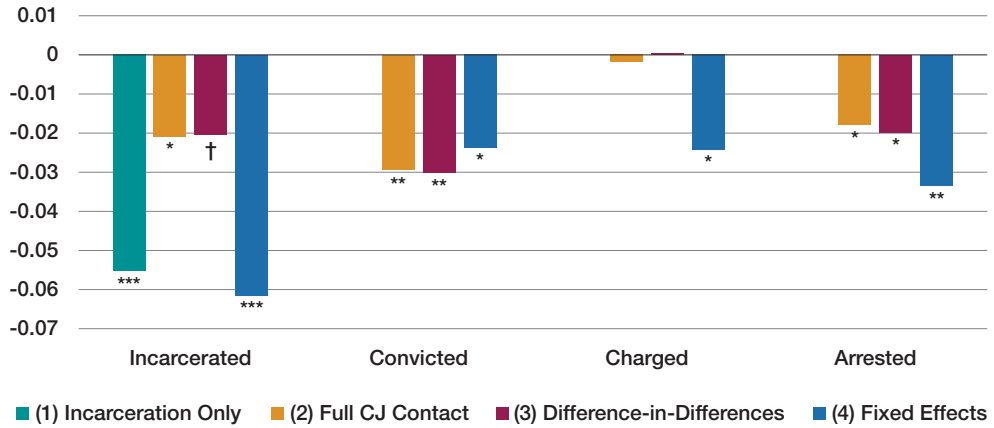
	(1) Incarceration Only	(2) Full Criminal Justice Contact	(3) Difference-in- Differences	(4) Fixed Effects
Some college	-0.0757 (0.0709)	-0.0776 (0.0709)	-0.0808 (0.0710)	
Bachelor's	-0.140 (0.0860)	-0.136 (0.0860)	-0.137 (0.0860)	
Graduate or Professional Degree	-0.226* (0.0958)	-0.231* (0.0958)	-0.233* (0.0958)	
Parents' Net Worth in 1997 (in 10,000s)	0.00415* (0.00176)	0.00416* (0.00177)	0.00416* (0.00177)	
Region				
Northeast	-0.623*** (0.0687)	-0.624*** (0.0687)	-0.626*** (0.0687)	-0.549** (0.196)
Midwest	0.183*** (0.0536)	0.189*** (0.0537)	0.188*** (0.0537)	0.140 (0.150)
West	-0.415*** (0.0598)	-0.418*** (0.0599)	-0.420*** (0.0599)	-0.986*** (0.148)
Rural	0.669*** (0.0482)	0.664*** (0.0483)	0.665*** (0.0483)	0.441*** (0.0571)
Unknown (Urban or Rural)	0.548*** (0.0792)	0.543*** (0.0793)	0.544*** (0.0794)	0.324*** (0.0977)
Observations (Person- Years)	72,923	72,923	72,923	33,845
Respondents	8,792	8,792	8,792	3,778

*** p<0.001, ** p<0.01, * p<0.05, † p<0.1.

Note: Standard errors clustered at the individual level.

Exhibit 6

Difference in Probability of Current Homeownership by Criminal Justice Contact



CJ = Criminal Justice.

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, † $p < 0.1$.

Note: Coefficients from linear probability model. Standard errors clustered at the individual level.

Because ever-incarcerated individuals have necessarily encountered the criminal justice system at lower levels, however, part of what the coefficient on *previously incarcerated* in model 1 reflects is the relationship between those lower level forms of justice system contact and homeownership—though some members of the reference group (never incarcerated) will have also been exposed to these forms of criminal justice contact. Thus, by incorporating the fuller range of criminal justice contacts captured by NLSY97 in models 2–4, we can get a better sense of how much each of these less severe forms of contact contributes toward homeownership differentials and how much incarceration independently adds to disparities in homeownership. When I add measures of prior arrest, prior charge, and prior conviction to the model, the coefficient on *previously incarcerated* drops substantially in magnitude (in models 2 and 3) but remains statistically significant.

The coefficients in model 2 indicate that conviction and incarceration are each independently associated with significantly lower log odds of homeownership. All else held equal, conviction is associated with a 20 percent decrease in the odds of homeownership ($1 - \exp[-.227] = .203$)—or a 3 percentage point lower probability of being a homeowner—while incarceration is associated with an additional 23 percent decrease in odds of homeownership ($1 - \exp[-.26] = .229$)—or a 2 percentage point lower probability—above and beyond the influence of any conviction that preceded incarceration. Prior arrest is also associated with significantly lower probability of homeownership (2 percentage points lower) in the linear probability model (exhibit 6), but the difference is not statistically significant in the logit model (exhibit 5).

Model 3 uses a difference-in-differences-inspired setup to test whether homeownership patterns among respondents who will ever have contact with the justice system already differ from those of individuals who will never have such contact even before actual exposure to arrest, conviction, and so on. In this model, the coefficients on the treatment group dummy variables (for example,

will ever be arrested) indicate the extent to which homeownership levels already differ significantly between respondents who will encounter the criminal justice system in the future (but have not yet) and those who report no interactions with the justice system by 2015, conditional on covariates included in the model. Model 3 results indicate that differences in homeownership levels before criminal justice system contact (for those who will eventually have it) are not statistically significant, suggesting that the included covariates are successful at capturing important sources of potential confounding.

The coefficients on the interaction terms in this model reflect the average difference in “pre-treatment” versus “post-treatment” homeownership levels for respondents who will ever experience any of these forms of criminal justice contact. As in model 2, conviction and incarceration are significantly and negatively associated with log odds of homeownership. Homeownership levels decrease by about 3 percentage points, on average, following first conviction, while incarceration is associated with an additional 2 percentage point decrease in probability of homeownership (exhibit 6), all else held equal. In the linear probability model (exhibit 6), arrest is again associated with significantly lower probability of homeownership (2 percentage points lower), although the difference is not statistically significant in the logit model (exhibit 5).

Finally, model 4 in exhibit 5 displays the results from a fixed effects logit model of current homeownership. Because the fixed effect model relies upon within-person comparisons to estimate the effects of arrest, being charged, conviction, and incarceration on homeownership, unobservable, individual-level fixed characteristics that may confound the relationship between criminal justice contact and homeownership necessarily drop out of this model. The fixed effect model does not, therefore, incorporate the homeownership experiences of never-arrested individuals in estimating any of the coefficients because these individuals have no within-person variation in criminal justice system contact over time.

In the fixed effects logit model (exhibit 5), the relationship between conviction and homeownership is no longer statistically significant and is about one-half its size in models 2 and 3. Instead, having been charged with a crime appears to emerge as the more relevant event in relationship to homeownership among the justice-system-involved individuals included in the fixed effect model. The coefficient on *previously incarcerated* remains highly statistically significant and is even larger in magnitude than in prior models. The fixed effect coefficient from the linear probability model (exhibit 6), indicates that probability of homeownership in any given year drops by about 6 percentage points, on average, following first incarceration.

In the fixed effects linear probability model, the negative association between conviction and homeownership remains statistically significant ($p < 0.05$), and the coefficient on *previously arrested* becomes statistically significant ($p < 0.01$). (As in the fixed effect logit model, the *previously charged* coefficient is negative and statistically significant.) Because linear probability models are not designed to fit binary outcome variables as well as logit models, however, the significant coefficients that emerge only in this model may not be as reliable as those from the logit model (exhibit 5).

Although the findings from the logit fixed effect model are somewhat inconsistent with those in

models 1–4 and the linear probability models of homeownership, the most important takeaway is that incarceration does not appear to be the only form of criminal justice contact associated with lower probability of homeownership. Instead, conviction, and potentially arrest and being charged, appear to pick up part of the association between incarceration and homeownership observed in the naïve model (model 1).

Age at First Entry into Homeownership

Exhibit 7 displays results from OLS regression models predicting age at first reported homeownership for respondents who are ever observed to own homes by 2015. Because the outcome is age at first homeownership, positive coefficients in these models indicate a later entry into initial homeownership. Models 1 through 3 mirror those used in exhibit 5, but there is no fixed effect model because only 1 person-year (the last survey prior to entry into homeownership) is used for models of age at first homeownership. In lieu of a fixed effect model, exhibit 7 includes a final model that is restricted to respondents who report ever having been arrested by 2015. While not as restrictive as a fixed effects model, this model setup should help allay concerns that individuals who will ever interact with the criminal justice system differ from those who will not in important unobservable ways that could also affect their probability of homeownership.

Because exhibit 7 models only include one observation per respondent, the treatment group variables (for example, *will ever be arrested*) in the difference-in-differences-style model (model 3) represent the average difference (in years) in age at entry into first homeownership between respondents who will eventually be arrested, for example, but have not yet been before their first homeownership spell and respondents who will never be arrested, conditional on covariates. The coefficients on the interaction terms (for example, *will ever be arrested* multiplied by *previously arrested*), on the other hand, represent the average difference in age at entry into first homeownership between respondents who have already interacted with the justice system prior to first homeownership and those who will eventually interact with the justice system in the same way (for example, arrest) but have not yet before first homeownership.

Exhibit 7

Regression Models Predicting Age at First Homeownership (1 of 4)

	(1) Incarceration Only	(2) Full Criminal Justice Contact	(3) Difference-in- Differences	(4) Will Ever Be Arrested Only
Previously Arrested		0.272 (0.200)		1.525*** (0.309)
Will Ever Be Arrested (Not Yet Arrested)			- 0.509 (0.369)	
Will Ever Be Arrested (Previously Arrested)			0.290 (0.209)	
Previously Charged		0.558* (0.270)		0.520† (0.288)
Will Ever Be Charged (Not Yet Charged)			- 0.436 (0.418)	
Will Ever Be Charged (Previously Charged)			0.508† (0.279)	
Previously Convicted		0.562* (0.252)		0.568* (0.267)
Will Ever Be Convicted (Not Yet Convicted)			- 0.399 (0.364)	
Will Ever Be Convicted (Previously Convicted)			0.507* (0.257)	
Previously Incarcerated	2.577*** (0.282)	1.525*** (0.314)		1.505*** (0.337)
Will Ever Be Incarcerated (Not Yet Incarcerated)			- 0.344 (0.319)	
Will Ever Be Incarcerated (Previously Incarcerated)			1.453*** (0.315)	

Exhibit 7 (cont.)

Regression Models Predicting Age at First Homeownership (2 of 4)

	(1) Incarceration Only	(2) Full Criminal Justice Contact	(3) Difference-in- Differences	(4) Will Ever Be Arrested Only
Currently Incarcerated	-1.333 (0.977)	-1.355 (0.969)	-1.424 (0.965)	-1.658 (1.023)
Age	0.913*** (0.0365)	0.921*** (0.0362)	0.912*** (0.0361)	1.091*** (0.0977)
Female	-0.402*** (0.106)	-0.267* (0.107)	-0.311** (0.106)	-0.0131 (0.220)
Race/Ethnicity				
African-American (Non-Hispanic)	0.572*** (0.146)	0.611*** (0.144)	0.614*** (0.144)	0.810** (0.277)
Hispanic	0.404** (0.147)	0.438** (0.146)	0.432** (0.145)	0.407 (0.275)
Other (Non-Hispanic)	0.156 (0.274)	0.214 (0.272)	0.215 (0.271)	0.512 (0.632)
Cohabiting	1.253*** (0.103)	1.232*** (0.103)	1.208*** (0.102)	1.139*** (0.204)
Own Labor Income Last Year (in 10,000s)	0.395*** (0.0234)	0.394*** (0.0231)	0.387*** (0.0231)	0.377*** (0.0490)
Spouse/Partner Labor Income Last Year (in 10,000s)	0.112*** (0.0214)	0.113*** (0.0209)	0.110*** (0.0207)	0.130** (0.0443)
Individual Net Worth at 20 (in 10,000s)	-0.0444** (0.0137)	-0.0432** (0.0136)	-0.0442** (0.0135)	-0.0731* (0.0298)
Highest Degree Completed				
High School	3.450*** (0.146)	3.451*** (0.145)	3.312*** (0.147)	3.042*** (0.259)

Exhibit 7 (cont.)

Regression Models Predicting Age at First Homeownership (3 of 4)

	(1)	(2)	(3)	(4)
	Incarceration Only	Full Criminal Justice Contact	Difference-in-Differences	Will Ever Be Arrested Only
Associate's, Some College	4.805*** (0.241)	4.839*** (0.239)	4.673*** (0.240)	4.010*** (0.507)
Bachelor's	5.096*** (0.192)	5.178*** (0.190)	5.000*** (0.192)	4.680*** (0.411)
Graduate or Professional Degree	6.579*** (0.290)	6.719*** (0.288)	6.539*** (0.289)	5.985*** (0.856)
Current Student	-1.493*** (0.120)	-1.402*** (0.120)	-1.433*** (0.119)	-1.495*** (0.249)
Ever Used Marijuana Since Last Interview	-0.274* (0.139)	-0.400** (0.139)	-0.290* (0.139)	-0.651** (0.227)
Ever Used Hard Drugs Since Last Interview	-0.0797 (0.273)	-0.219 (0.272)	-0.144 (0.271)	0.130 (0.388)
Ever Carried a Gun Since Last Interview	0.120 (0.202)	0.0977 (0.200)	0.121 (0.200)	-0.424 (0.341)
Household Structure in 1997				
One Biological Parent, One Stepparent	0.197 (0.151)	0.134 (0.150)	0.140 (0.149)	0.0342 (0.279)
One Biological Parent Only	0.411*** (0.124)	0.340** (0.123)	0.355** (0.123)	0.581* (0.236)
Other (No Biological Parents Present)	0.372 (0.258)	0.301 (0.256)	0.368 (0.255)	-0.142 (0.437)
Parents' Education				
High School	-0.212 (0.170)	-0.184 (0.169)	-0.190 (0.169)	-0.212 (0.296)

Exhibit 7 (cont.)

Regression Models Predicting Age at First Homeownership (4 of 4)

	(1)	(2)	(3)	(4)
	Incarceration Only	Full Criminal Justice Contact	Difference-in-Differences	Will Ever Be Arrested Only
Some college	-0.296† (0.176)	-0.268 (0.175)	-0.296† (0.175)	-0.371 (0.324)
Bachelor's	-0.182 (0.205)	-0.167 (0.204)	-0.163 (0.204)	0.219 (0.382)
Graduate or Professional Degree	-0.129 (0.221)	-0.102 (0.220)	-0.119 (0.219)	0.647 (0.440)
Parents' Net Worth in 1997 (in 10,000s)	-0.00688 (0.00440)	-0.00659 (0.00435)	-0.00658 (0.00431)	-0.00736 (0.00866)
Region				
Northeast	0.151 (0.156)	0.162 (0.154)	0.155 (0.154)	0.477 (0.312)
Midwest	-0.102 (0.125)	-0.116 (0.124)	-0.110 (0.123)	0.139 (0.242)
West	-0.00347 (0.137)	0.00886 (0.136)	-0.00799 (0.136)	0.351 (0.273)
Rural	-0.282* (0.122)	-0.255* (0.121)	-0.235† (0.121)	0.00145 (0.234)
Unknown (Urban or Rural)	-0.727** (0.252)	-0.702** (0.250)	-0.667** (0.249)	-0.690 (0.526)
Constant	19.47*** (0.236)	19.16*** (0.239)	19.43*** (0.242)	17.88*** (0.474)
Observations (Respondents)	3,843	3,843	3,843	1,095

*** p<0.001, ** p<0.01, * p<0.05, † p<0.1.

Note: Models restricted to respondents who are ever observed to own a home by 2015. Standard errors clustered at the individual level.

The outcome has changed, but the substantive findings from these models are similar to those from the exhibit 5 models of current homeownership. Criminal charges, conviction, and incarceration are all independently associated with significantly later entry into first homeownership across all models. In the naïve model (model 1), incarceration appears to be associated with a 2.6 year-delay in entry into homeownership relative to otherwise similar individuals, but the size of this difference drops to roughly 1.5 years once earlier forms of criminal justice contact are considered (models 2–4). Being charged with a crime is associated with about a half year delay in entry into first homeownership, and being convicted is associated with an additional one-half year delay in entry into homeownership. Finally, while the association between arrest and age at first homeownership is not statistically significant in the full sample (models 2 and 3), among respondents who will ever be arrested (model 4), those who have already been arrested prior to first homeownership become homeowners a full 1.5 years later, on average, than respondents who will eventually be arrested but have not yet been prior to first homeownership.

Years of Homeownership

As the exhibit 5 models show, criminal justice contact appears to be a barrier to entry into homeownership. But for those justice-system-involved individuals who do manage to cross the threshold into homeownership, their ability to do so appears to be delayed relative to that of observably similar peers who have not had criminal justice contact (exhibit 7). Exhibit 8 models of years of total homeownership to date provide insight into the question of how long justice-system-involved individuals who do successfully become homeowners at some point are able to maintain homeownership relative to same-aged peers, even when differences in age at first entry into homeownership are taken into account. On the whole, exhibit 8 results indicate that, even for the subset of criminal-justice-system-involved individuals who do successfully become homeowners, interactions with the justice system are associated with shorter total duration of homeownership than is experienced by otherwise similar individuals without justice system involvement.

Exhibit 8

Regression Models Predicting Total Years of Homeownership to Date (1 of 4)

	(1) Incarceration Only	(2) Full Criminal Justice Contact	(3) Difference-in- Differences	(4) Fixed Effects
Previously Arrested		- 0.242** (0.0843)		- 0.425*** (0.0776)
Will Ever Be Arrested (Not Yet Arrested)			0.159 (0.101)	
Will Ever Be Arrested (Previously Arrested)			- 0.221* (0.0906)	
Previously Charged		- 0.0472 (0.111)		- 0.114 (0.0957)
Will Ever Be Charged (Not Yet Charged)			- 0.0622 (0.109)	
Will Ever Be Charged (Previously Charged)			- 0.0584 (0.116)	
Previously Convicted		- 0.206* (0.0975)		- 0.469*** (0.0864)
Will Ever Be Convicted (Not Yet Convicted)			0.0824 (0.0831)	
Will Ever Be Convicted (Previously Convicted)			- 0.192† (0.0998)	
Previously Incarcerated	- 0.720*** (0.213)	- 0.364† (0.218)		- 0.413*** (0.0959)
Will Ever Be Incarcerated (Not Yet Incarcerated)			- 0.0941 (0.0968)	
Will Ever Be Incarcerated (Previously Incarcerated)			- 0.377† (0.219)	

Exhibit 8 (cont.)

Regression Models Predicting Total Years of Homeownership to Date (2 of 4)

	(1)	(2)	(3)	(4)
	Incarceration Only	Full Criminal Justice Contact	Difference-in-Differences	Fixed Effects
Currently Incarcerated	- 0.641* (0.290)	- 0.679* (0.291)	- 0.675* (0.291)	- 0.00182 (0.167)
Age	0.394*** (0.00955)	0.399*** (0.00968)	0.400*** (0.00967)	0.442*** (0.00304)
Age at First Homeownership	- 0.231*** (0.00634)	- 0.231*** (0.00632)	- 0.231*** (0.00633)	
Female	0.0367 (0.0363)	- 0.00583 (0.0364)	0.00208 (0.0367)	
Race/ethnicity				
African-American (Non-Hispanic)	- 0.0641 (0.0550)	- 0.0749 (0.0550)	- 0.0753 (0.0550)	
Hispanic	0.0201 (0.0613)	0.00815 (0.0611)	0.00802 (0.0613)	
Other (Non-Hispanic)	0.117 (0.112)	0.102 (0.113)	0.103 (0.113)	
Cohabiting	- 0.211*** (0.0515)	- 0.210*** (0.0515)	- 0.209*** (0.0515)	- 0.292*** (0.0258)
Own Labor Income Last Year (in 10,000s)	0.00744 (0.00954)	0.00593 (0.00949)	0.00609 (0.00949)	- 0.0168*** (0.00500)
Spouse/Partner Labor Income Last Year (in 10,000s)	0.0175*** (0.00498)	0.0158** (0.00503)	0.0158** (0.00504)	0.0106** (0.00390)
Individual Net Worth at 20 (in 10,000s)	0.00564 (0.00495)	0.00511 (0.00493)	0.00526 (0.00494)	
Highest Degree Completed				
High School	- 1.142*** (0.0650)	- 1.156*** (0.0648)	- 1.149*** (0.0651)	- 1.677*** (0.0312)

Exhibit 8 (cont.)

Regression Models Predicting Total Years of Homeownership to Date (3 of 4)

	(1)	(2)	(3)	(4)
	Incarceration Only	Full Criminal Justice Contact	Difference-in-Differences	Fixed Effects
Associate's, Some College	-1.137*** (0.125)	-1.180*** (0.126)	-1.174*** (0.126)	-1.996*** (0.0656)
Bachelor's	-1.598*** (0.0973)	-1.658*** (0.0981)	-1.651*** (0.0985)	-2.523*** (0.0521)
Graduate or Professional Degree	-1.568*** (0.130)	-1.651*** (0.132)	-1.646*** (0.132)	-2.555*** (0.0806)
Current Student	0.438*** (0.0344)	0.401*** (0.0345)	0.400*** (0.0346)	0.147*** (0.0274)
Ever Used Marijuana Since Last Interview	-0.00501 (0.0403)	0.0456 (0.0403)	0.0391 (0.0404)	0.0646* (0.0299)
Ever Used Hard Drugs Since Last Interview	-0.103† (0.0576)	-0.0518 (0.0578)	-0.0587 (0.0580)	0.0398 (0.0504)
Ever Carried a Gun Since Last Interview	-0.0361 (0.0627)	-0.0334 (0.0624)	-0.0344 (0.0626)	-0.0197 (0.0455)
Household Structure in 1997				
One Biological Parent, One Stepparent	-0.142** (0.0510)	-0.126* (0.0508)	-0.128* (0.0508)	
One Biological Parent Only	-0.0974† (0.0516)	-0.0738 (0.0520)	-0.0772 (0.0521)	
Other (No Biological Parents Present)	-0.305*** (0.0797)	-0.285*** (0.0793)	-0.287*** (0.0793)	
Parents' Education				
High School	0.131† (0.0707)	0.124† (0.0705)	0.124† (0.0705)	

Exhibit 8 (cont.)

Regression Models Predicting Total Years of Homeownership to Date (4 of 4)

	(1)	(2)	(3)	(4)
	Incarceration Only	Full Criminal Justice Contact	Difference-in-Differences	Fixed Effects
Some College	0.0882 (0.0701)	0.0809 (0.0698)	0.0817 (0.0700)	
Bachelor's	0.0648 (0.0691)	0.0624 (0.0690)	0.0601 (0.0691)	
Graduate or Professional Degree	0.0961 (0.0757)	0.0820 (0.0754)	0.0820 (0.0756)	
Parents' Net Worth in 1997 (in 10,000s)	0.00160 (0.00112)	0.00159 (0.00112)	0.00158 (0.00112)	
Region				
Northeast	-0.0134 (0.0506)	-0.0132 (0.0504)	-0.0133 (0.0504)	0.226** (0.0848)
Midwest	-0.0190 (0.0425)	-0.0126 (0.0425)	-0.0137 (0.0425)	0.0864 (0.0676)
West	-0.0457 (0.0568)	-0.0487 (0.0569)	-0.0473 (0.0570)	-0.0845 (0.0702)
Rural	0.183*** (0.0425)	0.168*** (0.0422)	0.169*** (0.0422)	0.0682* (0.0290)
Unknown (Urban or Rural)	-0.201*** (0.0474)	-0.209*** (0.0474)	-0.208*** (0.0473)	-0.203*** (0.0520)
Constant	-1.272*** (0.156)	-1.271*** (0.156)	-1.314*** (0.158)	-7.294*** (0.0692)
Observations (Respondents)	59,935	59,935	59,935	59,935
Respondents	3,868	3,868	3,868	3,868

*** p<0.001, ** p<0.01, * p<0.05, † p<0.1.

Note: Models restricted to respondents who are ever observed to own a home by 2015. Standard errors clustered at the individual level.

As with models of current homeownership and age at first entry into homeownership, we see that the size of the coefficient on *previously incarcerated* in the naïve model (model 1) drops markedly once earlier forms of criminal justice contact are added to the model. While model 1 suggests that prior incarceration is associated with .7 fewer years of homeownership, on average, conditional on covariates and age of first homeownership, the coefficient on *previously incarcerated* drops to roughly half that size (.36 to .41) once earlier forms of criminal justice contact are accounted for. In particular, arrest and conviction each have a consistently significant negative association with homeownership duration, even when differences in age at first entry into homeownership are taken into account.

The model 2 and 3 coefficients indicate that having been arrested is associated with roughly one-quarter year less of homeownership duration, conditional on age and age of first entry into homeownership, while prior conviction is independently associated with .2 fewer years of homeownership, on average. Model 3, the difference-in-differences model, shows that patterns in homeownership duration prior to criminal justice contact do not differ significantly between individuals who will eventually be involved with the justice system (but have not yet been) and respondents who never have justice system contact, conditional on covariates.

Results from the fixed effects model (model 4) suggest that, among respondents who ever have some form of contact with the criminal justice system, arrest, conviction, and incarceration are each independently associated with about .4 to .5 fewer years of homeownership, even after accounting for delays in entry into homeownership. Again, because the criminal justice contact variables in these models are not mutually exclusive, these associations are cumulative, meaning that for someone who has been arrested, convicted, and incarcerated all three of these coefficients would apply to their expected total years of homeownership.

Robustness Checks

I have conducted the same analyses presented above on alternative versions of the homeownership measures that exclude continued ownership of a prior residence (in models of current homeownership and total years of homeownership) and/or include spouse/partner sole ownership of current residence (for all models). Results with these alternative versions of the homeownership measures are substantively similar to those presented here and are available upon request.

I have also run Cox proportional hazard models of entry into homeownership and exit from homeownership using the same covariates included in the previous model. The findings from these models are substantively consistent with those reported earlier in this report. Criminal justice contact—particularly conviction and incarceration—is associated with delayed entry into homeownership and, conditional on becoming a homeowner, earlier exit from homeownership.²¹

Finally, I have also run the above models with race, gender, and class (below versus above median parental net worth in 1997) interactions, respectively. I find no evidence that the relationship between criminal justice contact and homeownership outcomes differs by gender but limited

²¹ The results of these hazard models are shown in table A3 in the Joint Center for Housing Studies working paper (Bryan, 2019).

evidence that the relationships between some forms of criminal justice contact and some homeownership outcomes differ by race and class.

Although arrest history is not significantly associated with logit models of current homeownership across the full sample, race- and class-interacted models indicate that prior arrest is associated with significantly lower log odds of current homeownership for African-American respondents and for poorer respondents (that is, those whose parents had below median net assets in 1997). These patterns hold in both the full criminal justice contact and difference-in-difference models (models 2 and 3). When individual fixed effects models are run only on African-American respondents or poorer respondents, however, the relationship between arrest and current homeownership is not statistically significant, mirroring the findings from the fixed effects model (model 4) in exhibit 5. The negative relationships between prior conviction and incarceration and current homeownership do not significantly differ by class background.

Race-interacted models also suggest that prior incarceration may be less detrimental for the current homeownership prospects of Hispanic respondents than Whites ($p < 0.1$), at least in the full criminal justice contact and difference-in-difference models (models 2 and 3, respectively). The relationship between prior incarceration and current homeownership is still negative and marginally significant ($p < 0.1$) in the fixed effect model (model 4) run only on Hispanic respondents, however.

With regard to age at first entry into homeownership, I find some evidence that arrest may be more detrimental but incarceration less detrimental for Hispanics than for Whites, but differences are only marginally significant ($p < 0.1$) in some models (models 2 and 3 for arrest, and model 3 only for incarceration). Class-interacted models reveal that having been charged with a crime is only associated with delayed entry into homeownership for poorer respondents. The relationships between conviction and incarceration history and age at first homeownership do not significantly vary by class background, however. Finally, I find no significant class- or race-based differences in the relationship between criminal justice contact history and total years of homeownership. All results from interacted models are available upon request.

Discussion

Across the three outcomes examined in this article a general pattern emerges: criminal justice contact is associated with lower levels of (current) homeownership, delayed entry into homeownership for those respondents who do make this transition in early adulthood, and shorter duration of homeownership among respondents who succeed in becoming homeowners. A substantial portion of the relationship that would be attributed to incarceration only in a simpler analysis that excludes other forms of criminal justice contact appears to be attributable to a combination of arrest, being charged, and, especially, conviction. Incarceration has the strongest relationship (in terms of magnitude) with all homeownership measures, however, which is fitting given that incarceration marks a far more severe disruption to life than arrest or conviction. That said, the fact that arrest only, without any further justice system contact, is negatively related to homeownership (particularly accrued years of homeownership) is noteworthy given that more than 10 million adults are arrested annually (FBI, 2018).

Importantly, arrests, like all forms of criminal justice contact, are not evenly distributed throughout the population. African-Americans in particular are arrested at a rate disproportionate to their share of the population and their level of criminal activity (Beckett et al., 2005; Gase et al., 2016). Thus, the disparities observed at every level of criminal justice contact are likely to feed into racial disparities in homeownership and, eventually, wealth accrual over the life course. Because the NLSY97 respondents included in this analysis are still relatively young—and many have yet to enter homeownership—it is difficult to forecast exactly how large an impact these disparities in justice system contact will have on homeownership and wealth disparities in midlife, but the findings of this analysis give cause for concern.

It is highly likely that criminal justice contact may affect not just an individual's ability to enter or maintain homeownership but also the neighborhood and unit quality available to potential homebuyers. Delving into the question of how criminal justice contact affects unit and neighborhood quality for homebuyers with prior justice system contact is beyond the scope of this article, but it is well worth investigating given that both factors are likely to have significant implications for the wealth returns to homeownership. Moreover, while I find only limited evidence that race moderates the relationship between criminal justice contact and homeownership, race may be much more likely to affect the quality of units and neighborhoods available to homebuyers with a history of criminal justice system contact.

NLSY97 also contains information on the type of offense for which individuals were charged, convicted, and incarcerated. Thus, future analyses could investigate whether the findings presented here vary by level of offense (that is, misdemeanor versus felony) or type of offense (for example, drug charge). Likewise, future research could also delve into the timing of criminal justice contact in relation to homeownership patterns.

Another fruitful direction for future research would be exploring whether homeownership and wealth more broadly affect probability of criminal justice system interaction. There is good reason to suspect that this may be the case—for example, it may be easier to get a bail bond, thus avoiding pre-trial incarceration, if you can offer a vehicle or other assets as collateral. But to my knowledge only one study has looked at this relationship descriptively, finding that probability of incarceration is lower among higher wealth individuals (Zaw, Hamilton, and Darity, 2016). Because there are a number of confounding factors likely to influence both wealth and likelihood of interacting with the criminal justice system, however, a causally motivated analysis of this question would be an important contribution to the literature.

Although the NLSY97 cohort is still relatively young, the NLSY97 data provide an important opportunity to begin investigating how a fuller range of criminal justice system interactions affect subsequent outcomes and opportunities for the millions of Americans who pass through the justice system every year. Incarceration rates may be declining (Kaeble and Cowhig, 2018), but these findings highlight the importance of lower level forms of criminal justice contact that are not the focus of current criminal justice reform efforts (for example, Charles Koch Institute, 2019; #cut50, 2019).

Moreover, these data also afford the opportunity to systematically explore the much-speculated-

on housing and homeownership patterns of millennials. While high student loan debt burden is often blamed for lower levels of homeownership among millennials compared to prior generations (Kitroeff, 2018; Thompson, 2018), student loan debt is a constraint more relevant for relatively advantaged potential homebuyers with post-secondary degrees.²² This article highlights a constraint on potential homeownership for millennials at the other end of the market, for whom student loan debt is likely to be a less relevant factor in the transition into homeownership: the expansive reach of the American criminal justice system.

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²² While higher educated individuals are more likely to be homeowners, 56 percent of heads of household with a high school diploma and 41 percent with less than a high school diploma own their homes (Young, 2017).

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The Potential for Shared Equity and Other Forms of Downpayment Assistance to Expand Access to Homeownership

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Abstract

Previous studies of the financial constraints for homeownership attainment have found that cash grants to cover downpayments and closing costs can substantially increase the share of renters who can afford to buy a home. Shared equity homeownership is an alternative to traditional homeownership (and renting) that provides a substantial upfront reduction in the purchase price of the home, which reduces the cost of homeownership and can expand access for households that do not have the savings for a downpayment or have incomes too low to qualify for market rate mortgages. Despite the interest in shared equity, there has been relatively modest growth in the number of these housing units, with fewer than 250,000 of them nationally. If the financial, administrative, and political barriers to shared equity programs could be overcome, how many households could potentially benefit from this alternative to renting and owning? We use household-level income, assets, and debt data from the Survey of Income and Program Participation (SIPP) to expand on previous literature by assessing how a broader range of upfront financial assistance would affect the ability of potential homeowners to buy modestly priced homes, providing estimates of the potential scale of programs providing modest downpayments as well as more substantial amounts of assistance consistent with the levels typically provided by shared equity programs.

Abstract (cont.)

We find that 6.6 million potential homeowners could purchase a home in their county with assistance of \$25,000 to \$100,000, a level consistent with what shared equity programs typically provide. An additional 8.6 million potential homeowners would be able to purchase with financial assistance of \$100,000 or more. Still an equal number (15.2 million) of potential homeowners would be able to buy with relatively modest assistance of \$10,500 or less—amounts typically provided by traditional downpayment assistance programs. We disaggregate our results by racial/ethnic group, income, and geography and show that there may be much greater demand for shared equity than can be met by current programs.

There is substantial evidence that homeownership has a positive association with gains in household wealth, as well as with a range of social benefits, including increased civic participation, improved educational outcomes for children, and higher residential satisfaction (Herbert, McCue, and Sanchez-Moyano, 2014; Rohe and Lindblad, 2014). Of course, owning a home is also associated with significant financial risks—particularly for low- and moderate-income households—given potentially dramatic swings in home values and all-too-common changes in individuals' financial circumstances (Herbert and Belsky, 2008; Shlay, 2006). Nonetheless, given the potential benefits of homeownership, substantially lower homeownership attainment among racial and ethnic minorities and lower-income households became a concern for U.S. policymakers beginning in the early 1990s (Molinsky, Belsky, and Herbert, 2014; Retsinas and Belsky, 2004). In the years following the Great Recession, the U.S. homeownership rate fell sharply, raising renewed concerns about disparities in homeownership by race and ethnicity as well as substantial declines in owning among younger households (Choi et al., 2018; Goodman, Zhu, and Pendall, 2017; JCHS, 2018).

Among the barriers to homeownership are a lack of knowledge about the process for purchasing a home, limited income and savings relative to the cost of housing, a weak credit history that limits access to mortgage financing, and a lack of financial and other supports to maintain homeownership after purchase (Herbert et al., 2005). Research has consistently found, however, that the lack of savings for a downpayment and closing costs is by far the most significant barrier (Barakova et al., 2003; Herbert et al., 2005). For this reason, downpayment assistance programs have been shown to have the greatest potential for expanding access to homeownership (Listokin et al., 2001; Wilson and Callis, 2013). Among different forms of upfront financial assistance to enable homeownership, shared equity homeownership models have been promoted as ideally suited for households needing substantial subsidies to close the gap between how much they can afford and the cost of market-rate housing (Davis, 2006; Lubell, 2014). Given the magnitude of the subsidy, a hallmark of shared equity models is the retention and growth of this subsidy for successive homeowners by capturing both the subsidy and a share of home appreciation upon sale of the home. Importantly, although shared equity homeownership models vary, they often include a range of supports both before and after purchase from a local organization managing the program.

These supports are intended to mitigate the risks of homeownership, increasing the likelihood that owning is sustained over time and its potential benefits realized.

Interest in shared equity models has increased in recent years as home prices have outpaced income growth in many areas of the country, making it increasingly difficult for low- and moderate-income households to afford even modestly priced homes. In addition, the widespread prevalence of gentrification pressures in formerly low-income neighborhoods has also led to interest in forms of homeownership that both allow residents to share in the rising tide of home prices while preserving housing affordability for future low- and moderate-income residents (Thaden, 2018). Private-sector companies have developed shared appreciation models of homeownership distinct from nonprofit shared equity models, particularly in high-cost areas.

For a variety of reasons, despite this interest in shared equity approaches, there has been only modest growth in the number of nonprofit shared equity housing units (Lubell, 2014; Thaden, 2018). Perhaps most fundamental is the lack of funding for the subsidies needed to close the gap between what the targeted households can afford and the market price of housing. There are also very few sources of funding for the operations of the organizations providing stewardship for these programs, including screening and supporting homebuyers and monitoring and overseeing the transition of these housing units between owners over time. In addition, there are questions about the extent of consumer interest in these forms of homeownership given their financial and organizational complexity and the limitations they place on sharing in gains in future home prices (Thaden, Greer, and Saegert, 2013).

In making the case for expanded funding to support shared equity programs, one important question is how large the potential demand is for such efforts. Previous studies have assessed the number of households who would fail to meet current underwriting standards for common mortgage products but would be able to qualify with modest amounts of subsidies to either reduce mortgage payments or to provide funds for downpayments or closing costs (Listokin et al., 2001; Wilson and Callis, 2013). These studies, however, do not examine specifically how many potential homeowners would require large subsidies to be able to afford to buy a home. As a result, they do not provide a good gauge of the scale of demand for shared equity models in which the write down of housing costs is substantial.

The purpose of this current study is to provide a finer-grained assessment of the distribution of potential homeowners by the amount of upfront subsidy needed to bring homeownership within reach. Specifically, using the 2014 panel of the Survey of Income and Program Participation (SIPP), we assess the number of individuals who currently could not afford a modestly priced home using standard underwriting for Federal Housing Administration (FHA) insured mortgages but who could buy with varying degrees of write down of the market price of the home. The primary focus of the article is on the potential scale of demand for shared equity homeownership as indicated by the number of potential homeowners who could only afford a modestly priced home through a substantial reduction in the amount of mortgage debt they would assume. Our analysis also provides estimates of the number of individuals who would be able to purchase a modestly priced home with relatively small amounts of upfront financial assistance that are typically provided by downpayment assistance programs.

This study also extends previous studies by incorporating county-specific home prices to consider the substantial variation in home prices across housing markets. Previous studies have also focused solely on existing households to assess the potential demand for homeownership. Because a fairly significant number of homeowners transition from other living arrangements where they are not the head of household (including living with parents or living with other roommates), this study also includes individuals living in these situations in the count of potential homeowners.

The results of this analysis provide the number and share of potential homebuyers needing varying levels of financial assistance in order to afford modestly priced homes. These counts are provided for potential homebuyers by income level, race and ethnicity, and the level of house prices in the market where they live to indicate which demographic groups and market areas offer the greatest potential demand for shared equity homeownership and other forms of downpayment assistance. We find that 15.2 million potential homeowners would be able to purchase with substantial amounts of upfront financial assistance, including 6.6 million who could purchase with assistance of between \$25,000 to \$100,000, with an additional 8.6 million needing \$100,000 or more. Our focus is on the \$25,000 to \$100,000 band because most shared equity programs provide subsidies of this magnitude, though some provide assistance of more than \$100,000 per unit especially in high cost areas like Washington, D.C. and the San Francisco Bay Area (Theodos et al., 2017). An equal number of potential homeowners would be able to buy with much more modest amounts of assistance of under \$10,500. Results disaggregated by racial and ethnic group show that minorities would be more likely to benefit from the higher levels of assistance provided by shared equity programs: 27 percent of non-Hispanic Whites need assistance of \$25,000 or more, compared with 31 percent of African-Americans, 30 percent of Asians, and 36 percent of Hispanics. Thus, an expansion of shared equity programs would have the potential to help reduce the disparities between the White and minority homeownership rates.

The next section of the article provides a brief review of previous studies examining financial barriers to homeownership and the potential for different forms of financial assistance to overcome these barriers. Next, we present an overview of shared equity homeownership models, the typical income levels and amounts of subsidies provided in existing programs, and other common forms of downpayment assistance provided to low- and moderate-income homebuyers. We then describe the data and analytic approach before presenting the results of our analysis. The article concludes with a discussion of findings and conclusions for policy.

Financial Barriers to Homeownership

Given the high value of homes relative to incomes, most households must rely on mortgage financing to purchase a home. In determining how much credit to extend to homebuyers and whether this is possible, lenders employ underwriting criteria that take into consideration whether the borrower's income is sufficient to cover monthly debt service payments and other recurring costs of ownership and non-housing debt. Borrowers are also required to invest some of their own savings in the home to reduce lender risk if the home is foreclosed and must be sold to repay the outstanding debt. Higher levels of upfront investment in the home also have the benefit of reducing the amount that must be borrowed and reduces the level of income needed to cover monthly mortgage costs.

A variety of studies have examined the degree to which potential homebuyers are unable to purchase modestly priced homes due to either insufficient income or savings to meet standard underwriting criteria. These studies provide an indication of the relative importance of income and savings constraints and also allow for assessments of the degree to which subsidies that supplement income or provide upfront assistance toward a downpayment and closing costs have the potential to make home purchase more feasible (Listokin et al., 2001).

Most prominent among these studies is a regular series of reports produced by U.S. Census Bureau researchers since the 1980s using the SIPP, with Wilson and Callis (2013) being the most recent report in this series. Using survey data from 2009, this study finds that only 6.8 percent of renters could afford a modestly priced home (defined as the 25th percentile home in the state of residence). The analysis reveals that potential homebuyers are more likely to be constrained by a lack of savings than by insufficient income. For example, among renter families, 24.8 percent are constrained solely by a lack of sufficient savings, while only 1.8 percent are solely constrained by a lack of income, with a large majority (73.6 percent) constrained by both factors. The study further finds that reducing the mortgage interest rate by 3 percentage points would only increase the share of renters who can afford a modestly priced home by 0.5 percentage point, whereas providing \$5,000 in upfront cash assistance would increase the share by 1.9 percentage points and a \$10,000 grant would increase the share by 9.3 percentage points. The results highlight how upfront subsidies toward the purchase price of the home have great potential for expanding access to homeownership.

An earlier study by Listokin et al. (2001) employed essentially the same methodology to a 1995 wave of the SIPP and came to very similar conclusions about the much greater potential for upfront cash grants to expand access to homeownership. This study assessed the impact of both income supplements and upfront cash grants and found that the latter had a much greater impact on the share of renters who could afford to purchase a home. The largest impacts were associated with cash grants of \$10,000, which increased the share that could afford to purchase a home by 26.4 percentage points. The much larger impact found in this study compared with Wilson and Callis (2013) reflects the fact that a \$10,000 grant in 1995 represented a much larger share of the value of a modestly priced home, indicating that relatively large upfront grants have the potential to substantially increase the share of renters who could purchase a home.

In addition to income and savings, access to mortgage credit is also predicated on the credit history of the borrower. There is a much thinner literature assessing the significance of impaired credit for access to homeownership given limited credit information in most publicly available data. One notable exception is Barakova et al. (2003) which incorporated estimates of credit scores to assess the relative importance of constraints on mortgage borrowing due to limited income, savings, or impaired credit. The results indicate that removing the constraint imposed by a lack of savings would increase the probability of homeownership among renters by 62 percent, a much greater impact than removing income (3 percent) or credit (10 percent) constraints. Like most studies assessing the significance of financial barriers to homeownership, the analysis in this study is not able to account for credit barriers to accessing mortgage financing, but the results of Barakova et al. (2003) suggest that this will result in only a small overestimate of the share who can afford to buy with upfront financial assistance alone.

Shared Equity Homeownership and Downpayment Assistance Programs

A principal concern of this article is the potential demand for shared equity homeownership approaches that provide substantial upfront financial assistance to homebuyers, while also offering supports for homebuyers both before and after purchase to help sustain homeownership. As first framed by Davis (2006), shared equity homeownership encompasses forms of homeownership in which resale of the home is restricted to limit the amount of appreciation the owner may realize in order to preserve long-term affordability of the home. The sale price of the home is generally substantially below the market value, with public or philanthropic funding used to make up the difference. These programs also typically involve oversight of this housing by a nonprofit organization or a public entity that screens and prepares buyers prior to purchase, monitors and supports homeowners after purchase, and then oversees resale of the home to another income eligible homeowner.

There are three primary legal structures used to implement shared equity homeownership: community land trusts, limited equity cooperatives, and deed restrictions (Davis, 2006; Lubell, 2014). In a community land trust, the land is owned by the trust and leased to the homeowner, with the ground lease establishing the rights of the trust to repurchase the property on sale under agreed upon terms. The trust is managed by a board composed of residents of the land trust, residents of the surrounding community, and public officials and other local supporters of the trust. In a limited equity cooperative, residents purchase shares in the cooperative that give them the right to occupy a home in the development and to have a say in the management of the property, including the admittance of new members. Sale prices of shares are set by the bylaws for the cooperative, with limited equity cooperatives setting these prices below market levels. Finally, deed restricted housing are homes that have covenants in their deeds limiting the resale price and income for the owner. Unlike community land trusts and limited equity cooperatives, deed restricted housing may not have a nonprofit organization as a steward overseeing the property. The most common form of deed restricted housing in recent years has been developed through inclusionary zoning ordinances that mandate or incentivize developers to reserve a portion of the units to be affordable to a designated income level for a specified period.

For the most part, shared equity approaches to homeownership have followed one of these three models, with either public or nonprofit organizations managing these programs. In recent years, however, private forms of shared equity homeownership have started to emerge, in which private investors provide an equity investment in a home in exchange for a share of future appreciation.¹ There are also shared appreciation mortgages in which some portion of the home is financed using below market interest rate debt that is also entitled to a share of the home's appreciation. While the focus of this paper is primarily on the public and nonprofit forms of shared equity homeownership, the findings are also relevant for sizing the market potential of these other forms of shared equity financing.

¹ Unison Home Ownership Investors is one private company that, for example, matches a 10 percent borrower downpayment (resulting in a 20 percent downpayment on a property) in exchange for 40 percent of property appreciation. See more at <https://www.unison.com/>.

In a recent scan of the field, Thaden (2018) finds that limited equity cooperatives account for the largest share of shared equity housing units, with an estimate of 167,000 homes, although about 100,000 of these are in New York City alone. Deed restricted housing units through inclusionary zoning programs account for at least another 50,000 units based on a field survey by Thaden and Wang (2017). Finally, community land trusts are estimated to include about 9,000 housing units in 165 active organizations. Thaden (2018) notes that despite the interest in this type of housing, there appears to have been little net growth since Davis (2006) reviewed available evidence on the number of shared equity homes across the country.

In his review of shared equity forms of homeownership, Lubell (2014) identifies several barriers to greater expansion of shared equity homeownership. Perhaps most important is the lack of a consistent source of financial subsidies that can be used to write down the cost of the home that is required to make homes affordable to the target income group. The next most significant hurdle is the cost of the administration of these programs, requiring ongoing oversight and stewardship by a nonprofit entity that must somehow generate revenue to cover these operations considering there are no ongoing public sources of funding for these activities.

Consumer confusion and hesitancy about these forms of owning is another obstacle, with the limitations placed on realizing appreciating home values and the oversight provided by the program stewards making some potential homebuyers reluctant to consider shared equity options. In a series of 14 focus groups with consumers in Nashville, those currently searching for homes who felt they could afford to buy without substantial assistance were found to be least receptive to shared equity homeownership approaches, whereas homeowners who had defaulted on their mortgages were universally receptive to the idea (Thaden, Greer, and Saegert, 2013). Further research on attitudes among financially distressed homeowners in Nashville also found substantial interest in shared equity homeownership as a means of providing greater support for owners (Saegert et al., 2015). These studies also find that consumers were concerned about not being able to fully realize the appreciation in their homes, the potential intrusion into their ability to control the properties by the program steward, being limited in where they could choose to live, and being identified as living in subsidized housing. Practitioners and advocates expressed reluctance about the limits on appreciation shared equity models place on low- and moderate-income owners (Jacobus and Sherriff, 2009).

There are also a variety of alternative means of subsidizing the purchase of homes by low- and moderate-income households that do not require equity sharing or oversight by a program steward. A review of the way in which state and localities use the federal HOME program² to subsidize homeownership provides a good indication of the range of these alternative approaches, as HOME is one of the most common sources of downpayment assistance (Turnham et al., 2004). A survey of state and local jurisdictions' use of this funding to provide subsidies for low- and moderate-income homebuyers found that a majority of the programs created by these entities employed forgivable loans or grants as long as the homeowner stayed in the home for at least 5 years. Thus,

² The HOME Investment Partnerships Program (HOME) provides block grants to state and local governments to fund affordable housing for low-income households. Participating jurisdictions often partner with local nonprofit groups to use HOME funds for a variety of programming that promotes affordable rental housing and homeownership. More information is available at https://www.hud.gov/program_offices/comm_planning/affordablehousing/programs/home/.

homebuyers generally capture the entire value of the subsidy, with no recapture for redeployment with subsequent homebuyers. In about one-third of the programs surveyed, assistance was provided in the form of repayable loans, although typically these programs did not require ongoing payments but simply recaptured the loan amount upon sale or payoff of the first mortgage. In these cases, the original subsidy is retained but will decline in value relative to the inflation in home values over time. Based on recent reports on HOME program activity since 2013, the median amount of assistance per homebuyer provided through these programs was \$19,000, with about 70 percent receiving less than \$50,000.³ Over its history, 70 percent of assisted homebuyers have had incomes between 51 percent and 80 percent of area median income (AMI), with the remaining share earning less than 30 percent of AMI.

There is limited information available on the typical amounts of subsidies provided through shared equity programs. The most recent information available is from an evaluation of nine large shared equity programs (Theodos et al., 2017). This study found that the average difference between the market value of the home and the price paid by the homebuyer was \$94,000, although the range across programs was broad—from a low of \$27,000 to a high of \$183,000. Overall, six of the programs had average amounts of assistance under \$100,000. The average income of homebuyers across these programs was \$44,000, representing 51 percent of AMI.⁴ These results suggest that shared equity programs tend to provide much higher levels of assistance for a lower income group of homebuyers than more traditional downpayment assistance as shown by experience with the HOME program.

The focus of this study is in assessing the scale of potential demand for shared equity homeownership based largely on both the amount of financial assistance needed to make homeownership attainable and the income level of potential homebuyers. Based on this review of existing program attributes and consumer attitudes, we assume that shared equity homeownership programs will have the greatest appeal where the amount of assistance is fairly substantial, so that owners would be unlikely to be able to afford to purchase absent this support and more willing to accept the limitations on equity accumulation and the stewardship of their ownership by an outside organization. The findings we present, however, will still allow those interested in this subject to gauge the most appropriate cutoffs for the level of assistance provided.

Data

We use data from the most recent panel of the SIPP to estimate the number of households nationwide that are candidates for shared equity or other forms of downpayment assistance. In 2014, SIPP surveyed a nationally representative sample of over 29,000 households and collected data about the demographic and socioeconomic characteristics of these households, including detailed information on sources and amounts of income, assets, and debts in calendar year 2013. These detailed financial data and the large nationally representative sample make SIPP the most

³ Information on HOME program activity downloaded from <https://www.hudexchange.info/programs/home/home-activities-reports/>.

⁴ It is not known how typical these levels of assistance are across a broader range of programs, but another recent study suggested that typical per unit subsidy was \$40,000, which is well below the levels reported for these programs (Theodos et al., 2015).

appropriate source of data for estimating how much households could afford to spend on housing.⁵

Our analysis relies on individual-level internal user files of Wave 1 of the 2014 SIPP. We merge these files with restricted use data identifying individuals' residential addresses during the survey period (from January 2013 through month of survey in early 2014). These addresses allow us to identify the state and county where individuals lived in December 2013, the month for which respondents reported information on assets and debts. We assign individuals to counties so that we can account for geographic variation in home values. This accounting for geographic variation provides a more precise estimate of ability to afford a home where the individual currently lives than a national or regional criterion home value, on which previous studies have relied.

We use data from the Census Bureau's 2013 American Community Survey (ACS) to estimate housing values for U.S. counties. For observations in each county, we calculate the 10th, 25th, 40th, and 50th percentile in the distribution of housing values based on all owned homes.⁶ We then merge the ACS data to the individual-level SIPP sample so that we can estimate a household's ability to afford a very low-, low-, moderate-, and median-value home in their area.⁷

Analytic Approach

Potential Homeowning Units. The first step in our analysis is to determine who in the SIPP sample is eligible to become a homeowner. We create a sample of potential homeowning units (PHs) based on current tenure and household composition, as measured in December 2013.⁸ Our pool of "potential homeowners" includes three main groups: (1) existing renter households; (2) existing households that neither own nor rent their homes (those of "other" tenure); and (3) non-households, comprising adult individuals and couples who currently live in someone else's home. PHs in the non-household group must include a potential head of household who is between the ages of 25 and 65.

An example may help illustrate how we construct our PH sample. Consider a case in which a woman between the ages of 25 and 65 and her husband live with the woman's parents in a home owned by the woman's parents. In this example, we consider the woman and her husband to be a PH, if although they are currently a non-household, they could leave the parents' home and establish their own independent household. If the parents in this example rented rather than owned their home then this hypothetical household would include two PHs: the woman and her husband are one, and the woman's parents are a second.

We are motivated to expand our PH sample from existing renter households to also include non-

⁵ See Listokin et al. (2001), Savage (2009), and Wilson and Callis (2013) for prior home affordability analyses using SIPP.

⁶ As a robustness check, we additionally calculate these same four points in the distribution based only on owned homes where the owners moved in the last year; this is a proxy for recent sales and more current values. The results are nearly identical and available upon request.

⁷ We report results based on the 50th and 25th percentile housing values. Results for the 40th and 10th percentile are available upon request.

⁸ The SIPP survey instrument asked respondents to report their assets and debts in December 2013 so we rely on household rosters and other individual covariates reported during this month to determine the composition of PHs.

households, individuals and couples living in others' homes, based on our analysis of public-use data from Waves 9 and 15 of the 2008 SIPP panel. This analysis shows that approximately 20 percent of individuals who transitioned from not owning a home in Wave 9 to owning a home by Wave 15 had lived in someone else's home in the earlier wave. Restricting our sample of PHs to independent renter households, while excluding individuals and couples who live in someone else's home, would therefore omit a sizeable group of potential homeowners from our estimates.

We acknowledge that the assumptions we make in building our PH sample may overestimate the total number of PHs nationwide. Including non-households in our PH sample likely overestimates the number of PHs, as some of these individuals and couples might pool income and assets with the householders of their current home to purchase a home together. For instance, in the example discussed above, the woman and her husband may pool resources with the woman's parents to purchase a home together rather than each PH purchasing a home on their own. In that case, the household would produce only one new homeownership unit, but our assumptions would designate it as including two PHs. Not knowing who would purchase together and who would purchase separately is a limitation of our analysis; we choose to err on the side of including more PHs rather than assume certain sets of individuals would combine resources to purchase a home.

We attempt to partially counteract this overestimation by restricting our pool of non-household PHs to those headed by a potential householder between the ages of 25 and 65. We do this recognizing that there is a strong life-course component to homeownership, in that transitioning into homeownership is correlated with coupling up and aging into the 30s and 40s. Our own analysis of restricted 2015 American Housing Survey data shows that households under 25 and over 65 comprise small percentages of first-time homebuyers (7 percent and 2 percent, respectively). Yet almost one-half of our unrestricted sample of non-household PHs are under 25, and an additional small fraction are 65 or older.⁹ The upshot is that roughly one-half of our unrestricted sample of non-household PHs are, by the data, statistically very unlikely to become first-time homebuyers in the near future. Additionally, most non-households in our unrestricted sample are single-earner households (93 percent), in part because of the sizeable portion under age 25. In a few years' time, however, many in this group may partner, simultaneously increasing their likelihood of purchasing a home and potentially doubling their financial home purchasing power. This doubling of financial power may mean they do not need financial assistance to purchase a home, and it could also reduce the number of PHs in this group by one-half (for example, if two single-person non-household PHs couple up, they become just one PH). Considering these factors, we exclude from our PH sample non-households who are under age 25. We also exclude non-households aged 65 and older, assuming that individuals and couples of this age who are not living independently are unlikely to (re)establish an independent household.

Can potential homeowners afford to buy a home? Once we identify all PHs in the 2014 SIPP, we aggregate individual-level income, assets, and debts at the household level to determine whether the PH could afford to purchase the median-priced home in their county of residence.¹⁰ We consider three primary components of "affordability": (1) whether a PH has sufficient assets to

⁹ By contrast, most renters in our PH pool are aged 25–64.

¹⁰ Please see appendix exhibit A for our definitions of income, assets, and debts, which follow the methodology outlined in Wilson and Callis (2013).

afford a downpayment on the median-value home in its county of residence; (2) whether a PH has sufficient income to afford monthly mortgage payments on the median-value home in its county of residence; and (3) whether a PH has a manageable amount of non-housing debt.

We set the downpayment amount for each PH at 3.5 percent of the median-value home in its county, following the minimum downpayment requirement for FHA loans.¹¹ We define monthly mortgage payments as “affordable” if they require less than 31 percent of monthly household income, and we consider non-housing debt to be “manageable” if mortgage payments and debt service together consume less than 43 percent of monthly household income.¹² These assumptions follow FHA front- and back-end debt-to-income ratios, respectively, and assume no compensating factors (FHA, 2019). For most PHs, non-housing debt service payments may consume no more than 12 percent of their monthly income; assuming that most PHs will need to pay the maximum 31 percent of income for mortgage payments, this leaves 12 percent of income remaining for non-housing debt payments (43 percent of monthly income less 31 percent for mortgage payments equals 12 percent for non-housing debt payments). For some higher-income PHs who can afford median mortgage payments using less than 31 percent of their monthly income, however, debt service payments may exceed 12 percent.

We begin our analysis by calculating the minimum downpayment and monthly mortgage payments for the median-value home in each county. As stated above, we set the downpayment amount at 3.5 percent of the median-value home in the area. To calculate the monthly mortgage payment, we assume a 30-year mortgage with a 4.5 percent interest rate—the 30-year fixed rate mortgage average in the United States in December 2013 (Freddie Mac, 2019). We calculate monthly mortgage payments based on a principal amount of 99.5 percent of the median-value home, which assumes that closing costs and other fees total 3 percent of the value of the home, and that these costs can be financed. The monthly payments also include state-specific property tax rates from Walczak (2015) and assume a property insurance rate of 0.35 percent of property value and a mortgage insurance rate of 0.85 percent of property value.¹³

The next step in our process is to determine whether each PH can afford the median-priced home in their county with its existing balance of assets, income, and debts. We categorize PHs as being able to afford the median-value home in their county if they meet each of our three criteria outlined above (1) having sufficient assets to afford the downpayment, (2) having sufficient income to afford the mortgage payments, and (3) holding a manageable amount of non-housing debt. If PHs meet all three of these criteria, or if they have assets sufficient to buy the median-value home outright without a mortgage, we categorize them as able to afford homeownership without assistance. PHs who do not meet all three criteria, and who cannot afford to buy a home with their existing balance of assets, income, and debt, are of interest for us: they represent households that

¹¹ Fannie Mae and Freddie Mac also offer 3-percent-downpayment programs. We use FHA underwriting criteria because it is generally much less restrictive than GSE underwriting requirements, which require loan level pricing adjusters for higher risk loans.

¹² Please refer to appendix exhibits A and B for the types of debts we include in non-housing debt, as well as the loan terms we use to calculate debt service payments and monthly mortgage payments.

¹³ State-specific property tax rates are mean effective property tax rates calculated as the ratio of total real taxes paid over total home value (Walczak, 2015). The property insurance and mortgage insurance rates mirror JCHS assumptions used in affordability calculations for the State of the Nation’s Housing Report (JCHS, 2018).

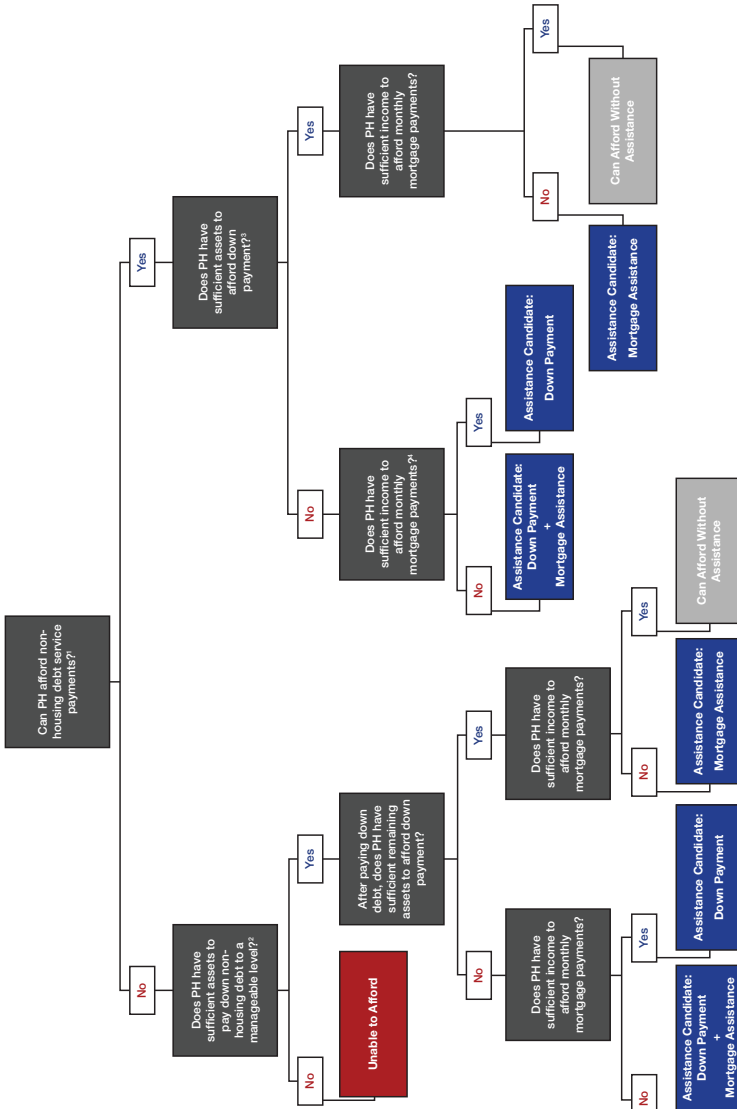
could potentially afford to buy a home with upfront financial assistance.

Once we have established the pool of PHs who cannot afford the median-value home without assistance, we determine the type of barrier(s)—income, assets, or debts—preventing them from being able to purchase a home. Among those PHs with excessive non-housing debt, or those for whom debt service payments combined with estimated mortgage payments require more than 43 percent of monthly income, we attempt to reorganize PH debts and assets in ways that might allow them to qualify for home purchase assistance. To do this, we use any existing assets the PH holds to “pay down” its excessive non-housing debt to a manageable level (again, for most PHs, this equals 12 percent of monthly income). We categorize PHs who do not hold sufficient assets to pay down their non-housing debt to manageable levels as “unable to purchase” even with upfront home purchase assistance, assuming that such assistance cannot be used to pay off non-housing debt. After performing these asset and debt reorganizations, our pool of candidates for upfront home purchase assistance is reduced to PHs with manageable non-housing debt but who may still face income or asset barriers. Before moving on to our final step and assessing the amount of assistance each remaining PH needs, we categorize as “unable to purchase” all PHs with incomes that are zero or negative, assuming that they are unlikely to be able to sustain the costs of homeownership in the long term even with assistance.

Finally, we determine the amount of assistance that each PH remaining in our sample would need to purchase the median-value home in its county of residence. These remaining PHs fall into three categories: those who are constrained by a lack of savings but have sufficient income, those who have sufficient savings but low incomes, and those who are both savings and income constrained. For PHs who have sufficient income to not be constrained by the 31 percent front-end ratio, the amount of assistance is limited to what is needed to supplement PH assets in order to support a 3.5 percent downpayment. For PHs with assets equal to or greater than 3.5 percent of the median-value home, but who are income constrained, the amount of assistance is determined by the difference between the mortgage amount the income of the PH could support and the median-value home plus closing costs less the 3.5 percent downpayment. For PHs who face both income and savings constraints, we calculate the amount of assistance needed to afford the median-value home as the difference between the amount of mortgage debt the income of the PH will support and the value of the home plus closing costs less whatever assets the PH has to put toward the home purchase. Exhibit 1 presents a flow chart representing the steps in our analysis.

Exhibit 1

Method of Determining Necessary Home Purchase Assistance



PH = Potential Homeowner Units.

¹ PHs can “afford” non-housing debt service payments if their monthly debt payments and estimated mortgage payments on the median-priced home in their county of residence do not exceed 43 percent of their monthly income (FHA’s back-end ratio). In most cases, PHs would pay 31 percent of their monthly income toward mortgage payments, which means their debt payments cannot exceed 12 percent of their income. Debt payments may exceed 12 percent of income, however, if a PH’s income is sufficiently high that mortgage payments require less than 31 percent of income. For instance, we allow PHs to pay 15 percent of their income toward debt service if estimated mortgage payments on the median-priced home in their county would consume only 28 percent of their income.

² We use any existing assets to “pay down” PH’s non-housing debt until it reaches a level such that their monthly debt payments and estimated mortgage payments on the median-priced home in their county do not exceed 43 percent of their monthly income. In most cases, this means that we pay debt down to a level such that monthly debt service payments require 12 percent of PH monthly income. See footnote 1 above for further information.

³ We assume a downpayment of 3.5 percent on the median-priced home in each PH’s county of residence. Please see appendix exhibit B for further information about our downpayment assumptions.

⁴ We calculate monthly mortgage payments on the median-priced home in each PH’s county of residence and assume that a PH can afford payments if they require less than 31 percent of the PH’s income each month. Please see appendix exhibit B for further information about our mortgage payment assumptions. PHs with incomes that are zero or negative are categorized as unable to purchase.

Throughout the analysis described in this section, the criterion home is the median-value home in each PH county: we repeat this analysis for criterion homes priced at the 25th percentile of the housing price distribution in each county and report selected findings from those results below.

Results

Description of the Sample. Exhibit 2 shows weighted descriptive statistics of the full sample of PHs we use to estimate affordability gaps (first column) and disaggregates the sample into renters (second column) and non-households (third column). We identified approximately 14,000 PHs in the SIPP sample, representing approximately 51.2 million PHs nationally. This is a disproportionately low-income sample, reflecting the fact that homeowners, on average, have higher incomes than non-homeowners. The median PH income is \$24,700, and 43 percent of the sample had an annual income under the first quintile cut point of the national distribution, approximately \$25,000 (an additional 7 percent of PHs have zero or negative income). Another 23 percent had an annual income between \$25,000 and \$45,000, whereas 16 percent of the sample had a 2013 income between \$45,000 and \$75,000, and 11 percent had an income in the top two quintiles of the national distribution, above \$75,000. The median amount of assets held by PHs is just \$313, with a majority of PHs (51 percent) holding assets totaling between \$1–\$5,000, and fully 29 percent holding no assets at all. Meanwhile, the majority of PHs (53 percent) hold no non-housing debt, and 21 percent have small amounts of non-housing debt that totals under \$10,000. Fully 70 percent of our PH sample are single-earner households, with the remaining 30 percent comprising married couples or non-married partners. The race and ethnicity breakdown of the PHs is approximately 53 percent non-Hispanic White, 18 percent non-Hispanic African-American, 19 percent Hispanic, 5 percent Asian, and 5 percent other race.

Exhibit 2

Descriptive Statistics (1 of 2)

	Means		
	Full Sample	Renters	Non-Households
Income			
Zero or Negative	7%	5%	14%
\$1–\$24,999	43%	42%	47%
\$25,000–\$44,999	23%	24%	21%
\$45,000–\$74,999	16%	17%	12%
\$75,000–\$119,999	7%	8%	4%
\$120,000 or More	4%	5%	2%
Median Income (\$)	24,700	27,040	18,930
Single Earner	70%	63%	93%
Assets			
No Assets	29%	26%	36%
\$1–\$5000	51%	52%	47%

Exhibit 2 (cont.)

Descriptive Statistics (2 of 2)

	Means		
	Full Sample	Renters	Non-Households
\$5,001–\$10,000	6%	6%	5%
\$10,001–\$25,000	6%	6%	4%
\$25,001–\$50,000	3%	3%	2%
\$50,001–\$100,000	2%	2%	2%
More than \$100,000	4%	4%	2%
Median Assets (\$)	313	397	187
Non-Housing Debt			
No Debt	53%	51%	61%
\$1–\$5,000	14%	14%	15%
\$5,001–\$10,000	7%	7%	7%
\$10,001–\$25,000	13%	14%	10%
\$25,001–\$50,000	7%	8%	5%
More than \$50,000	5%	6%	2%
Race-Ethnicity			
Non-Hispanic White	53%	53%	52%
Non-Hispanic African-American	18%	18%	16%
Non-Hispanic Asian	5%	5%	6%
Hispanic	19%	19%	22%
Other	5%	5%	4%
Age			
Less than 25 Years Old	7%	10%	
25–34 Years Old	29%	23%	46%
35–44 Years Old	20%	20%	20%
45–54 Years Old	18%	17%	18%
55–64 Years Old	14%	14%	16%
65 Years Old and Up	12%	16%	
Median Age	42	43	35
County Price-to-Income (PTI) Ratio			
PTI < 3	38%	38%	39%
PTI > 3 < 5	42%	43%	41%
PTI > 5	19%	19%	20%
Total	51,190,000	38,900,000	12,280,000

Note: These results were disclosed by the US Census Bureau's Disclosure Review Board, authorization number CBDRB-FY19-396.

Source: Wave 1 of the 2014 panel of the SIPP

Breaking down our PH sample into renters, who comprise 76 percent of our PH sample, and non-households, 24 percent of our sample, illuminates several noteworthy differences between the two groups.¹⁴ Renters have higher incomes and hold more assets, on average, than the non-households in our sample. The typical renter PH has an annual household income of \$27,040, whereas the typical non-household brings in \$18,930 per year. The share of renter PHs who hold no assets at all is just over one-quarter (26 percent), but among non-household PHs, it is 10 percentage points higher, at 36 percent. Renter PHs also have more debt than do non-household PHs. While roughly one-half (51 percent) of renter PHs hold no non-housing debt, fully 61 percent of non-households are debt free. Further, 14 percent of renter PHs have upwards of \$25,000 in debt, compared with just 7 percent of our subsample of non-households. Household composition also differs between the two groups. Among renters, 63 percent of PHs are single-earner households, compared with 93 percent of non-household PHs. The higher shares of debt-free and single-earner PHs among non-households may be due in part to their relatively younger age: the median age of renters in our PH sample is 43, whereas that of non-households is 35.

We present some results stratified by the housing price-to-income ratio of the county in which the PH lives. We select counties as a rough proxy for the geographic boundary within which PHs are likely to search for a home. We define counties with housing price-to-income (PTI) ratios of 5 or above as expensive markets, those with ratios between 3 and 5 as middle markets, and those with ratios below 3 as inexpensive markets. The counties categorized as expensive markets include coastal cities we would expect to find in this category such as San Francisco, Los Angeles, New York, and Boston. In our sample, 19 percent of PHs live in expensive markets. The middle market category includes the counties containing Chicago, Phoenix, and Miami at the higher end, Atlanta, Louisville, and Providence toward the middle, and Raleigh, near the low end of the category. Approximately 42 percent of our sample lives in middle markets. The inexpensive market category includes counties located predominantly in the midwest, great plains, and the south: Cincinnati, St. Louis, San Antonio, Pittsburgh, and Cleveland are representative cities in this category. Thirty-eight percent of our PH sample lives in inexpensive markets.

Exhibit 3 shows county-level housing value distributions, for all counties and then by PTI category. On average, the median value of owned homes across all counties was \$175,200 in 2013.¹⁵ Homes at the 25th percentile of the distribution across counties were valued at \$111,000, on average. As expected, if we look only at counties with PTI ratios of 5 or above (the expensive metros), the mean value of homes at the median of the distribution is \$400,000 and the 25th percentile value is \$280,000. This declines to \$199,800 and \$125,000, respectively, in the middle market counties, and to \$125,000 and \$80,000 in the inexpensive counties, those with the lowest PTI ratios.

¹⁴ Our “renters” category also includes independent households who neither rent nor own their unit, whereas non-households currently live in a household headed by someone else.

¹⁵ By comparison, the National Association of Realtors® (NAR) median sales price of existing homes in 2013 was \$197,100 in 2013 dollars (NAR, Existing Home Sales via Moody's Analytics, 2014). This statistic is based on transaction closings from Multiple Listing Services (MLS) and thus excludes transactions not reported by MLS.

Exhibit 3

Mean Value Across Counties at Given Percentile

	50th Percentile	25th Percentile
All Counties	\$175,200	\$111,000
Counties with PTI < 3	\$125,000	\$80,000
Counties with PTI > 3, < 5	\$199,800	\$125,000
Counties with PTI ≥ 5	\$400,000	\$280,000

PTI = Housing Price-to-Income Ratio.

Note: These results were disclosed by the US Census Bureau's Disclosure Review Board, authorization number CBDRB-FY19-396.

Source: 2013 ACS

Can potential homeowners afford to buy a home? We find that 9 percent of PHs could afford to buy the median-value home in their county of residence without assistance given their income and assets as of December 2013. Meanwhile, 14 percent of PHs could afford to buy a home at the 25th percentile of value in their county. Our analysis of affordability identifies four barriers to affording a home, shown in exhibit 4. Eighty-three percent of PHs were unable to afford the median-value home because they had insufficient assets for a 3.5 percent downpayment. Assets were a limiting factor even at the lower end of the housing market: 79 percent of PHs had insufficient assets for a 3.5 percent downpayment on a home at the 25th percentile of the distribution in their county. Cash flow was also an affordability constraint among PHs. Three-quarters of PHs (76 percent) had insufficient monthly income to afford monthly mortgage payments on the median-value home in their county, assuming they could dedicate no more than 31 percent of their monthly income to the mortgage. Considering a home priced at the 25th percentile of the county's distribution, the monthly mortgage payment would require more than 31 percent of monthly income for 60 percent of PHs. Non-housing debt also presented a substantial obstacle. For 70 percent of PHs, the combination of maximum permissible mortgage payments plus monthly payments owed on any non-housing debt exceeded the maximum back-end ratio of 43 percent if they were to purchase median-value homes in their area. Considering mortgage payments required for a home at the 25th percentile of value, the share is somewhat lower, but still more than one-half (54 percent) of PHs have prohibitively high amounts of non-housing debt. For almost all PHs in our sample, monthly mortgage payments would consume the full 31 percent of their current income, leaving 12 percent of income available for debt payments (per the back-end ratio of 43 percent): approximately 16 percent of PHs are limited by having debt service payments that require more than 12 percent of their monthly income.

In addition to identifying the four barriers to affordability PHs faced, exhibit 4 shows the number of affordability barriers PHs would have to overcome to afford a home. Nine percent of PHs faced no affordability barriers; they could afford the median-value home. At the lower end of the housing value distribution, 14 percent of PHs could afford a home with no assistance. At the other extreme, 12 percent of PHs faced all four barriers: insufficient assets for a downpayment on the median-priced home, insufficient income for mortgage payments assuming 31 percent of income for the mortgage and 43 percent of income for mortgage and non-housing debt combined, and non-housing debt service obligations of over 12 percent of monthly income. Just over one-half of PHs faced three barriers to affording the median-value home, compared with 40 percent of PHs with three barriers to affording a home at the 25th percentile of the housing value distribution.

Exhibit 4

Affordability Barriers

% Limited by	Full Sample		Renters	Non-Households
	50th Percentile	25th Percentile	50th Percentile	50th Percentile
Downpayment	83%	79%	82%	87%
Front End 31%	76%	60%	73%	84%
Back End 43%	70%	54%	67%	78%
Debt Service > 12%	16%	16%	17%	15%
Number of Barriers				
0	9%	14%	10%	6%
1	14%	23%	15%	11%
2	13%	13%	13%	12%
3	52%	40%	49%	59%
4	12%	10%	12%	13%
Total Number PHs	51,190,000	51,190,000	38,900,000	12,280,000

PH = Potential Homeowning Units.

Note: These results were disclosed by the US Census Bureau's Disclosure Review Board, authorization number CBDRB-FY19-396.

Source: Wave 1 of the 2014 panel of the SIPP and 2013 ACS

Among those PHs limited by high non-housing debt, student debt contributes the most substantial barrier of any debt type (exhibit 5). For almost one-half (47 percent) of PHs with non-housing debt, student debt represents most of their total amount of debt. By contrast, credit card debt represents the majority share of non-housing debt for 29 percent of PHs, and vehicle debt is the predominant type of debt for 21 percent of PHs. The upshot is that student debt represents by far the largest contributor to non-housing debt for the PHs in our sample, with credit card debt coming in a distant second, and vehicle debt third.

Exhibit 5

Share of PHs with Greater than 12 Percent Non-Housing Debt Whose Outstanding Balance is Majority Education, Credit Card, or Vehicle Debt

Share of Total Debt	Type of Debt			
	Education	Credit Card	Vehicle	No Predominant Type
Less than One-Half	53%	71%	79%	98%
More than One-Half	47%	29%	21%	2%
Total	8,297,000	8,297,000	8,297,000	8,297,000

PH = Potential Homeowning Units.

Note: Total is PHs with nonhousing debt service payments that require more than 12 percent of their monthly income. These results were disclosed by the US Census Bureau's Disclosure Review Board, authorization number CBDRB-FY19-396.

Source: Wave 1 of the 2014 panel of the SIPP

In exhibit 6 we present the share of PHs who can afford a home at the 50th and 25th percentiles of the housing value distribution. This table includes PHs in all counties across the nation. The first

row shows the share of PHs who can afford a home outright—this is the same share that has zero affordability barriers in exhibit 4. The second row reports the share of PHs who we determine will be unable to afford a home even with assistance. This means that these PHs either have negative or zero income or they have insufficient assets to pay down non-housing debt to 12 percent of monthly income (or, for higher-income PHs for whom estimated monthly mortgage payments would consume less than 31 percent of income, to 43 percent of income minus the share of income required for monthly mortgage payments). Just under one-quarter of PHs (24 percent) cannot afford homes at the 50th percentile of the housing value distribution even with assistance. For low-cost homes at the 25th percentile, the share is similar, at 22 percent. A relatively larger proportion of non-household PHs have insurmountable barriers than do renter PHs: almost one-third (30 percent) of non-household PHs are unable to purchase a median-cost home even with assistance, compared with 22 percent of renter PHs.

Exhibit 6

Assistance Needed to Afford Criterion Home

	Full Sample		Renters	Non-Households
	50th Percentile	25th Percentile	50th Percentile	50th Percentile
Can Afford	9%	14%	10%	6%
Unable to Purchase	24%	22%	22%	30%
Assistance Needed				
Less than \$3,500	11%	26%	11%	9%
\$3,500–\$7,000	15%	10%	15%	13%
\$7,001–\$10,500	4%	3%	4%	4%
\$10,501–\$25,000	7%	4%	7%	9%
\$25,001–\$50,000	4%	4%	5%	4%
\$50,001–\$75,000	4%	4%	5%	4%
\$75,001–\$100,000	4%	3%	4%	4%
\$100,001–\$150,000	6%	3%	6%	6%
\$150,001–\$200,000	4%	2%	3%	4%
\$200,001–\$250,000	2%	2%	2%	2%
More than \$250,000	5%	2%	5%	5%
Total	51,190,000	51,190,000	38,900,000	12,280,000

Note: Potential housing units (PHs) that are “Unable to Purchase” have either (1) high non-housing debt, even after paying down debt with any available assets, or (2) zero or negative income. For most PHs, for whom estimated mortgage payments will consume 31 percent of income (the maximum permissible amount under Federal Housing Administration [FHA] front-end ratio), “high debt” means their monthly non-housing debt service payments exceed 12 percent of income. These results were disclosed by the US Census Bureau’s Disclosure Review Board, authorization number CBDRB-FY19-396.

Source: Wave 1 of the 2014 panel of the SIPP and 2013 ACS

The rest of exhibit 6 shows the share of PHs who could afford the criterion home given specific levels of housing assistance. We present 11 categories of assistance. The level of assistance required by each PH is calculated as the sum of two discrete amounts: (1) the difference between the estimated downpayment on the criterion home in the county of residence for the PH and any

remaining assets the PH holds after paying down non-housing debt to a manageable level; and (2) the difference between the mortgage amount for the criterion home after downpayment (99.5 percent of value assuming closing costs of 3 percent are financed and downpayment of 3.5 percent) and the mortgage amount supported by 31 percent of the PH's monthly income. PHs who face income constraints, asset constraints, or both may appear in any category; their level of support represents the sum of income and asset assistance needed.

To provide an intuitive point of reference for the assistance amounts presented, we set the upper bounds of the first three categories to reflect downpayment amounts required for homes at three price points: \$100,000 (requiring a downpayment of \$3,500), \$200,000 (requiring a downpayment of \$7,000), and \$300,000 (requiring a downpayment of \$10,500). We then specify eight additional categories of housing assistance of greater amounts. PHs that fall into these high-assistance categories may be well-suited for nonprofit or private sector shared equity programs, which generally provide subsidies over \$25,000 to each homebuyer household (Theodos et al., 2017), whereas PHs that fall into the low-assistance categories may be better suited to traditional downpayment assistance programs that provide grants or loans for these more modest amounts of assistance.

To afford the median-value home, 30 percent of all PHs need less than \$10,500 in assistance (including only those PHs that are eligible for and in need of assistance and excluding PHs who can afford to buy without assistance or who are unable to purchase, 45 percent of PHs need less than \$10,500). This share represents approximately 15.2 million PHs. Another 7 percent would need assistance of between \$10,500 and \$25,000 (11 percent among only those eligible for and in need of assistance), which is a significant amount of financial support but below what most shared equity programs provide. Meanwhile, 17 percent of PHs (25 percent of those eligible for and in need of assistance) would need a very substantial amount of assistance, requiring over \$100,000 in assistance to afford the median-value home. Finally, 12 percent, representing 6.6 million PHs, would need between \$25,000 and \$100,000 in assistance, corresponding to typical amounts for existing shared equity programs—our primary interest in this paper.¹⁶

As shown in the second column of exhibit 6, smaller amounts of assistance suffice as the criterion home value moves lower in the distribution.¹⁷ For example, a home at the 25th percentile of the distribution would be affordable outright to 14 percent of PHs, up from 9 percent for the median-value home. And 40 percent of PHs (63 percent among those eligible for assistance), or 20.4 million PHs, could afford a criterion home at the 25th percentile of the distribution with up to \$10,500 in assistance—an increase of 34 percent compared with the median-value home.

The results presented in exhibits 2, 3, 4, and 6 are based on analyses of the full sample of PHs. Next, we disaggregate the results by race or ethnicity, income, and geography to emphasize how different groups and PHs living in different areas face different constraints to affording

¹⁶ Please see appendix exhibits C and D for results based on home values from the 2016 ACS. We conduct this sensitivity analysis in recognition that home prices were unusually low in 2013 after the Great Recession. The results with 2016 home values differ very little from the results based on 2013 values.

¹⁷ Results are very similar if we use county housing values reported by recent owners, as a proxy for homes that recently transacted, rather than all owners.

homeownership. Exhibit 7 replicates part of exhibit 4, presenting barriers to affordability within race and ethnicity groups. A higher share of African-American and Hispanic PHs has insufficient assets for a downpayment of 3.5 percent on the median-value home (92 percent each) compared with Asian and White PHs, but even so, the vast majority of Asian and White PHs (73 percent and 77 percent, respectively) also do not have enough money for the downpayment. Racial and ethnic disparities exist in income as well, with the highest relative share of Hispanic PHs having insufficient income for monthly mortgage payments (86 percent), followed by African-American PHs (81 percent) and Asian PHs (78 percent). White PHs have the lowest share with insufficient income, but even their share is well over a majority, at 71 percent.

Exhibit 7

Affordability Barriers, by Racial/Ethnic Group

	White			African-American			Asian			Hispanic		
	50th Percentile	25th Percentile	50th Percentile	50th Percentile	25th Percentile	50th Percentile	50th Percentile	25th Percentile	50th Percentile	50th Percentile	25th Percentile	
Downpayment	77%	73%	92%	90%	67%	73%	67%	67%	92%	89%		
Front End 31%	71%	54%	81%	66%	67%	78%	67%	86%	71%	71%		
Back End 43%	64%	50%	75%	59%	61%	71%	61%	80%	63%	63%		
Debt Service <12%	17%	17%	17%	17%	11%	11%	11%	14%	14%	14%		

*Note: These results were disclosed by the US Census Bureau's Disclosure Review Board, authorization number CBDRB-FY19-396.
Source: Wave 1 of the 2014 panel of the SIPP and 2013 ACS*

Racial and ethnic disparities in affordability are also apparent from exhibit 8, showing the share of each group that (1) could afford to purchase outright, (2) is unable to purchase due to insurmountable barriers, and (3) could afford the criterion home given certain levels of assistance. In 2013, far higher shares of Asian and White PHs could afford to purchase the median-value home in their county without assistance compared with African-American and Hispanic PHs. Indeed, 14 percent of Asian PHs could afford to buy without assistance, as well as 12 percent of White PHs, compared with just 4 percent of African-American PHs and 3 percent of Hispanic PHs.

Exhibit 8 shows that there is little disparity among all four race and ethnicity groups in terms of the share that are unable to purchase the median-value home even with assistance. We see more of a disparity in terms of the amount of assistance necessary for PHs to afford the median-value home, with higher shares of African-American and of White PHs in need of just a small amount of assistance (under \$10,500) compared with Asian and Hispanic PHs. On the flip side, we see relatively larger shares of Asian and Hispanic PHs in the high-assistance categories (\$100,000 and over) compared with African-American and White PHs. African-American and Hispanic PHs are the largest potential beneficiaries of shared equity models of homeownership, which we proxy with the \$25,000–\$100,000 assistance categories: 15 percent of African-American PHs need assistance in the \$25,000–\$100,000 range, as well as 14 percent of Hispanic PHs, 12 percent of White PHs, and 6 percent of Asian PHs. The pattern is similar but somewhat less pronounced when considering a criterion home at the 25th percentile of the county housing value distribution. The shares of PHs that fall into the categories of assistance between \$25,000 and \$100,000 do not vary much by race and ethnicity, with 7 to 12 percent of all groups falling in this range. A larger share of Asians (18 percent) and Hispanics (15 percent), however, would require \$100,000 or more in assistance compared with African-Americans and Whites (each 7 percent), putting these PHs out of the likely range of many shared equity programs. Meanwhile, a small amount of assistance (under \$10,500) could bring homeownership of low-cost homes within reach for nearly one-half (45 percent) of African-American PHs, as well as 40 percent of Whites, 39 percent of Hispanics, and 26 percent of Asians.

Exhibit 8

Assistance Needed to Afford Criterion Home, by Racial and Ethnic Group

	White			African-American			Asian			Hispanic		
	50th Percentile	25th Percentile	50th Percentile	25th Percentile	50th Percentile	25th Percentile	50th Percentile	25th Percentile	50th Percentile	25th Percentile	50th Percentile	25th Percentile
Can Afford	12%	18%	4%	6%	14%	20%	3%	6%	22%	23%	3%	6%
Unable to Purchase	24%	21%	27%	26%	22%	22%	23%	22%	22%	23%	23%	22%
Assistance Needed												
Less than \$3,500	13%	28%	9%	30%	7%	14%	7%	22%	7%	7%	7%	22%
\$3,500–\$7,000	14%	9%	18%	11%	9%	6%	13%	9%	9%	13%	13%	12%
\$7,001–\$10,500	4%	3%	4%	4%	4%	6%	5%	4%	4%	5%	5%	5%
\$10,501–\$25,000	5%	4%	7%	5%	15%	7%	12%	7%	15%	12%	12%	5%
\$25,001–\$50,000	4%	4%	5%	4%	3%	1%	5%	3%	3%	5%	5%	4%
\$50,001–\$100,000	8%	6%	10%	8%	3%	6%	9%	3%	3%	9%	9%	8%
\$100,001–\$150,000	6%	3%	7%	3%	4%	4%	6%	4%	4%	6%	6%	5%
\$150,001–\$250,000	5%	3%	4%	3%	7%	7%	7%	7%	7%	7%	7%	6%
More than \$250,000	3%	1%	5%	1%	13%	7%	9%	1%	13%	9%	9%	4%

Note: These results were disclosed by the US Census Bureau's Disclosure Review Board, authorization number CDBRB-FY19-396. Source: Wave 1 of the 2014 panel of the SIPP and 2013 ACS

Exhibit 9 disaggregates the results from the full sample based on PH annual income. A very small share, just 1 percent, of PHs with income under \$25,000 could afford the median-value home, with 37 percent deemed unable to afford a home even with assistance (around one-third of whom are barred from receiving assistance due to zero or negative income). These shares are nearly reversed among PHs with income above \$75,000, with 39 percent able to purchase outright and only 4 percent unable to purchase even with assistance. PHs in the two middle income categories have much greater potential need for assistance, with 79 percent of those earning \$25,000–\$45,000 potentially benefiting from assistance as well as 71 percent of those earning \$45,000–\$75,000. In keeping with this, homeownership assistance of between \$25,000 and \$100,000, such as that provided by shared equity programs, would help the biggest shares of PHs in the first and second income quintiles to afford a median-value home. Approximately 5 million PHs in these two lower-income categories could afford the median-value home in their county with between \$25,000 and \$100,000 in assistance. An even larger number of lower income PHs in the first two income quintiles—some 9.1 million—could afford to buy the median-value home in their county with assistance of less than \$10,500.

Exhibit 9

Assistance Needed to Afford Criterion Home, by Income Level

	Less Than \$25,000	\$25,001- \$45,000	\$45,001- \$75,000	More Than \$75,000
	50th Percentile	50th Percentile	50th Percentile	50th Percentile
Can Afford	1	6	18	39
Unable to Purchase	37	15	10	4
Assistance Needed				
Less than \$25,000	30	40	49	48
\$25,000-\$100,000	16	16	5	3
\$100,001-\$250,000	15	10	9	4
More than \$250,000	2	13	8	3
Total	25,700,000	11,760,000	7,997,000	5,731,000

Note: These results were disclosed by the US Census Bureau's Disclosure Review Board, authorization number CBDRB-FY19-396.

Source: Wave 1 of the 2014 panel of the SIPP and 2013 ACS

Geography also plays an important role in determining homeownership affordability. As described above, we categorize counties into three groups based on the housing price-to-income ratio: expensive, middle market, and inexpensive. Exhibit 10 presents the affordability gaps by county price category. In the expensive markets (counties), just 8 percent of PHs could afford the median-value home with housing assistance under \$10,500, and fully one-third of PHs would need over \$100,000 of assistance to afford this criterion home. In the middle market counties, assistance needs are far lower: nearly one-third of PHs (6.6 million) require less than \$10,500 in assistance to afford the median-value home, whereas 20 percent (4.2 million) would need at least \$100,000. Even in the inexpensive markets, nearly 6 percent of PHs need over \$100,000 in assistance to afford the median-value home, but at the same time, 39 percent could buy with less than \$10,500 in assistance. In terms of the share of PHs that would need assistance in the \$25,000–\$100,000 shared equity range, the shares are quite low in the expensive markets (5 percent), but substantially higher in the middle (12 percent) and inexpensive markets (17 percent).

Exhibit 10

Assistance Needed to Afford Criterion Home, by County Price-to-Income Ratio

	Price-to-Income Ratio Above 5		Price-to-Income Ratio Between 3 and 5		Price-to-Income Ratio Below 3	
	50th Percentile	25th Percentile	50th Percentile	25th Percentile	50th Percentile	25th Percentile
Can Afford	6%	10%	9%	13%	11%	16%
Unable to Purchase	24%	24%	25%	23%	23%	21%
Assistance Needed						
Less than \$3,500	4%	5%	6%	20%	19%	44%
\$3,500-\$7,000	1%	5%	17%	17%	19%	4%
\$7,001-\$10,500	3%	12%	7%	2%	1%	1%
\$10,501-\$25,000	23%	9%	4%	3%	3%	4%
\$25,001-\$50,000	3%	2%	4%	4%	6%	5%
\$50,001-\$75,000	1%	3%	4%	5%	6%	4%
\$75,001-\$100,000	1%	2%	4%	4%	5%	1%
\$100,001-\$150,000	3%	5%	9%	5%	5%	
\$150,001-\$200,000	4%	7%	6%	2%		
\$200,001-\$250,000	4%	6%	3%	1%		
More than \$250,000	23%	10%	2%	0%		
More than \$150,000					1%	
More than \$100,000						1%
Total	9,786,000	9,786,000	21,720,000	21,710,000	19,680,000	19,690,000

Notes: Blank cells have insufficient sample size for us to report, so we collapse those rows into the "More than \$150,000" and "More than \$100,000" aggregate assistance categories at the bottom of the table. These results were disclosed by the US Census Bureau's Disclosure Review Board, authorization number C8DRB-FY19-396.
 Source: Wave 1 of the 2014 panel of the SIPP and 2013 ACS

A further focus on specific income levels within expensive, middle market, and inexpensive counties suggests that the biggest share of PHs who could be helped by between \$25,000 and \$100,000 of housing assistance is in the second income quintile and middle market counties (exhibit 11). We focus on the second and third income quintiles as our target group for shared equity assistance for two reasons: first, although a large share of PHs in the lowest income quintile are eligible for and in need of assistance, they may be less likely to be homeowner ready due to weaker credit histories and a lack of ability to save even modest amounts toward home purchase; and second, shared equity programs tend to target households with incomes of approximately \$44,000 (Theodos et al., 2017). Roughly one-quarter (26 percent) of PHs with income between \$25,000 and \$45,000 in middle market counties (1.3 million PHs) and 8 percent of PHs in these areas with income between \$45,000 and \$75,000 (280,000 PHs) could afford the median-value home with between \$25,000 and \$100,000 of assistance. Almost one-third (30 percent) of PHs in the second income quintile and over one-half (55 percent) of those in the third income quintile in middle market counties (3.4 million total) could buy with less than \$25,000 of housing assistance, whereas 1.4 million would need over \$100,000 to afford the median-value home. The majority of PHs in these income categories living in expensive counties (72 percent in each group) would need over \$100,000 in assistance to afford the median-value home, and 64 percent and 65 percent of PHs in these income categories in inexpensive counties could afford the median-value home with less than \$25,000 in assistance.

In sum, our aggregate statistics show that a large share of PHs cannot afford to purchase in their home counties because they have insufficient assets to afford a 3.5 percent downpayment and do not have high enough incomes to support monthly mortgage payments for the criterion home. Analysis of the full sample shows that nearly 6.6 million PHs could afford to buy the median-value home in their county with between \$25,000 and \$100,000 in assistance, the range we think is most suitable to shared equity models based on past research. An additional 8 million PHs could afford to buy with more than \$100,000 of assistance, a level of assistance some shared equity programs reach, private sector options in particular. There are, however, 15.2 million PHs that would be brought within reach of homeownership with just \$10,500 or less in assistance. For low-cost homes at the 25th percentile of the distribution, the numbers are comparably large, even though more PHs can afford homes at that price point without assistance. Some 5.5 million PHs could afford to buy a low-cost home in their area through a shared equity program or similar form of assistance that provides \$25,000–\$100,000 of assistance, and fully 20.5 million PHs could buy a low-cost home in their area with small amounts of assistance totaling just \$10,500 or less.

Our results also demonstrate that there are disparities amongst racial and ethnic groups in terms of barriers to affordability and the amount of assistance that would be necessary for PHs to afford the criterion home. We take advantage of the large national sample of SIPP to look at affordability and assistance necessary to achieve homeownership within different income groups and in counties with different types of housing markets, providing estimates for how many PHs could afford homeownership in different scenarios. In the next section, we discuss where and in what situations a shared equity approach to homeownership assistance could be particularly valuable in terms of helping PHs become homeowners, and where smaller forms of assistance might be sufficient to close existing gaps in access to homeownership.

Exhibit 11

Assistance Needed to Afford Criterion Home, by County Price-to-Income Ratio

	50th Percentile: 2nd Income Quintile \$25,000–\$45,000		
	PTI Ratio		
	PTI Ratio Above 5	Between 3 and 5	PTI Ratio Below 3
Can Afford	1%	4%	11%
Unable to Purchase	12%	18%	14%
Assistance Needed			
Less than \$25,000	11%	30%	64%
\$25,000–\$100,000	3%	26%	10%
\$100,001–\$250,000	8%	19%	1%
More than \$250,000	64%	4%	
More than \$150,000			1%
Total	2,030,000	5,098,000	4,631,000
	50th Percentile: 3rd Income Quintile \$45,001–\$75,000		
	PTI Ratio		
	PTI Ratio Above 5	Between 3 and 5	PTI Ratio Below 3
Can Afford	2%	17%	28%
Unable to Purchase	14%	13%	6%
Assistance Needed			
Less than \$25,000	5%	55%	65%
\$25,000–\$100,000	8%	8%	
\$100,001–\$250,000	36%	6%	
More than \$250,000	36%	2%	
More than \$7,000			2%
Total	1,584,000	3,472,000	2,940,000

PTI = Price-to-Income.

Notes: Blank cells have insufficient sample size for us to report, so we collapse those rows into the "More than \$7,000" and "More than \$150,000" aggregate assistance categories at the bottom of the panels. These results were disclosed by the US Census Bureau's Disclosure Review Board, authorization number CBDRB-FY19-396.

Source: Wave 1 of the 2014 panel of the SIPP and 2013 ACS

Discussion and Conclusion

Our goal in this paper is to estimate the number of PHs that could benefit from homeownership assistance programs with a primary focus on those that could be assisted by shared equity approaches to homeownership. Our review of the literature on shared equity and other homeownership assistance programs suggests that the amount of assistance typically provided by shared equity programs falls within the range of \$25,000 to \$100,000, although larger amounts are also not uncommon. In interpreting our results, we focus on the number and share of PHs who would benefit from this level of assistance. Still, many PHs could afford homeownership in their home counties with less than \$25,000 in assistance; other types of homeownership assistance may be more appropriate than shared equity for these PHs given the cost of administering shared equity programs and consumers' preference for traditional homeownership when it is financially feasible to afford a home without large amounts of financial support.

Overall, we find that 9 percent of PHs could afford to buy the median-value home and 14 percent could afford the 25th percentile home in their county of residence given income and assets as of December 2013. This estimate is higher than found by Wilson and Callis (2013) using the 2009 SIPP data in which 7 percent of renters could afford to buy the 25th percentile-priced home. There are several reasons for the differences in these estimates. Perhaps most important is the difference in market conditions between the time periods studied, with 2013 representing a relatively affordable period due to declines in both house prices and interest rates relative to 2009. In addition, we estimate affordability for approximately 14,000 PHs in the SIPP sample, representing approximately 51.2 million PHs. The PHs in our sample include individuals and families living with other households, in addition to renter households and individuals living independently; this explains why our sample represents a higher number of PHs than it would if we considered only renting families and individuals. Finally, we use county-level housing value estimates from 2013 to assess affordability rather than national or regional values to provide a more precise estimate of housing affordability. It is important to note that the results presented in this paper may not be representative of what PHs would face in the housing market today. The 2013 housing values are close to the bottom of the trend in housing prices following the Great Recession and so do not incorporate the rapid appreciation experienced in many areas of the country in recent years.¹⁸

How many PHs could potentially benefit from shared equity and what are their characteristics? Approximately 12 percent of PHs could afford the median-value home in their county with between \$25,000 and \$100,000 of housing assistance. Twelve percent may appear to be a small share, but it represents nearly 6.6 million PHs nationally. There are currently approximately 250,000 shared equity homes across the country (Thaden, 2018). Our estimate that nearly 6.6 million PHs could potentially become homeowners through shared equity suggests that there may be substantial unmet demand for this type of homeownership program. Even assuming one-half of the PHs in this category were not interested in shared equity or not prepared to buy a home leaves enough demand for more than a tenfold increase in the number of shared equity units across the country. Furthermore, if even greater levels of subsidy were available through nonprofit shared equity or private sector shared appreciation programs, an additional 8.6 million households could purchase with assistance of \$100,000 or more.

Focusing on affordability gaps by racial/ethnic group shows that between 13 percent and 15 percent each of White, African-American, and Hispanic PHs would require between \$25,000 and \$100,000 of assistance to afford the median-value home in their area, compared with 6 percent of Asians. These shares represent approximately 3.4 million White PHs, 1.4 million African-American PHs, 1.4 million Hispanic PHs, and 160,000 Asian PHs that would be the target audience for shared equity programs. The 2013 homeownership rate among African-Americans was 43.8 percent. If all 1.4 million African-American PHs became homeowners in 2013, the homeownership rate among African-Americans would have been 10 percentage points higher, at 53.6 percent. Even if just 10 percent of these African-American PHs (140,000) transitioned to homeownership as a result of housing assistance, the homeownership rate among African-Americans would have been

¹⁸ To account for this, we show results from two sensitivity analyses in the appendix (exhibits C and D) that substitute 2016 ACS home values for the 2013 values we use throughout this analysis. Using the 2016 home values brings our estimate of the number of PHs that can afford to buy the median-value home in their county down to 8 percent, closer to the estimates offered by Wilson and Callis (2013).

1 percent higher. Among Hispanics, the 2013 homeownership rate would have been 55.5 percent compared with 46.1 percent, assuming all 1.4 million PHs transitioned to homeownership. The disparity between the White and African-American homeownership rate and White and Hispanic homeownership rate would have been 5 percentage points smaller if all African-American and Hispanic PHs transitioned to homeownership. Relatively larger shares of African-American and White PHs would be able to access homeownership with small amounts of assistance (under \$10,500) compared with Asians and Hispanics. As a group, however, African-Americans and Hispanics would be the greatest beneficiaries of a shared equity type of program that provided \$25,000–\$100,000 in assistance.

Another goal for shared equity programs is to increase homeownership among low- and moderate-income households to extend the wealth accumulation and residential stability benefits of homeownership to households lower in the income distribution. Our results by income category suggest that higher shares of PHs with income in the first three quintiles of the national income distribution—below \$75,000 in 2013—would benefit from assistance between \$25,000 and \$100,000 compared with PHs with income above \$75,000. Over 4 million PHs in the first income quintile, 1.8 million in the second, and 400,000 in the third fall into the range of assistance appropriate for shared equity. Our sample is disproportionately low income, with 50 percent of the sample in the lowest income quintile and 23 percent in the second income quintile. It is not surprising, therefore, that the distribution of PHs who could be assisted by \$25,000 to \$100,000 is also skewed toward the lowest income. It is notable, however, that few participants in existing shared equity programs have incomes below \$25,000. This likely reflects a range of factors, including poor credit histories, limited ability to save even modest amounts toward home purchase, and perhaps unstable income that may make homeownership riskier. While this income group represents many PHs, those with higher incomes may be a more appropriate target for shared equity programs.

One of the strengths of our analysis and of the restricted use SIPP data that we use is our ability to identify the county in which each PH lives. With this information we estimate affordability specific to the housing market in which each PH would likely become a homeowner. The most potential demand for shared equity programs appears to be in middle market and inexpensive counties: nearly 2.7 million PHs in middle market counties and 3.3 million PHs in inexpensive counties need between \$25,000 and \$100,000 in assistance to afford the median-value home. By comparison, only 440,000 PHs in the expensive counties could buy the median-value home with between \$25,000 and \$100,000 in assistance. Approximately 3.2 million PHs in these expensive counties would need over \$100,000 to afford the median-value home. Shared equity or shared appreciation models providing over \$100,000 in assistance would be particularly useful if targeted to these high-cost areas.

In addition to the level of house prices, the likely rate of future appreciation in the market is an important factor to consider in targeting areas where shared equity programs may be most effective. High rates of house price appreciation may make it difficult for these programs to maintain affordability over time unless they capture a relatively high share of appreciation, which will limit the returns realized by participating homeowners. On the other hand, areas where home

price appreciation is weak will offer only limited financial returns to owners. Indeed, prospective homeowners expressed hesitation about shared equity programs given their concern about limited equity appreciation in areas with low housing price growth (Thaden, Greer, and Saegert, 2013). For these reasons, middle-priced markets may hold the most promise for shared equity programs.

Summarizing these results highlights the fact that many PHs could benefit from shared equity. These estimates demonstrate that approximately 6.6 million PHs could become homeowners with a level of assistance consistent with a shared equity approach to homeownership. This does not mean, however, that all these PHs should become homeowners or that shared equity is the most appropriate strategy for those who are good candidates for homeownership. As we discuss at the beginning of this article, there are many challenges to shared equity programs. Some of the challenges relate to the supply of shared equity homes—in particular, the source of funding for subsidies on the order of \$25,000 to \$100,000 per unit, the administrative burden of keeping track and maintaining affordability of units receiving shared equity investment, and political barriers to shared equity (Lubell, 2014). Other challenges exist on the demand side. PHs may be reluctant to purchase within a shared equity program as they are hesitant to share appreciation and accept oversight by program administrators when traditional homeownership is within reach (Lubell, 2014; Saegert et al., 2015).

Another contribution of this analysis is the finding that many PHs—approximately 19 million—could afford the median-value home in their area with far less assistance: less than \$25,000 and in many cases less than \$10,500. These estimates suggest that shared equity programs are not necessarily the best approach to encouraging and supporting homeownership among all PHs. For the PHs with affordability gaps under \$10,500, it likely makes more sense for them to receive downpayment assistance in the form of a grant or forgivable loan rather than take part in a program that requires continuous administration and oversight by an organizational steward. Programs that encourage and subsidize savings may also be efficient and effective at providing this more modest amount of funding needed to purchase a home. For larger amounts of assistance up to \$25,000, a repayable loan that does not entail ongoing payments but still recaptures the subsidy for use with future homebuyers may be more efficient. We argue for shared equity as one option of many approaches to encouraging and supporting homeownership among non-owners; our results identify scenarios in which shared equity may make sense and other scenarios in which another option may be more efficient. It is important to acknowledge that shared equity programs inherently involve limits on the wealth building potential of homeownership that do not result from other programs that promote homeownership because any equity appreciation must be shared with the subsidizing organization or used to keep the subsidized unit affordable for the next purchaser. Previous research finds that shared equity programs reached low-income buyers, that the units involved stayed relatively affordable, and that buyers realized wealth gains (Temkin, Theodos, and Price, 2013). Homeowners who use downpayment assistance to facilitate a purchase, however, are typically not subject to the same restrictions on equity accrual and thus get to keep any additional equity they earn while owning their home. It would be particularly problematic to encourage homeownership among non-White PHs or other groups historically disadvantaged in terms of wealth accumulation solely through an approach that limits long-term gains.

We made several analytical choices to be as inclusive as possible in terms of the number of individuals and households we count as potential homeowner units. One of these, that we discussed previously, involves including individuals and couples who live in someone else's home as PHs. As a result, our analysis includes approximately 51 million PHs, a substantially larger number than the 42.4 million renter households in 2013. Another analytic decision that contributes to a larger sample size is our inclusion of PHs with negative, zero, and very low incomes. We categorize PHs with negative or zero income as unable to purchase the criterion home and many of the lowest income PHs in our sample end up in the unable to purchase category as well. It would be reasonable to set a higher income cut off, such as \$15,000, for the unable to purchase category, but that would exclude some low-income households with assets who could achieve homeownership with some assistance. We find that over 4 million PHs in the lowest income category—under \$25,000 per year—could afford homeownership with assistance between \$25,000 and \$100,000. As discussed above, however, there are likely other characteristics of these households that make them less promising candidates for homeownership. Any homeownership promotion program should consider a range of factors that contribute to homeownership readiness beyond the income, assets, and debt data available to incorporate here.

There are at least three additional limitations to this analysis that are worth highlighting. We use Wave 1 of the 2014 panel of the SIPP to estimate affordability because the SIPP survey includes detailed measures of income, assets, and debt for all adults in all households in a large nationally representative sample. In addition, we rely on internal user files with geographic identifiers for SIPP respondents, allowing a finer-grained comparison of PH finances to county-specific housing values. The SIPP data do, however, present a couple of disadvantages. One disadvantage is that the most recent data available were collected in 2013. We acknowledge that housing values in 2013 were, in general, much lower than housing values in 2019, and the national distribution and distribution of housing values in expensive, middle market, and inexpensive counties may seem surprisingly low to this audience. Ideally, we would have more recent survey data with up-to-date income, assets, and debt figures so we could run this analysis using more recent housing values, though our results based on 2016 housing values are not meaningfully different. A second disadvantage is the lack of information on expenditures in the SIPP. We had to make a series of assumptions about PH debt service payments so that we could determine how much income they could dedicate to a mortgage payment (see appendix exhibit B). Blanket assumptions about the term and interest rate of various types of loans introduce error into the estimates; with data on expenditures and debt service payments we could estimate more precisely PH income available for mortgage payments. A third limitation is the lack of information on PH credit history and history of homeownership in the SIPP. Qualitative work suggests that individuals with a history of mortgage delinquency or foreclosure may be particularly interested in the shared equity model of homeownership (Saegert et al., 2015; Thaden, Greer, and Saegert, 2013); estimating affordability among this group would be valuable in future research.

In conclusion, our results suggest that there are as many as 6.6 million potential homeowners that could achieve homeownership with the assistance of shared equity programs assuming that these programs are most suitable when assistance of between \$25,000 and \$100,000 is needed to make homeownership attainable. This estimate of the potential beneficiaries far exceeds the current

number of shared equity units in existence across the United States. We show that there may be much greater demand for shared equity than can be met by current programs. We report estimates demonstrating how many PHs would be helped into homeownership by different levels of housing assistance. We do not advocate for shared equity to be the only approach to homeownership assistance; instead we present evidence suggesting there may be substantial demand for shared equity as one type of program among many that are made available for individuals and households who face asset, income, and debt constraints to buying a home outright without any assistance.

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Appendix

Exhibit A

Key Terms

Term	Definition
Potential Homeowning Units (PHs)	<p><u>Includes</u> individuals and couples who are:</p> <ul style="list-style-type: none"> • Current household heads who rent • Current household heads who are “other” non-owners <p>OR</p> <ul style="list-style-type: none"> • Aged 25–65 • <u>Not</u> current householders (living in someone else’s home) • <u>Not</u> the spouse or unmarried partner of current householders <p><u>Excludes</u> individuals and couples who are:</p> <ul style="list-style-type: none"> • Non-households under age 25 or over age 65 • Current homeowners
Monthly Income	<p><u>Includes:</u></p> <ul style="list-style-type: none"> • Earned income • Other income (for example survivor benefits, disability benefits, child support, alimony) • Social insurance income <p><u>Excludes:</u></p> <ul style="list-style-type: none"> • Investment income • Property income
Assets	<p><u>Includes:</u></p> <ul style="list-style-type: none"> • Savings accounts • Checking accounts • Stocks and mutual funds • Bonds <p><u>Excludes:</u>¹⁹</p> <ul style="list-style-type: none"> • Rental properties • Other real estate • Other assets • Businesses • Retirement accounts • Education savings accounts
Debts	<p><u>Includes:</u></p> <ul style="list-style-type: none"> • Education debt (student loans) • Credit card debt • Vehicle debt <p><u>Excludes:</u>²⁰</p> <ul style="list-style-type: none"> • Rental property debt • Other real estate debt • Business debt • Other debt

¹⁹ These are less liquid forms of assets. Very few PHs have assets in these categories; among PHs who do, we assume they would be unlikely to tap these kinds of assets to help finance a home purchase.

²⁰ Very few PHs have debt in these auxiliary categories, so we exclude them for simplicity.

Exhibit B

Mortgage Payment & Debt Service Assumptions

Term	Definition	Data Source
Monthly Mortgage Payments	<u>Loan terms:</u> <ul style="list-style-type: none"> • 30-year fixed • 4.5 percent interest rate (US average in December 2013 for 30-year fixed-rate mortgage) 	Freddie Mac
	<u>Principal amount:</u> <ul style="list-style-type: none"> • 99.5 percent of area median home value (assuming closing costs and other fees total 3 percent of home value, and can be financed) 	2013 American Community Survey, 1-Year Data
	<u>Other included costs:</u> <ul style="list-style-type: none"> • State-specific property tax rates • Property insurance: 0.35 percent of property value • Mortgage insurance: 0.85 percent of property value 	Tax Foundation & FHA
Downpayments	3.5 percent of home value (minimum amount down for FHA loans)	FHA
Student Loan Payments	<u>Loan terms:</u> <ul style="list-style-type: none"> • 10-year loan term • 6 percent interest rate 	Board of Governors of the Federal Reserve System, 2019
	Vehicle Debt Payments	<u>Loan terms:</u> <ul style="list-style-type: none"> • 5-year loan term • 4.42 percent interest rate
Credit Card Debt Payments	Balance >\$2000: <ul style="list-style-type: none"> • Monthly payment = 5 percent of balance 	Board of Governors of the Federal Reserve System, 2019
	Balance <\$2000: <ul style="list-style-type: none"> • \$25 minimum monthly payment 	

The following exhibits (appendix exhibits C and D) recalculate the distribution of affordability barriers and the amount of assistance needed to afford the median-priced home in each PH's county with home values from the 2016 American Community Survey. We present these tables as a sensitivity analysis, acknowledging that in 2013 home values were at an unusually low point due to the Great Recession.

Exhibit C

Affordability Barriers, 2016 Home Values	
% Limited by	50th Percentile
Downpayment	84%
Front End 31%	80%
Back End 43%	75%
Debt Service > 12%	16%
Number of Barriers	
0	8%
1	12%
2	12%
3	56%
4	13%
Total Number PHs	51,190,000

Note: These results were disclosed by the US Census Bureau's Disclosure Review Board, authorization number CBDRB-FY19-396. Source: Wave 1 of the 2014 panel of the SIPP and 2016 ACS

Exhibit D

Assistance Needed to Afford Criterion Home, 2016 Home Values	
	50th Percentile
Can Afford	8%
Unable to Purchase	25%
Assistance Needed	
Less than \$3,500	8%
\$3,500-\$7,000	13%
\$7,001-\$10,500	6%
\$10,501-\$25,000	9%
\$25,001-\$50,000	4%
\$50,001-\$75,000	4%
\$75,001-\$100,000	4%
\$100,001-\$150,000	6%
\$150,001-\$200,000	4%
\$200,001-\$250,000	3%
More than \$250,000	7%
Total	51,190,000

Note: These results were disclosed by the US Census Bureau's Disclosure Review Board, authorization number CBDRB-FY19-396. Source: Wave 1 of the 2014 panel of the SIPP and 2016 ACS

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Building Wealth through Homeownership: A Comparative Study of MHP's ONE Mortgage Program and FHA

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Abstract

This article compares actual wealth building outcomes in the Massachusetts Housing Partnership's (MHP) subsidized ONE Mortgage Program to hypothetical outcomes for a borrower who received a comparable Federal Housing Administration (FHA) insured mortgage with the same loan amount. We find that ONE Mortgage loans had much lower monthly payments than the FHA loans, resulting in greater overall benefits to borrowers. Although ONE Mortgage loans delivered slightly lower levels of equity accumulation at time of sale, the net financial outcomes still overwhelmingly favored the ONE Mortgage loans. These findings are concerning given the large market share of FHA loans among low- and moderate-income (LMI) and minority homebuyers in Massachusetts. If these borrowers could have qualified for the ONE Mortgage program but instead received an FHA loan, our analysis suggests that they would have lost out on significant benefits. For the first time, this article quantifies the scale of that potential loss to Massachusetts's LMI first-time homebuyers.

Introduction

Home prices in Massachusetts have reached an all-time high (Federal Reserve Economic Data [FRED], 2019). Accordingly, homeownership has grown more elusive for low- and moderate-income (LMI) borrowers. These borrowers, often low on savings, are increasingly reliant on specialized high loan-to-value (LTV) mortgage products that allow them to buy a home with a smaller downpayment. Borrowers in Massachusetts have a large selection of options for high LTV mortgages, including products provided by the state's two Housing Finance Agencies (HFAs), Massachusetts Housing Partnership (MHPs) and MassHousing Finance Agency (MassHousing). These products offer special benefits that drastically reduce borrowers' mortgage costs. Despite the presence of these affordable alternatives, the largest proportion of LMI first-time homebuyers use Federal Housing Administration (FHA) loans (Campen, 2018).

FHA loans combine low downpayments with reasonably priced mortgage insurance, making them more accessible than many other high LTV loans (Fannie Mae, 2019). They have facilitated millions of home purchases by LMI and minority borrowers. Researchers have increasingly noted, however, that FHA loans are concentrated in LMI communities and among minority borrowers (Caplin, Cororaton, and Tracy, 2013; Immergluck, 2011). This concentration could carry significant risk, both for the FHA program overall and for individual borrowers (Lee and Tracy, 2018).

Lending in Massachusetts has mirrored the national trend, despite the presence of alternative mortgage options provided by state HFAs. Some worry that lenders in the state are too eager to offer their clients FHA loans, overselling the loans to borrowers who would be better off with an HFA product. Fortunately, Massachusetts is particularly well-suited to study the use of FHA loans because borrowers under 100 percent area median income (AMI) have many alternatives. In this article, we take the first step in addressing the use of specific mortgage products by examining two programs that have high degrees of targeting to the state's LMI homebuyers: (1) FHA-insured loans and (2) MHP's ONE Mortgage Program.

This analysis quantifies how ONE Mortgage loans and FHA loans differ in terms of overall household wealth creation. To do so, we use loan-level simulations to model the amount of wealth created by the ONE Mortgage and FHA loans and compare them on three dimensions: (1) equity accumulation realized at the time of property sale, (2) savings on monthly mortgage payments, and (3) a net financial outcome metric that considers the borrower's overall wealth building.

Our findings suggest that ONE Mortgage loans delivered borrowers a high degree of savings on monthly payments. This finding was consistent with our expectations, given the substantial impact of the ONE Mortgage's no-private mortgage insurance (PMI) benefit, discounted interest rate, and interest rate subsidy. Although the ONE Mortgages we examined had slightly lower equity accumulation at time of sale than FHA loans, every loan we simulated had a higher net financial outcome as a ONE Mortgage loan than it did as an FHA loan.

This research raises important questions about Massachusetts LMI borrowers' heavy reliance on FHA loans. We find that borrowers who would have qualified for an MHP loan but instead borrowed an FHA loan missed out on significant benefits. Our simulations place the average overall savings at \$19,544 in the ONE Mortgage when compared with an FHA loan. We estimate

that in 2017 alone, a maximum of about 1,500 FHA borrowers may have qualified for the ONE Mortgage, about 12.5 percent of all FHA borrowers in the state.

In addition to building our understanding of the potential risks of overreliance on FHA lending and evaluating the outcomes of the ONE Mortgage program, this research extends the literature regarding the effect of mortgage choice on household wealth. Our work also offers borrowers and public agencies a framework for comparing borrower outcomes across loan products, which holds promise to extend our analysis beyond Massachusetts.

History of LMI Lending in Massachusetts

Although the Civil Rights Act of 1968 and the Equal Credit Opportunity Act of 1974 both outlawed discriminatory practices in the mortgage market, *de facto* discrimination remained common. Prime lenders avoided lending in low-income communities and communities of color (Munnell et al., 1996), allowing these neighborhoods to become a captive market for subprime lending at high interest rates. Many of these subprime lenders viewed low-income and minority borrowers as less financially savvy and therefore targeted them with higher-cost, higher-spread mortgages (Massey et al., 2016).

In 1989, the Federal Reserve Bank of Boston released a study chronicling a pattern of racial bias in Boston's mortgage lending over a 5-year period from 1981–1985. The disparities in lending, the authors suggested, could not be explained by income, credit history, or other legitimate loan underwriting factors (Marantz, 1989). The Federal Reserve study laid bare systemic disparate treatment in the mortgage market and resulted in a massive public outcry. In the wake of that report, a task force was created comprised of homeownership practitioners from MHP, the Massachusetts Bankers Association, the Commonwealth of Massachusetts, the City of Boston, and the Massachusetts Affordable Housing Alliance. This group's mission was to form a strategy that would counter the pervasive influence of racial bias in the state's mortgage market.¹

The result of this effort was the introduction of two new affordable loan products: the SoftSecond Program (1991–2013) and then the ONE Mortgage Program (2014–present). These mortgage products were designed to address traditional barriers to homeownership and close the wealth gap by providing increased mortgage affordability to LMI and minority first-time homebuyers. The programs were housed within MHP, a quasi-public state housing finance agency founded in 1985 that works to increase the supply of affordable housing in Massachusetts. Since their introduction in 1991, more than 21,000 Massachusetts households have used one of these loans to purchase their first home. Two-thirds of ONE Mortgage loans in Boston and half of the loans statewide support purchases by households of color. The ONE Mortgage program accounts for about 1 percent of all home purchase loans to all borrowers in the State of Massachusetts and 4 percent of annual home purchase lending to LMI borrowers (Campen, 2018; Massachusetts Housing Partnership, 2016).

Meanwhile, national trends over the course of the 1990s and 2000s were characterized by the growth of mortgage lenders originating high-cost loans in the subprime market. The subprime

¹ For a full history of the ONE Mortgage and SoftSecond programs, see Ziegler, Schmiedl, and Callahan (2017).

lending industry continued to deliver inferior loans in LMI and minority communities. The subprime lenders that spent the most money advertising in LMI communities tended to have higher interest rates than other lenders (Gurun, Matvos, and Seru, 2016). Unsurprisingly, an analysis of lending in seven metropolitan areas found African-American and Hispanic borrowers to be 105 and 78 percent more likely to receive high cost mortgages, respectively (Bayer, Ferreira, and Ross, 2017). Lenders also extracted higher closing costs, resulting in African-American borrowers spending about \$700 more on closing costs than White borrowers (Woodward and Hall, 2010).

When the crisis arrived, the deepest distress fell on LMI and minority homeowners. Even in the years prior to the crisis, African-American households were 68.2 percent more likely than their White counterparts to transition back to renting at the conclusion of their homeownership experience (Sharp and Hall, 2014). The crisis magnified that effect. Foreclosure rates for African-American borrowers spiked to levels over three times that of White borrowers, while Hispanic homeowners saw foreclosure rates over four times greater than White households (Garriga, Ricketts, and Schlagenhauf, 2017).

Because credit had been so easily available in the two decades leading up to the crisis, FHA volumes were low. That changed rapidly, however, when the subprime mortgage crisis arrived in 2008 (Bhutta, Laufer, and Ringo, 2017). The collapse of the Mortgage Backed Securities (MBS) market meant that lenders looking to sell their originated loans on the secondary market became more dependent on selling loans to Fannie Mae and Freddie Mac. To do so, any loan with less than a 20-percent downpayment would need PMI. PMI companies, however, were raising their own underwriting standards. These insurers raised their minimum credit score requirements and lowered their maximum LTV limits, particularly in distressed areas (Avery et al., 2010). As the alternative products became less attractive, the share of FHA mortgages as a percentage of all first lien originations for owner-occupied home purchases increased from 5.7 percent in 2006 to 40.8 percent in 2009. As of 2016, 24.4 percent of all first lien originations for owner-occupied home purchases are FHA loans (Bhutta, Laufer, and Ringo, 2017).

Today, the worst subprime abuses of the crisis are over. Recent research on the mortgage market in Massachusetts suggests, however, that class and racial disparities may continue to impact the FHA loan market. FHA loans are most heavily marketed by non-depositories; licensed mortgage lenders are responsible for 77 percent of FHA loans originated in the state (Campen, 2018). In addition, African-American and Latino borrowers statewide are much more likely to receive FHA-insured loans than White borrowers; FHA-insured loans accounted for 35 percent of loans to African-American households in the greater Boston area, but only 7 percent of loans to White households. Meanwhile, only 2.4 percent of non-FHA home purchase loans were made to African-American borrowers. FHA lending accounts for 29 percent of LMI home purchase lending in the state, compared with about 4 percent for the MHP ONE Mortgage (Campen, 2018).

Affordable Loan Options in Massachusetts and Their Features

This analysis centers around three loan products: the SoftSecond Program; its successor, the ONE Mortgage Program; and FHA-insured 30-year fixed rate loans. The term sheet comparison in exhibit 1 summarizes the three programs.

Exhibit 1

Program Term Sheet Comparison (Single-Family/Condominium Guidelines Shown)

	MHP SoftSecond Loan Program	ONE Mortgage Program	FHA-Insured Loans (30-Year Fixed Rate)
<i>Applicable Borrowers</i>	Borrower must be first-time homebuyer (per FNMA definition) and primary resident	Borrower must be first-time homebuyer (per FNMA definition) and primary resident	Borrower must be primary resident
<i>Max Loan-to-Value</i>	97%	97%	96.5%
<i>Income Limits</i>	100% Area Median Income	100% Area Median Income	N/A
<i>Minimum Credit Score</i>	620	640	580 (credit scores below 580 are allowed for 90% Max loan-to-value loans)
<i>Maximum Underwriting Ratios (Housing Ratio/Debt to Income Ratio)</i>	38% / 43%	36% / 43%	40% / 50%
<i>Maximum Asset Limit</i>	\$75,000	\$75,000	N/A
<i>Mortgage Insurance</i>	None	None	Upfront and Monthly
<i>Loan Structure</i>	First Mortgage: up to 77% of purchase price Second Mortgage: 20% of purchase price; interest only for the first 10 years		Single loan
<i>Interest Rate Subsidy</i>	Subsidy applied years 1-9; repaid at time of refinance or sale	Subsidy applied years 1-7; repaid at time of refinance or sale	N/A
<i>Overall Public Funding</i>	\$12,000 (loan loss reserve + full value subsidy amount)	\$12,000 (loan loss reserve + full value subsidy amount)	N/A
<i>Education Requirements</i>	Prepurchase and Post-Purchase classes required	Prepurchase and Post-Purchase classes required	N/A

FNMA = Federal National Mortgage Association. N/A = information not available.
Source: HUD FHA Single Family Housing Policy Handbook

MHP's Subsidized Mortgage Programs

SoftSecond Loan Program (1991–2013)

The SoftSecond Loan Program was targeted at first-time homebuyers under 100-percent AMI. It offered a 30-year fixed interest rate with a minimum 3-percent downpayment. Although the loans could be offered up to 97-percent LTV, they were originated without mortgage insurance (MI). The loans avoided MI using a unique loan structure that combined public reserves with private financing. SoftSecond loans had a dual mortgage structure consisting of a 77-percent first mortgage and a 20-percent second mortgage, both offered by the participating lender. While the first loan was a conventional loan with a 30-year amortization schedule, the second loan was interest

only for the first 11 years. MHP covered lenders’ risk on the second mortgage by setting aside a percentage of the loan in a dedicated loan loss reserve fund. The average loan loss reserve (LLR) amount in the SoftSecond Program was \$1,979 per loan.

Participating lenders also provided affordability assistance by agreeing to offer these loans at a discounted interest rate without charging any points. The SoftSecond Program was offered to borrowers at a discounted interest rate, capped at the Freddie Mac weekly rate minus 30 basis points.

As a further benefit, eligible homebuyers below 80 percent AMI received a state-funded interest subsidy. The intent of the interest subsidy is to lower a borrower’s monthly payments early in the loan in order to transition first-time homebuyers into the higher costs and maintenance demands of their new home. In the SoftSecond Program, the subsidy was paid out over the course of the first 10 years of the loan. Borrowers repaid the subsidy when they sold their property or refinanced out of the program. We provide an example subsidy schedule in exhibit 2. The amount of public assistance per loan (loan loss reserve plus the full interest subsidy) was capped at \$12,000. The average full value subsidy amount (for loans receiving subsidy) was \$7,301. Over the course of the SoftSecond Program’s history, 7,033 borrowers received interest subsidy, which is about 40 percent of the 17,410 overall borrowers.

Exhibit 2

Sample SoftSecond Loan Program Subsidy Schedule

Purchase Price: \$350,000
 Downpayment: \$10,500 (3%)
 Mortgage Amount: \$339,500 (97%)
 Interest Rate: 4.00%
 Full Value Subsidy Amount: \$10,415

Year	1st Mortgage Payment (a)	2nd Mortgage Payment (b)	2nd Mortgage Subsidy Amount (c)	Total Payment (a + b + c)
1–5	\$1,286.63	\$233.33	-\$123.94	\$1,396.03
6	\$1,286.63	\$233.33	-\$99.15	\$1,420.82
7	\$1,286.63	\$233.33	-\$74.36	\$1,445.61
8	\$1,286.63	\$233.33	-\$49.82	\$1,470.15
9	\$1,286.63	\$233.33	-\$24.91	\$1,495.06
10	\$1,286.63	\$233.33	\$0.00	\$1,519.97
11–30	\$1,286.63	\$424.19 ^a	\$0.00	\$1,710.82

^a In year 11, the second mortgage payment increases as the loan transitions from interest only to fully amortizing.

Borrowers are able to receive subsidy forgiveness in certain hardship scenarios when they sell their property with a relatively small amount of price appreciation. In the first 5 years of their mortgage, they must repay the lesser of total subsidy received or the total amount of appreciation. After the first 5 years, they would repay the lesser of the total subsidy received or 20 percent of the total amount of appreciation.

ONE Mortgage Loan Program (2013–Present)

Until 2008, the SoftSecond Loan Program's interest-only 20-percent second mortgage was not controversial. It provided the benefit of lower monthly payments and eliminated the need for costly PMI. As the mortgage crisis unfolded nationwide and the amount of delinquencies and defaults increased, however, MHP decided to investigate alternative program models. Interest-only second mortgages had gained negative notoriety during the crisis as risky products that were created to help get people into homes without guarding against rising payments. It was important to not only find a way to maintain the low monthly payments of the SoftSecond Program, but also to increase the pace of equity building.

Thus, in 2013 MHP redesigned and rebranded the SoftSecond Loan Program as the ONE Mortgage Program. Many aspects of the ONE Mortgage were left unchanged from the earlier SoftSecond model. ONE Mortgages are a 30-year fixed rate mortgage with a minimum 3-percent downpayment. Like SoftSecond, ONE uses a publicly funded loan loss reserve to offer borrowers a no-PMI benefit and is offered to the borrower at the same 30-basis-point discount as the SoftSecond program. It adopted a new structure that incorporated a 97-percent fully amortizing first mortgage.

Other aspects of the program were altered to comply with post-crisis mortgage lending standards, however. The ONE Mortgage program abandoned the SoftSecond Program's two-mortgage structure in favor of a single 97-percent note. The ONE Mortgage Program also restructured the loan-loss reserve, accepting a higher share of potential losses. The average ONE Mortgage LLR since the program's inception has been \$2,364, a 19-percent increase over the average SoftSecond LLR. Because borrowers build their equity cushion faster with the one-mortgage structure, however, the likelihood of a loan-loss event is reduced. The ONE Mortgage subsidy also has a shorter subsidization schedule than the SoftSecond Program, lasting just 7 years compared with the SoftSecond's 10 (exhibit 3). The average full-value subsidy for a ONE Mortgage borrower has been \$7,672, 5 percent higher than the average subsidy in the SoftSecond Program. Other changes were made to MHP's eligibility and compliance requirements as the program rolled out, including debt-to-income (DTI) limits, credit score minimums, and liquid asset maximums.

Exhibit 3

Sample ONE Mortgage Program Subsidy Schedule

Purchase Price: \$350,000
 Downpayment: \$10,500 (3%)
 Mortgage Amount: \$339,500 (97%)
 Interest Rate: 4.00%
 Full Value Subsidy Amount: \$6,369

Year	1st Mortgage Payment	MHP Subsidy	Total Monthly Mortgage Payment
1-4	\$1,621	-\$96	\$1,525
5	\$1,621	-\$72	\$1,549
6	\$1,621	-\$49	\$1,572
7	\$1,621	-\$23	\$1,598
8-30	\$1,621	\$0	\$1,621

MHP = Massachusetts Housing Partnership.

FHA-Insured Loans

Since 1934, FHA-insured mortgage loans have been one of the Federal government’s premier products for increasing access to homeownership. The FHA uses federally backed insurance to facilitate private-sector mortgage lending. FHA has the broadest borrower eligibility guidelines of the various government-backed loan options. Unlike the SoftSecond and ONE Mortgage Programs, FHA loans do not have a set maximum income, maximum asset limit, or minimum credit score. This makes FHA loans an attractive option for borrowers from a range of income classes and levels of financial health. Also, unlike the SoftSecond and ONE Mortgage Program, FHA requires a 3.5 percent-downpayment and mortgage insurance. FHA insurance premiums are applied in the form of an initial payment, the upfront mortgage insurance premium (upfront MIP), and an ongoing “annual” payment. FHA insurance can be used to cover a variety of loan terms.²

MassHousing Mortgages

Unlike most states, Massachusetts has two HFAs, both offering income-restricted mortgage options. MHP offers the ONE Mortgage, whereas its larger counterpart, MassHousing, offers a suite of income-restricted mortgage options. The two organizations take very different approaches to their loan products, reflecting two fundamentally different approaches to the mortgage market. MassHousing is a wholesale lender and its lending is integrated into the secondary market. Their loans are originated by partner lenders, which include banks, credit unions, and licensed mortgage lenders. The loans are then serviced by MassHousing and sold to government-sponsored enterprises on the secondary market.³ In contrast, SoftSecond and ONE Mortgage loans are held in portfolio by the originating partner lender.

² In this paper, any reference to FHA loans is to the 30-year fixed rate variety.

³ See *MassHousing Agency Backgrounder* for more detail about MassHousing’s wholesale lending model. www.masshousing.com

MassHousing products are limited to borrowers below 135-percent AMI, with some products (such as the MassHousing 100 product) targeted at borrowers under 100-percent AMI. MassHousing's income guidelines are calculated in accordance with the Fannie Mae Selling Guide. In contrast, MHP compliance is based on an estimate of the entire household's income, including nonborrowers, which means that a borrower who is over 100-percent AMI by MHP's definition might still qualify for a MassHousing product limited to 100-percent AMI.⁴

Massachusetts's large number of variously overlapping Housing Finance Administration-mortgage products raises interesting questions about how borrowers decide among those products. MassHousing offers a suite of purchase loan products (five as of the writing of this paper), including a Federal Housing Administration option. These products are designed for various income brackets and financing scenarios. Because the large number of variously overlapping HFA products would introduce a large degree of complexity, we will limit our analysis to a comparison between ONE Mortgage Loans and FHA loans. Of note, it is important to clarify that one cannot distinguish if an FHA loan was originated through an HFA or by another private institution.

Prior Evaluations of Mortgage Subsidization

The ONE Mortgage is a combination of two types of public subsidy: (1) monthly payment reduction in the form of an interest rate discount and interest rate subsidy, and (2) no mortgage insurance (despite down payments as low as 3-percent) due to the presence of a publicly funded loan loss reserve. Because borrowers receive all those benefits together, it is difficult to tease out the effects of the individual subsidies.

Several studies have evaluated the impact of financing options on borrowers' wealth creation, although most focus on the relative benefits of participation in these programs in comparison to renting. The most direct parallels to our study are the several studies carried out on the Self-Help Ventures Community Advantage Program (Grinstein-Weiss et al., 2011; Stegman, Freeman, and Paik, 2007). The Community Advantage Program portfolio contains a variety of Community Reinvestment Act (CRA)-eligible mortgage products. Most loans in the portfolio are like the ONE Mortgage in that they are 3-percent downpayment loans with no PMI. Program participants who became homeowners earned \$10,196 more in net assets than renters over a 3-year period.

International subsidy experiments also offer insight into the potential of mortgage subsidies to increase homeownership rates. Like the Massachusetts Housing Partnership's ONE Mortgage Program, Portugal's *Credito Bonificado* program from 1986 provided interest subsidies specifically targeted at a low-income population. As in the Massachusetts Housing Partnership loans, *Credito Bonificado* subsidies were provided through the terms of the loan itself rather than through the tax code. The program increased borrowers' probability of purchasing a home by between 2 and 4 percentage points. A 1-percent increase in interest rate corresponded to a decrease in borrowing between 1.3 and 2.8 percent (Martins and Villanueva, 2005).

⁴ See *MassHousing General Underwriting Guide* for a full overview of MassHousing's underwriting parameters.

The Effect of Interest Rate Discounts and Subsidies

High interest rates raise a mortgage's monthly payments, increasing the likelihood of default. Higher debt-to-income ratios are strongly associated with increased loan delinquency (Campbell and Cocco, 2011). Evidence from the U.S. Home Affordable Modification Program demonstrates the role interest rates play in mortgage sustainability. The program, a federal initiative introduced in 2009 to aid homeowners at risk of foreclosure, provided incentives to lenders to provide borrowers with loan modifications that made the mortgages more affordable. Lenders were able to make several adjustments to make the loan more affordable, including adjustments to the interest rate. A 1-percent reduction in monthly payments was found to reduce the probability of redefaulting by 0.23 percentage point, and a 1-percent reduction in interest rate reduced the probability of redefault by 0.17 percentage point (Schmeiser and Gross, 2015).

Interest rates also impact demand for mortgage financing. Based on an analysis of high credit score borrowers, Lo (2017) argues that a 25-basis-point decrease in mortgage rates for people with high-FICO scores made those individuals 50 percent more likely to apply for a loan and also increased the loan size by an average of \$15,000.

The Effect of Low Downpayment Requirements

The size of a borrower's required downpayment is perhaps the largest determinant of whether a borrower will be able to purchase a home. Quercia, McCarthy, and Wachter (2002) find that loan-to-value constraints—and therefore the difficulty of saving up a sufficient downpayment—are the most important financial factors affecting a borrower's likelihood of achieving homeownership. The effect of higher downpayment requirements is an even larger effect than increases in monthly payment due to higher interest rates. In their model, increasing the maximum LTV from 80 percent to 97 percent led to a 3.25-percent increase in the probability of becoming a homeowner.

Although higher LTV loans have the advantage of increasing access to homeownership, they perform worse than lower LTV counterparts. FHA borrowers are 2.5 times as likely to experience a foreclosure event if the loan is originated at 95-percent LTV, compared with 80 percent (Lam, Dunskey, and Kelly, 2013). LTV has effects on duration of tenancy as well; high-LTV borrowers take longer to sell their properties as they hope to build up more equity prior to their sale (Genesove and Mayer, 1994).

The Effect of Subsidizing MI

The advent of MI has had a major positive effect on lenders' increasing willingness to extend credit to high LTV borrowers (Goodman and Kaul, 2017). On the other hand, MI is a significant cost to borrowers, potentially resulting in an effective cost increase of several hundred dollars per month. The effect of MI payments on borrower outcomes is not widely isolated in the literature. Because MI is generally applied as either an upfront cost that is factored into the loan amount or as a monthly payment, its effects can be predicted to be similar to the effects of an interest rate increase, however. The 2015 reduction of the FHA monthly insurance premium created a natural experiment for researchers to observe the effect of mortgage insurance on loan demand. A 50-basis-point reduction in mortgage insurance payments resulted in a 14-percent increase in home purchase borrowing by otherwise qualified borrowers. (Bhutta, Laufer, and Ringo, 2017).

Data and Methodology

Our analysis is based on a subset of 349 loans from MHP's SoftSecond database. This database contains over 21,000 loans and extends back to the creation of the SoftSecond Loan Program in 1991. The intent of our analysis is to quantify the difference between a fully subsidized MHP loan and a comparable FHA loan over the lifetime of that loan.

Filtering the Data Set

The most relevant data on home price appreciation in MHP's mortgage data set comes from borrowers who received an MHP subsidy and subsequently exited the program via a home sale event. When a borrower who received an MHP subsidy sells their property, they are required to report their sales price to MHP. MHP uses that information to determine whether the borrower's home price appreciation was modest enough to trigger the program's subsidy forgiveness provisions. MHP does not collect home appreciation data for non-subsidized loans, nor does MHP collect price appreciation data during a refinance, as these do not trigger any subsidy forgiveness scenarios.

In order to take advantage of the extra data associated with MHP subsidized property sales, we first limited the data set to subsidized loans that had already experienced a sale event. Our database contained a sales price for each of these loans, which we used to determine the borrower's actual amount of equity accumulation. Note that selecting only loans that received subsidy means that all loans in our subset also meet the subsidy criteria, which require the borrower's household income to be below 80-percent AMI and their Housing-to-Income ratio to be above 28 percent. Because only a few ONE Mortgage borrowers meeting our filters have sold their properties to date, this data set exclusively contains SoftSecond loans.

Next, we filtered out any multifamily (two- or three-unit) properties, which are not directly comparable with the single-family and condominium units that composed the bulk of our subset. Finally, we excluded properties with any form of affordability deed restriction. Affordability deed restrictions in Massachusetts allow low- and moderate-income borrowers to purchase properties at below-market prices but require that the borrower also sell their property at a below-market price. This creates an artificial limit on the amount of appreciation the homebuyer can experience, meaning they are not comparable with unrestricted market units. Our database did not capture deed restrictions and certain other loan characteristics until 2004, so all loans prior to this cutoff have been excluded.

Exhibit 4

Loan Subset Criteria
<ul style="list-style-type: none">• Loan closed between 1/1/2004 and 5/31/2013.• The subject property has been sold as of August 2018.• The subject property is a condominium or single-family home.• The subject property does not have any deed restriction limiting the price appreciation of the property.• Loan received MHP interest subsidy and meets the following subsidy award criteria:<ul style="list-style-type: none">◦ Household Income below 80 percent AMI.◦ Unsubsidized Housing to Income ratio is greater than 28 percent.

AMI = area median income.

MHP = Massachusetts Housing Partnership.

Constructing Our Comparisons

Our analysis compares actual borrower outcomes in the SoftSecond Loan Program to hypothetical outcomes for a comparable FHA mortgage. To compare these programs, we created three data sets each containing 349 loans:

1. A set of real SoftSecond loans drawn from MHP's loan database.
2. A set of simulated ONE Mortgage loans. Each loan in this set is based on a loan in the SoftSecond data set. For each loan, we hold constant the total loan amount, the interest rate, and the full value subsidy amount. The monthly payments are recalculated to reflect the differences in amortization between the two-mortgage structure of the SoftSecond Program and the ONE Mortgage Program. We also alter the subsidy payment schedule to reflect the new shorter schedule of the ONE Mortgage Program.⁵
3. A set of simulated FHA loans. Like the simulated ONE Mortgage loans, each simulated FHA loan is based on a loan from the SoftSecond set. For the FHA loans, we keep only the loan amounts constant. We modify the interest rate to match FHA's historical average at the time of origination using historical interest rates gathered from FHA's Announcements Archives (FHA 2019). Upfront private-mortgage-insurance payments are included in the loan amount, which is a common practice in FHA loans. In addition, these loans are assumed to have mortgage insurance until reaching 78-percent LTV, a common feature of FHA loans prior to June 2013.

Comparison Metrics

Our evaluation of the differences between these programs was based on three dimensions of wealth accumulation: (1) total monthly payment amount, (2) equity accumulation, and (3) net financial outcomes.

To give a baseline reflection of the time-value of money, all savings have been inflation adjusted to 2018 dollars. This makes our analysis sensitive not only to the differences in monthly payment amount, but also the timing of the monthly payments. This adjustment is particularly important when considering the benefits of the interest subsidy. MHP structures its interest subsidy on a declining schedule to deliver the largest impact early in the loan's amortization. (See Exhibit 3.) Besides adjusting for inflation, this analysis does not make additional assumptions about how borrowers might use the savings derived from lower monthly payments (for example, by paying down credit cards or investing in a savings instrument), although doing so would give additional weight to savings rendered early in the life of the loan.

⁵ ONE Mortgage subsidy schedule calculation (where "Full Value Subsidy" is the total amount of subsidy funds to be disbursed):

Year	Annual Subsidy Amount
Years 1–4	Full Value Subsidy/5.5
Year 5	Full Value Subsidy/7.33
Year 6	Full Value Subsidy/11
Year 7	Full Value Subsidy/22

Equity accumulation in this article is a measure of the total proceeds to the borrower when they sell their property. It is measured by subtracting the principal balance remaining on the loan at the time of sale from the sale price of the home. In the case of ONE Mortgage and SoftSecond loans, the subsidy repayment is also subtracted⁶:

$$\text{Equity Accumulation} = \text{Sale Price} - \text{Principal Balance} - \text{Subsidy Repayment}$$

Total monthly payments were calculated by adjusting the monthly payments for inflation and then summing the borrower's monthly payments, from the time they closed on their loan until sale:

$$\text{Total Monthly Payments} = \sum \text{Monthly Payments}$$

Finally, we created a Net Financial Outcome measure that captures the overall financial benefit to borrowers taking into consideration both equity accumulation and total monthly payments:

$$\text{Net Financial Outcome} = \text{Equity Accumulation} - \text{Total Monthly Payments}$$

Results

Equity Accumulation

In general, FHA loans offered borrowers slightly higher equity accumulation than ONE Mortgage. As seen in exhibit 5, on average, ONE Mortgage borrowers accumulated \$67,534 in equity accumulation compared with \$70,806 for FHA borrowers. Exhibit 6 shows loan level differences. The median loan built 4.4-percent less equity as a ONE loan than it did as an FHA. Approximately 84 percent of the loans modeled would have had higher equity accumulation under an FHA loan than a ONE Mortgage loan. Based on a two-tailed, two-sample t-test, using a 95 percent confidence level as the threshold, the difference in the means of the two groups is not statistically significant.

⁶ In practice, MHP does grant borrowers partial subsidy forgiveness if their property has had little appreciation. The MHP Subsidy Note allows borrowers to repay the lesser of either: (a) the amount of subsidy they received or (b) 20 percent of net appreciation. For simplicity, we assume that all borrowers repay the amount of subsidy they have received.

Exhibit 5

Average Equity Built

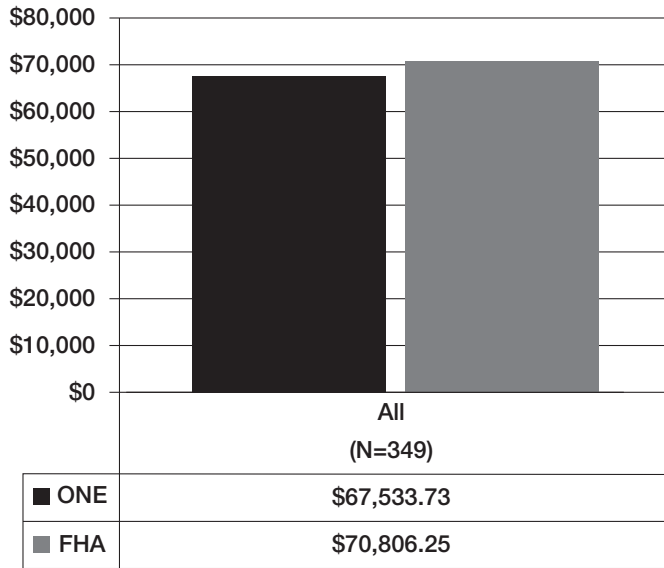
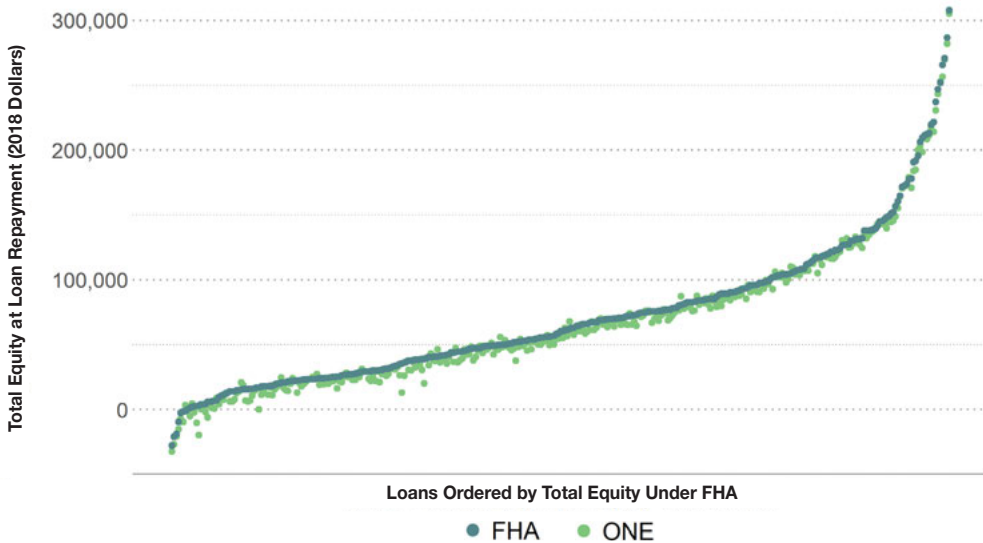


Exhibit 6

Total Equity at Loan Repayment - ONE Versus FHA (all equity in 2018 dollars)



FHA = Federal Housing Administration.

Although not statistically significant, the fact that FHA builds equity slightly faster than ONE is surprising, given that ONE Mortgages feature a discounted interest rate (ONE Mortgage interest rates are capped at 30 basis points below the Freddie Mac Primary Mortgage Market Survey). The difference in equity building is largely due to the required repayment of the MHP Subsidy Mortgage, which every borrower in this set received. Borrowers in this set repaid an average of \$7,698 in subsidy. In many cases, this repayment was enough to outweigh the equity-building benefits associated with the ONE Mortgage's lower interest rate. The effect of the subsidy repayment was greatest for borrowers with relatively small first mortgages. In the program as a whole, not all borrowers receive the subsidy and some that do may receive a partial subsidy forgiveness, so we expect that equity accumulation was somewhat more favorable towards borrowers in the program overall.

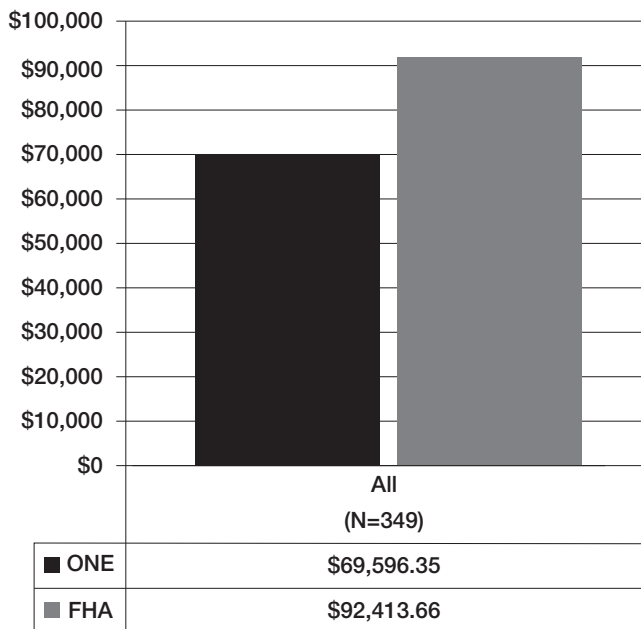
Monthly Payments

While FHA might result in higher equity realized at repayment, the ONE Program compared very favorably to an equivalent FHA loan in terms of the borrower's total monthly payments over the life of the loan. Both the mean and median life of loans within the data set are 6.43 years. As exhibit 7 shows, loans modeled as FHA mortgages had payments about 33 percent higher than when modeled as ONE mortgages. Not only did the overall averages favor the ONE Mortgage Program over FHA, but every single loan in the data set would have lower total payments under ONE than under a comparable FHA mortgage.

The distribution of total payments (exhibit 7) shows the stark difference between the products.

Exhibit 7

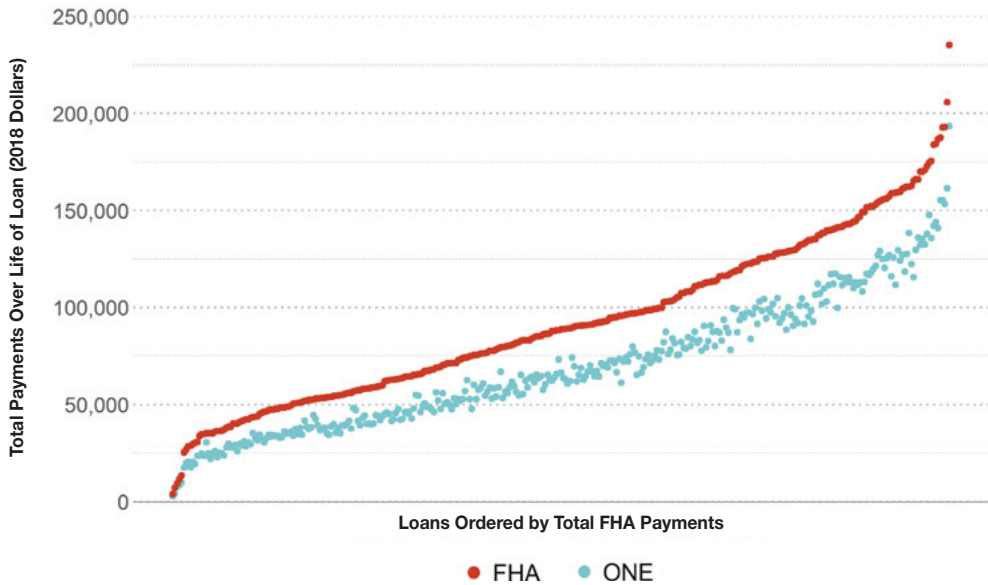
Average of Total Payments Over the Life of the Loan



FHA = Federal Housing Administration.

Exhibit 8

Total Payments Over Life of Loan - ONE v. FHA



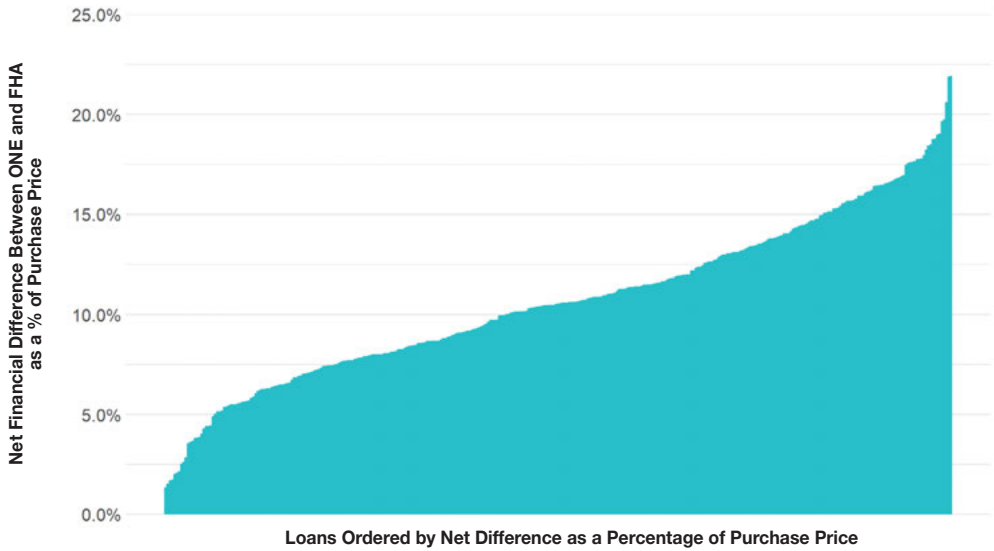
FHA = Federal Housing Administration.

Net Financial Outcome

In terms of net financial outcome, every loan in our subset performed better as a hypothetical ONE Mortgage compared with a hypothetical FHA loan. Exhibit 9 shows the relative net cost or gain as a percentage of purchase price over the life of the loan (amount of equity gained less the cumulative monthly payment). On average, this estimated net financial difference was the equivalent of 10.7 percent of the original purchase price.

Exhibit 9

Net Difference in Financial Outcome (as a Percentage of Original Purchase Price) When ONE Mortgage is Modeled Against FHA



FHA = Federal Housing Administration.

It is important to note that although all loans would have experienced better financial outcomes under ONE than FHA, not all net outcomes are net positive. Equity gained upon the sale of a home is naturally offset by payments over the life of the loan. In most cases, the net payments on a mortgage exceed price appreciation and amortization. In our data set, 56 percent of ONE loans would have had a net cost over the life of the loan, and 70 percent of FHA loans would have a net cost. Descriptive statistics for our analysis are shown in exhibit 10.

Exhibit 10

Descriptive Statistics (N=349)

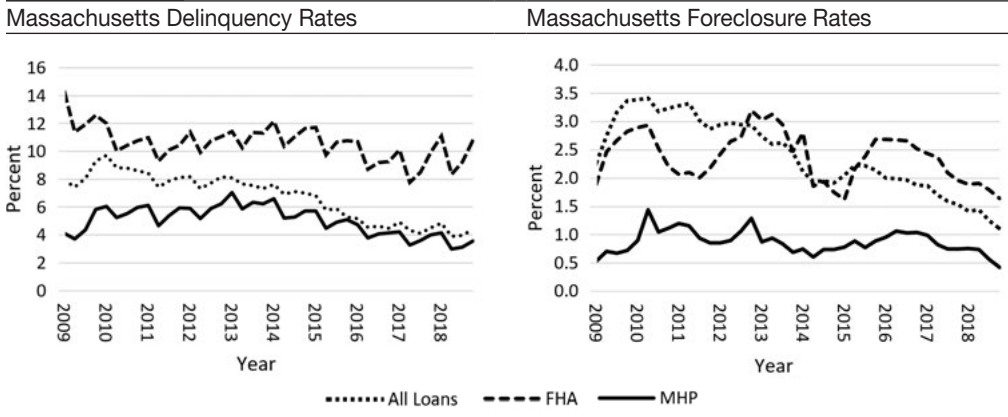
		Mean	Median	Minimum	Maximum
Monthly Payments (Cumulative)	SoftSecond	\$66,531.33	\$61,742.94	\$2,625.77	\$185,836.12
	ONE Mortgage	\$69,596.35	\$64,386.43	\$2,738.41	\$193,360.58
	FHA	\$92,413.66	\$88,766.47	\$3,942.46	\$235,122.52
Equity Accumulation	SoftSecond	\$64,448.00	\$53,314.04	\$(35,546.51)	\$301,438.05
	ONE Mortgage	\$67,533.73	\$56,527.68	\$(32,525.56)	\$305,119.12
	FHA	\$70,806.25	\$60,376.19	\$(27,828.98)	\$307,749.09
Net Financial Outcome	SoftSecond	\$(2,083.33)	\$(9,694.75)	\$(132,823.32)	\$239,265.21
	ONE Mortgage	\$(2,062.62)	\$(9,138.39)	\$(131,369.54)	\$239,683.30
	FHA	\$(21,607.40)	\$(27,188.15)	\$(163,504.38)	\$217,274.47

FHA = Federal Housing Administration.

Delinquency

Massachusetts Housing Partnership Loans have lower delinquency and foreclosure rates than both FHA loans and the average loan originated in the state (exhibit 11).⁷

Exhibit 11



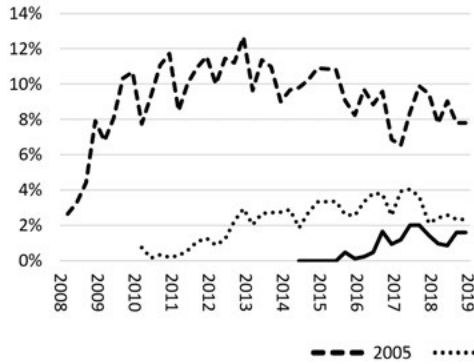
FHA = Federal Housing Administration.
MHP = Massachusetts Housing Partnership.
Source: MBS National Delinquency Surveys, 2009-2019; MHP eS2 database

The ONE Mortgage program was introduced in 2014 and is still relatively new. It has only existed during times of economic expansion and its performance has not been tested in a crisis. Exhibit 12 shows MHP delinquency rates over time for three selected vintages (2005, 2010, and 2015). The 2005 and 2010 vintages include only SoftSecond loans, whereas the 2015 vintage contains only ONE Mortgage loans. The stark contrast between the 2005 and 2010 delinquency data shows the unpredictable effect a recession can have on a seemingly low-delinquency Housing Finance Agency product. Given the ONE Mortgage program’s general similarity to the SoftSecond Program, we expect that performance would be generally comparable with the SoftSecond Program’s.

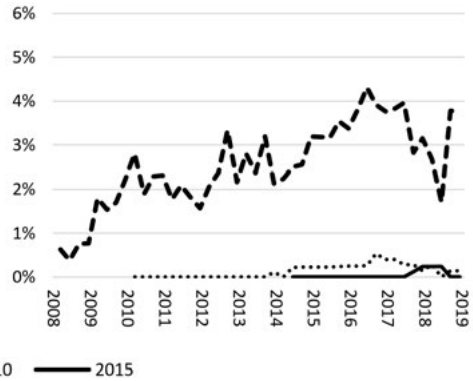
⁷ MHP’s delinquency rates are a measure of all currently delinquent loans (>30 days delinquent, but not reported as in foreclosure) divided by the number of active loans. Our foreclosure rate reports the percentage of loans that MHP lenders, who service the loans, report as being in the process of foreclosure.

Exhibit 12

MHP Delinquency Rates by Vintage



MHP Foreclosure Rates by Vintage



MHP = Massachusetts Housing Partnership.
Source: MBS National Delinquency Surveys, 2009-2019; MHP eS2 database

The ONE Mortgage Program and SoftSecond Program both feature built-in mechanisms that address delinquency and foreclosure. In addition to a lower monthly payment, ONE Mortgage borrowers receive ongoing delinquency counseling. Any time a borrower becomes 30 days delinquent, a counselor working for one of MHP's partner counseling agencies will offer free services. These independent nonprofit agencies provide borrowers a trusted third party who will help them resolve their delinquency. Depending on the borrower's desire to engage with the counselor's outreach efforts, these counseling sessions can be extensive. They may span dozens of interactions with borrowers over the course of months or even years. The assistance provided ranges from simple financial advice to more involved interactions, such as loan modification mediation between the borrower and lender.

How Many Federal Housing Administration Borrowers Could Have Qualified for the ONE Mortgage?

Due to the limitations of publicly available FHA data, it is difficult to create a satisfying estimate of the number of FHA borrowers who might have qualified for the ONE Mortgage Program. Home Mortgage Disclosure Act (HMDA) data lacks critical pieces of ONE Mortgage compliance data including FICO score, first-time homebuyer status, and borrower debt. Ginnie Mae mortgage-backed securities data provides another potential route, but it also lacks critical information. Although it does record borrower credit scores and debt to incomes, it lacks both borrower and household incomes and debt amount. Exhibit 13 illustrates the shortcomings of each data set.

Exhibit 13

Availability of MHP Borrower Qualifications in Publicly Available Data Sets

	MHP Borrower Qualifications									
	First-Time Homebuyer?	Household Income (Including Nonborrowers)	Qualifying Income	Credit Score	Borrower Assets	Loan Size	HTI	DTI	Upper Bound: FHA Loans That Could Have Been ONE (Annual)	Upper Bound: FHA Loans That Could Have Been ONE (Annual)
Ginnie Mae MBS	✓		✓			✓			1,516	\$382M
HMDA				✓		✓		✓	1,555	\$382M

DTI = Debt to Income. FHA = Federal Housing Administration. HMDA = Home Mortgage Disclosure Act. HTI = Housing to Income. MBS = Mortgage Backed Securities. MHP = Massachusetts Housing Partnership. Sources: HMDA LAR 2017; Ginnie Mae MBS Monthly Loan Level data

Filtering for FHA loans that met all HMDA-provided ONE Mortgage qualifying criteria in 2017 yields a subset of 1,555 loans in the total amount of \$382 million. A similar filtering of this data set for the Ginnie Mae MBS data set indicates 1,516 eligible loans, a total of \$382 million in lending. These estimates, neither of which applies the full panel of ONE Mortgage qualifications, should be taken as reasonable upper bounds of the number of FHA loans originated annually that might have qualified as ONE Mortgages.

Although they come from two different data sets filtered on different qualifying variables, the estimates arrived at a very similar numbers of loans and nearly identical gross dollar amounts. It is certainly tempting to read more into that match than it merits. Note that this estimate is not robust enough to accurately predict the actual size of the overlapping group of borrowers. Rather, we intend it simply to provide a sense of scale. Future research could refine the accuracy of our estimates using data from proprietary FHA loan databases.

Discussion

We live in an era in which LMI households are squeezed for every last dollar. In 2017, 59 percent of households could not cover a \$400 expense using cash or its equivalent (Board of Governors of the Federal Reserve Board, 2018). Over half of young adults who went to college in 2017 took on some personal debt, while one-fifth of them were behind on their payments (Federal Reserve Board, 2018). This student loan debt, increasing along with rising home prices in urban markets, makes it more difficult to afford the monthly costs of homeownership. To combat these statistics and still encourage homeownership, it is increasingly important to focus on the development of financial products that lower costs and increase housing stability.

Historically, homeownership has been the single biggest driver of household wealth in the United States. As Goodman and Mayer (2018) note, although homeownership generally offers households

superior wealth building when compared with renting, the advantage of owning a home is highly dependent on assumptions about home price appreciation and the relative costs of homeownership and renting. The terms of the mortgage and the types of subsidization used play a major role in evaluating the overall benefit of homeownership.

Since each new homebuyer's situation is different, it is difficult to broadly claim that one approach is better than another. Borrower preferences can vary on several key dimensions. While one person might place a higher value on monthly savings, another might place a higher value on equity accumulation. Some might be looking at the home as a long-term family asset, while others are looking at the home as a short-term investment.

The difficult tradeoffs involved in borrower preferences are reflected in our analysis: the ONE Mortgage program slightly underperformed FHA loans on measures of equity building, largely due to the sample selection, which limited our analysis to subsidized ONE Mortgage loans. The mechanics of the subsidy are to diminish equity accumulation in exchange for significantly lower monthly payments. Therefore, the subsidy mortgage is a major part of the ONE Mortgage's advantage over FHA in monthly payments but causes the borrower to lose out on overall equity. How should borrowers think about this tradeoff?

The MHP subsidy mortgage can be seen as a deferred amortization mechanism that transfers funds from the proceeds of the borrower's eventual home sale to a buydown of their monthly payments. It is disbursed to the borrower on a monthly basis over the course of the first 7 years until the full value of the loan has been paid out. Because it is a zero-interest loan, the subsidy is repaid at time of property sale. Although this design means the subsidy is a net-zero prospect to the borrower (in nominal terms), it subtly alters the economics of a mortgage loan from the borrower's perspective. Normally, the proceeds of equity accumulation can only be accessed during a refinance or at the time of sale. This means that for the most part, these funds remain inaccessible to the borrower, even though their preference may be to access them earlier in the life of the loan. The MHP subsidy allows the borrower to do so with no fees or penalties.

Policymakers should be sensitive to the fact that there is more to wealth building than equity accumulation alone; homeowners are interested in monthly savings as well as overall equity accumulation. Subsidization methods that allow for this kind of liquidity earlier in the loan address these borrower preferences. More affordable payments keep more money in the pockets of LMI homeowners. Affordability has the added benefit of stability, making it easier for low-income owners to maintain payments and avoid default and foreclosure. The FHA delinquency rate is consistently two to three times higher than MHP, whereas its foreclosure rate is about twice that of MHP. Contrary to expectations about high loan-to-value loans, MHP actually has lower delinquency and foreclosure rates than other overall rates for mortgage originations in Massachusetts, despite targeting LMI households.

Throughout the programs' histories, both SoftSecond and ONE Mortgage have had lower delinquency and foreclosure rates than the average Massachusetts mortgage loan. These loan performance figures benefit both borrowers and originating lenders. While borrowers have safer, more sustainable loans, lenders can produce more loans because of their relatively

strong performance. Most of our focus has been on affordability and wealth building, but the sustainability of homeownership is another important factor to consider when crafting housing policy at all levels. In addition to the losses foreclosures entail for the borrower, a single foreclosure is associated with an average loss to the loan holder of over \$58,000. Foreclosures also cost cities and neighborhoods, to the tune of \$27,000 and \$10,000 respectively (Immergluck and Smith, 2006).

Regardless of the tradeoffs between monthly payments and equity built into the ONE Mortgage, the overall takeaway of our study is clear: borrowers have better financial outcomes using a ONE Mortgage compared with an FHA loan. The average net financial difference between ONE Mortgages and FHA loans in our data set was the equivalent of 10.7 percent of the original purchase price, and every borrower was better off in terms of net financial outcome when modeled as a ONE Mortgage rather than an FHA loan.

HMDA data reveals, however, that FHA lending accounts for 29 percent of low- and moderate-income home purchase lending in the state compared with the ONE Mortgage's 4 percent (Campen, 2018; Massachusetts Housing Partnership, 2016). In the post-crisis era, FHA emerged as the next-best option for lenders who could no longer offer high cost loans. This was consistent with its original intent as the loan program of last resort (Immergluck, 2011). Why are Massachusetts borrowers using a more expensive last resort option when a more affordable State-sponsored option is available?

One reason is simply that many borrowers do not meet MHP's ONE Mortgage guidelines, which are more restrictive than those of FHA loans. Unlike ONE Mortgage loans, FHA loans do not have income or asset limits and lenders generally accept much lower credit scores. On the other hand, there are doubtless some borrowers who would have qualified for both programs but failed to discover the ONE Mortgage program during their mortgage search. Our research suggests that the number of these borrowers could be as high as 1,500 borrowers a year.

The volume of ONE Mortgage lending is also limited by the program's built-in constraints on pricing. Participating lenders must offer the product at a 30-basis-point discount from the Freddie Mac Primary Mortgage Market Survey. The ONE Mortgage program's equitable lending mission conceptually includes contributions from lenders alongside the public subsidy. The interest discount represents the lender's main contribution (alongside the sales and loan servicing functions). The interest rate discount ensures ONE Mortgage borrowers always receive a "better than the market" interest rate. It also means that the program's lending volumes are constrained by participating lenders' willingness to originate a loan with a discounted interest rate, however. In addition, the loans must be held in portfolio (with the exception of a relatively small quantity of loans sold between participating lenders). This means lenders need to adjust their lending volume to suit their appetite for the loans' built in interest rate risk over the anticipated life of the loan.

If there are large numbers of LMI and minority borrowers who would qualify for the ONE Mortgage program but are instead sold FHA mortgages, our analysis suggests it could constitute a problematic dynamic, not unlike similar patterns leading up to the crisis. This would be in line with concerns raised in Immergluck (2011). By showing that a categorically superior loan product

is available to LMI borrowers in Massachusetts, our analysis lays a groundwork for future research about FHA loan sales, which would enable more concrete conclusions about disparate lending of FHA loans.

Conclusion

Since the financial crisis, mortgage lending in LMI and minority communities nationwide has been dominated by FHA lending. FHA loans have emerged to fill the void left by the collapse of the high-cost mortgage-loan market, as licensed mortgage lenders operating in LMI communities have transitioned from a business model revolving around the sale of high-cost mortgages to one revolving around FHA loan sales. Given that history, researchers have asked to what extent the current FHA market is an improvement on the high-cost mortgages of the past and to what extent it is a continuation of the problematic trends of pre-crisis high-cost lending.

Our work addresses this question by taking advantage of a peculiar feature of the Massachusetts mortgage market: a large number of FHA borrowers seemingly could qualify for a widely available alternative, the ONE Mortgage. If the ONE Mortgage results in superior financial outcomes for borrowers, the fact that low-income homebuyers in Massachusetts depend on FHA loans would be suggestive of disparate outcomes for these borrowers.

Our analysis finds strong evidence that the ONE Mortgage is indeed a better option than FHA. In fact, every single loan we examined had better financial outcomes for the borrower when modeled as a ONE Mortgage than as an FHA loan. Although a borrower's optimal mortgage choice depends on their preferences for monthly savings, equity appreciation, and other factors, the ONE Mortgage provides a combination of subsidies that establishes it as a more affordable loan product from the borrower's perspective. ONE Mortgage borrowers may sacrifice a relatively small amount of equity when compared with FHA borrowers, but the monthly savings are overwhelming. Lower monthly payments are extremely beneficial to LMI borrowers, who can use the extra money for unexpected expenses and for staving off delinquency or foreclosure. As a result, the net financial outcomes were much better for our modeled ONE Mortgage loans than they were for FHA loans.

Conclusively addressing the question of whether FHA lending has a disparate impact will require better quantifying how many borrowers actually would have qualified for both programs. Although the research in this paper proposed an approximated upper bound of this number, more research is needed to produce a more accurate estimate. A promising pathway for subsequent research would be to use a proprietary data set to study the quantities and demographics of borrowers who would qualify for both programs. Establishing the scale of this group would enable more conclusive findings about disparate treatment and outcomes in FHA lending.

The ONE Mortgage's unique fusion of public subsidy with private loans has created a sustainable model that provides stable housing costs and long-term wealth building opportunities. Although LMI first-time homebuyers are often limited in their selection of home loans, there are stark differences between their options. When compared with FHA loans, the benefits of the ONE Mortgage Program are clear.

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Departments

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Data Shop

Data Shop, a department of Cityscape, presents short articles or notes on the uses of data in housing and urban research. Through this department, the Office of Policy Development and Research introduces readers to new and overlooked data sources and to improved techniques in using well-known data. The emphasis is on sources and methods that analysts can use in their own work. Researchers often run into knotty data problems involving data interpretation or manipulation that must be solved before a project can proceed, but they seldom get to focus in detail on the solutions to such problems. If you have an idea for an applied, data-centric note of no more than 3,000 words, please send a one-paragraph abstract to david.a.vandenbroucke@hud.gov for consideration.

Measuring Homelessness and Resources to Combat Homelessness with PIT and HIC Data

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Disclaimer: The views expressed in this article are those of the author and do not represent the official positions or policies of the Office of Policy Development and Research, the U.S. Department of Housing and Urban Development, or the U.S. Government.

Introduction

In this article, I introduce readers to two U.S. Department of Housing and Urban Development (HUD) data sources measuring homeless populations and resources that are devoted to reducing homelessness. HUD's Point in Time (PIT) data contain homeless populations estimates (sheltered and unsheltered) and estimates for homeless subpopulations.

Housing Inventory Count (HIC) contains data on beds, units, and programs designated to serve homeless populations. PIT and HIC electronic data are currently available from 2007 through 2018 on the HUD Exchange web portal (2019a).

As a data analysis example, I merge the state level PIT and HIC data with state population and temperature data to examine how rates of homelessness, the proportion of homeless populations that are sheltered, and ratios of bed counts relative to homeless populations vary with January average temperatures.

In the next two sections, I describe the contents of the PIT and HIC data and how they are generated. I then discuss limitations of the PIT data. I describe the data analyzed and present data analysis examples the next two sections and summarize the article in the final section.

Point in Time Data

In this section, I describe how the PIT data are collected and the contents of the database. This section draws heavily on HUD's Point-In-Time Methodology Guide (2014) and Johnston (2012).

A Continuum of Care (CoC) is a consortium of providers within defined areas (states, Washington, D.C., Puerto Rico, and other U.S. territories) that provide a broad range of housing and services to homeless populations.

HUD requires CoCs to submit a count of the sheltered and unsheltered homeless population in their area. CoCs submit their PIT data with their annual applications for Homeless Assistance Grants.

HUD defines the sheltered homeless as:

“An individual or family living in a supervised publicly or privately operated shelter designated to provide temporary living arrangement (including congregate shelters, transitional housing, and hotels and motels paid for by charitable organizations or by federal, state, or local government programs for low-income individuals)” (2014: 7).

HUD defines the unsheltered homeless as:

“An individual or family with a primary nighttime residence that is a public or private place not designed for or ordinarily used as a regular sleeping accommodation for human beings, including a car, park, abandoned building, bus or train station, airport, or camping ground” (2014: 8).

PIT counts must be conducted during the last 10 days in January and represent all homeless persons who were sheltered and unsheltered. HUD (2014) provides guidance to CoCs on developing their PIT data.

CoCs report PIT data by household type (households with at least one adult and one child, households without children, and households with only children) and on subpopulations (unsheltered homeless youth, veterans, and persons experiencing chronic homelessness).

HUD requires CoCs to submit annual PIT data on the sheltered homeless. Sheltered counts are reported by project type: emergency shelter, Safe Haven, and transitional housing.

Many CoCs develop their sheltered count data from their Homeless Management Information System (HMIS) data. A HMIS is a local information technology system used to collect client-level data and data on the provision of housing and services to homeless individuals and families and persons at risk of homelessness (HUD, 2019b). Each CoC is responsible for selecting an HMIS software solution that complies with HUD's data collection, management, and reporting standards.

When HMIS data are insufficient for generating sheltered counts, CoCs supplement their HMIS data with project- and client-level surveys.

HUD encourages CoCs to report counts of the unsheltered homeless population annually, but they must do so every 2 years. Unsheltered persons are not generally recorded in HMIS; as such the unsheltered count is more involved and more costly to produce than the sheltered count.

There are two approved methods that CoCs can use for conducting their unsheltered PIT count: the night of count approach, and the service-based (post-night) count approach.

The night of count approach involves “counting people who are staying in public or private places not designated for or ordinarily used as a regular sleeping accommodation for human beings, including cars, parks, abandoned buildings, buses or train stations, airports, or camping grounds during the hours between sunset and sunrise” (HUD, 2014: 51).

There are three approved methods for collecting data when using the night of count approach:

1. Complete coverage count.
2. Known locations count.
3. Random sample of areas count.

A complete coverage count involves attempting to count every unsheltered homeless person during a single night. While conducting a complete coverage count, however, CoCs might not be able to conduct interviews sufficient to obtain all the demographic characteristics of unsheltered people required. If CoCs are not able to conduct interviews at the same time as the night of the count, “a statistically relevant sampling method should be used to provide a valid and reliable basis to determine demographic characteristics of all persons counted” (HUD, 2014: 52).

A known locations count involves identifying the specific locations that will be visited by volunteers on the night of the count. “CoCs should use an informed and reasonable basis for identifying known locations where unsheltered people are likely to be residing on the night of the count” (HUD, 2014: 53).

The random sample of areas count method involves sampling using high and low probabilities for designated geographic areas where unsheltered homeless people might be on the night of the count. Enumerators are expected to visit every high-density area and a statistically valid sample of low-density areas on the night of count.

CoCs using the service-based approach conduct interviews with users of non-shelter services during a specific time period. CoCs using this approach will often hold a specific event that is likely to attract homeless persons, such as provision of healthcare services or a special meal (Johnston, 2012). Although this method requires the CoC to determine who has already been counted, it tends to reach homeless people who choose to use the services available and who might be difficult to count otherwise due to where they choose to sleep (Johnston, 2012).

Housing Inventory Count Data

Along with PIT data, HUD also requires CoCs to submit HIC data annually. HIC data consist of an annual inventory of the beds, units, and programs designated to serve the CoC's homeless population. HIC data are reported by household types served (households with at least one adult and one child, households without children, and households with only children). The HIC data are often pulled directly from the CoC's HMIS.

Critique of Point in Time Data

Van Dam (2019), Boone (2019), and Hopper et al. (2008) discuss limitations of the PIT data. According to Boone, "PIT counts are widely understood to undercount the number of people experiencing homelessness by a significant margin—some experts say by half or more" (Boone, 2019). Daniel Flaming of the Los Angeles-based Economic Roundtable believes that the PIT counts "are conservative, and they provide a low-end estimate" (Van Dam, 2019).

Kelly Cutler of the Coalition on Homelessness, quoted in Boone (2019), argues that scheduling the PIT count in winter leads to an undercount because "The count is during the winter early in the morning, when it's harder to actually find folks because they're seeking some sort of refuge. They want to stay out of sight in general for their own safety."

As evidence of undercounting, Boone (2019) cites statistics from the U.S. Department of Education on homeless children attending public schools. According to the National Center for Education Statistics (2017), 1.3 million homeless children attended public schools in 2015. The total PIT homeless count for 2015 was 564,708.

The discrepancy between the HUD and U.S. Department of Education homeless counts can be at least partly explained by the differences in definitions of homelessness. The U.S. Department of Education identifies students as homeless "if they lack a fixed, regular, and adequate nighttime residence" (NCES, 2017). This definition would include students who may be "temporarily doubled up with other families or sharing housing due to loss of housing, economic hardship, or other reasons (such as domestic violence); living in hotels or motels; living in shelters or other forms of temporary housing; or living in unsheltered situations (for example, living in cars, parks, campgrounds, Federal Emergency Management Agency (FEMA) trailers, or abandoned buildings)," (NCES, 2017).

The U.S. Department of Education definition of homelessness includes categories of homelessness (temporarily doubled up with other families, for example) that would not be included in the HUD definition used for generating PIT data.

Hopper et al. (2008) found that New York City reports underestimated the city's unsheltered population and, in their research, present methods they found to increase the accuracy of estimates of the unsheltered homeless population.

The PIT data have also been criticized for not including margins of error. According to Daniel Flaming, if margins of error were available, they would be large (Van Dam, 2019).

Description of Data Analyzed

In this section, I describe the data analyzed in the following section and present summary statistics.

I use 2018 PIT data to compute state rates of homelessness and the proportion of state homeless populations that are sheltered. As an alternative measure of resources relative to homeless populations, I use 2018 PIT and HIC data to compute ratios of state bed counts relative to the estimated state homeless populations, expressed as percentages. This alternative measure reflects the fact that resources devoted to combatting homelessness may not always be effective in sheltering homeless individuals, due to where they may choose to sleep.

To measure the homeless population relative to state population, I compute a rate of homelessness per 10,000 population, which equals 10,000 multiplied by the homeless population estimate divided by estimated state population. State population estimates were taken from the U.S. Census Bureau's Population Estimates Program for 2018 and were available for the 50 states, Washington, D.C., and Puerto Rico.

To measure the proportion of state homeless populations that are sheltered, I divided the 2018 PIT total sheltered count for each state by the 2018 PIT total homeless count. I express the proportions in percentage terms.

To measure state bed counts relative to the estimated state homeless population, I divided the 2018 HIC total state bed counts by the 2018 PIT total state homeless counts. I express the ratios in percentage terms in order to make them easier to compare with the proportion of state homeless populations that are sheltered.

In the next section, I explore how the three previously mentioned homelessness measures vary with state average temperatures for January 2018, the month in which the 2018 PIT data were collected.

State temperature data were taken from The National Oceanic and Atmospheric Administration's Climate Divisional Database (2019). Monthly average temperature data were only available for 49 states, excluding Hawaii.

Exhibit 1 contains summary statistics for the rate of homelessness per 10,000 population (hereafter referred to as the homelessness rate), the proportion of homeless populations that are sheltered (hereafter referred to as the proportion sheltered), the ratio of beds relative to the estimated homeless population (hereafter referred to as the bed ratio), and January average temperatures for 2018.

- The homelessness rate has a mean of 15.7, a standard deviation of 15.1, and varies from 4.5 in Mississippi to 98.3 in Washington, D.C., with a median of 10.6.
- The proportion sheltered has a mean of 71.1 percent, a standard deviation of 22.0 percent, and varies from 2.1 percent in the Northern Mariana Islands to 96.1 percent in Maine, with a median of 75.4 percent in South Dakota.

- The bed ratio has a mean of 81.4 percent, a standard deviation of 25.5 percent, and varies from 2.9 percent in the Northern Mariana Islands to 133.9 percent in North Dakota, with a median of 86.5 percent in Louisiana.
- Average January 2018 temperatures (in 49 states, excluding Hawaii) have a mean of 29.4 degrees Fahrenheit, a standard deviation of 10.6 degrees, and vary from 6.8 degrees in Alaska to 55.1 degrees in Florida, with a median of 29.7 degrees in Colorado.

Exhibit 1

Summary Statistics

Variable	N	Mean	Std. Dev.	Min	Median	Max
Rate of Homelessness per 10,000 Population	52	15.737	15.091	4.527	10.620	98.284
Proportion of the Homeless Population That is Sheltered (%)	55	71.1%	22.0%	2.1%	75.4%	96.1%
Ratio of Beds Relative to the Homeless Population (%)	55	81.4%	25.5%	2.9%	86.5%	133.9%
January Average Temperature (Degrees Fahrenheit)	49	29.355	10.560	6.800	29.700	55.100

Sources: PIT data, 2018; HIC data, 2018; Population Estimates Program, 2018; NOAA Climate Divisional Database, 2018

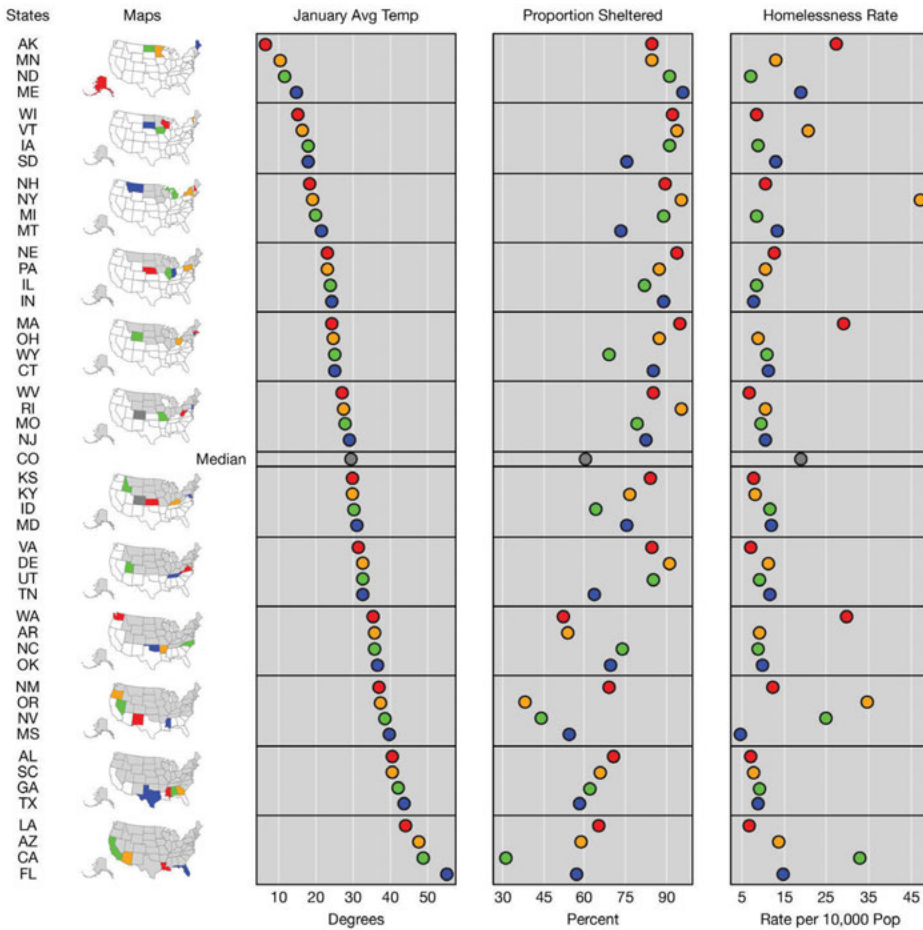
Data Analysis

In this section, I explore how three state measures of homelessness for 2018—the homelessness rate, the proportion sheltered, and the bed ratio—vary with state average temperatures for January 2018. I also explore the relationship between the proportion sheltered and the bed ratio.

Exhibit 2 presents a linked micromap with columns of data for state January average temperature, the proportion sheltered, and the homelessness rate. The data are sorted by January average temperature and are only presented for the 49 states (excluding Hawaii) for which temperature data were available.

Exhibit 2

Linked Micromap of January Average Temperatures, Proportions Sheltered, and Homelessness Rates



Sources: PIT data, 2018; Population Estimates Program, 2018; NOAA Climate Divisional Database, 2018

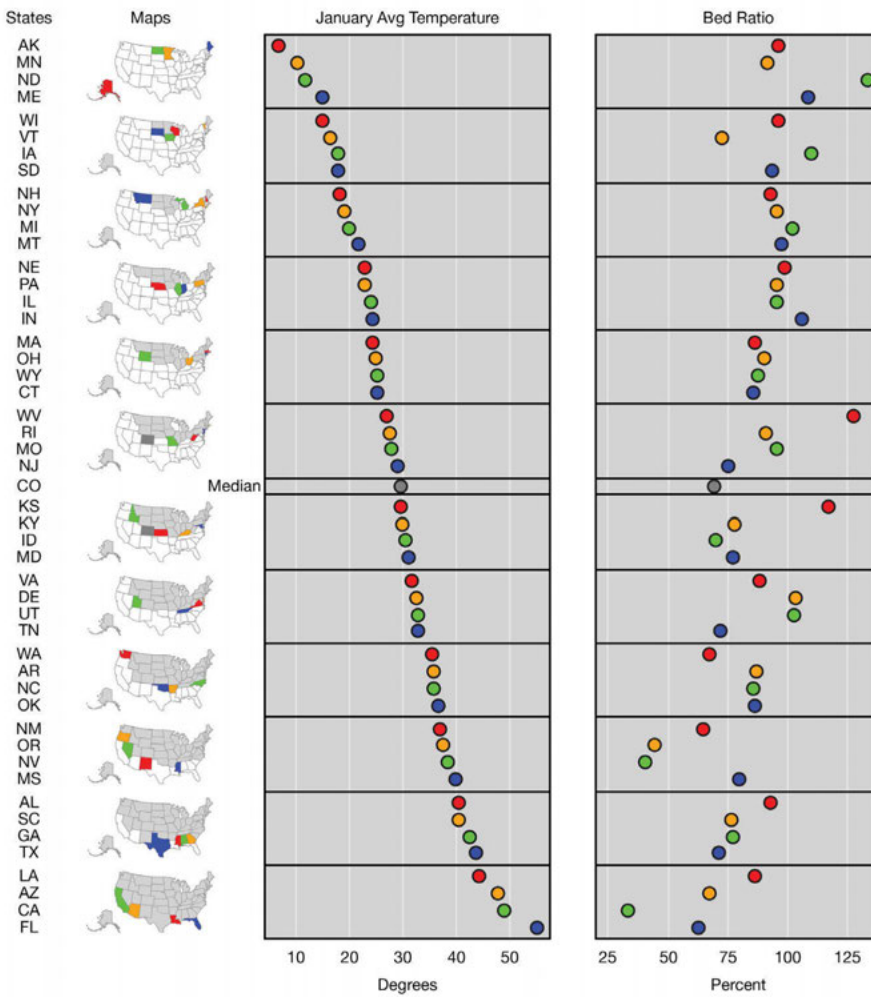
Exhibit 2 reveals an inverse relationship between average temperature and proportion sheltered—the proportion sheltered tends to decrease as January average temperature increases. The Pearson correlation coefficient between the two variables is -0.744 (p -value $< .0001$). The inverse relationship could reflect less necessity for providers to shelter homeless populations in warmer winter climates, or a decreased preference of homeless people to seek winter shelter in warmer states.

The data in exhibit 2 indicate that there is little relationship between January average temperatures and homelessness rates; the Pearson correlation coefficient between the two variables is -0.056 (p -value = $.702$).

Exhibit 3 presents a linked micromap with columns of data for January average temperature and the bed ratio. The data are sorted by temperature. Similar to the data in exhibit 2 for temperature and the proportion sheltered, the data in exhibit 3 indicate that there is an inverse relationship between January average temperatures and bed ratios. The Pearson correlation coefficient between the two variables is -0.610 ($p\text{-value} < .0001$).

Exhibit 3

Linked Micromap of January Average Temperatures and Bed Ratios



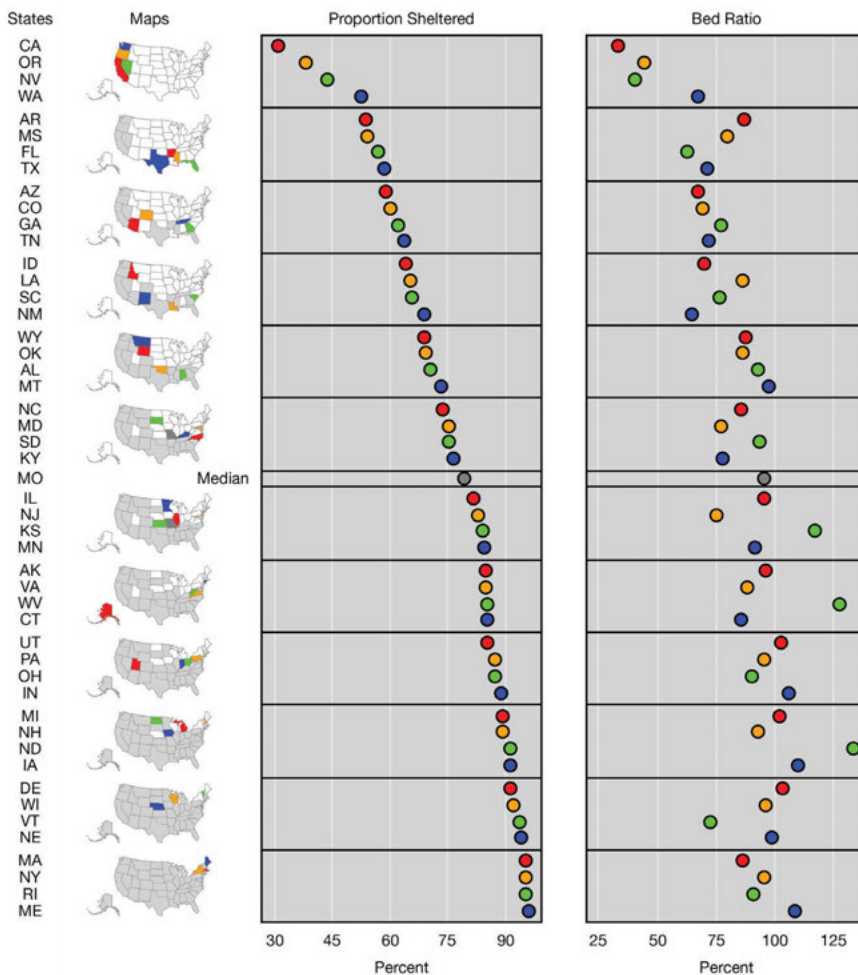
Sources: PIT data, 2018; HIC data, 2018; NOAA Climate Divisional Database, 2018

The data in exhibit 3 reveal that in nine states (Delaware, Indiana, Iowa, Kansas, Maine, Michigan, North Dakota, Utah, and West Virginia) the bed ratio exceeds 100 percent. One should be cautious in interpreting a bed ratio exceeding 100 percent as an indicator of excess bed capacity in that state, given concerns that PIT data undercount the true homeless population (Boone, 2019; Hopper et al., 2008; Van Dam, 2019).

Finally, I explore the relationship between proportions sheltered and bed ratios. Exhibit 4 reports a linked micromap with columns of data for the proportion sheltered and the bed ratio; the data are sorted by the proportion sheltered.

Exhibit 4

Linked Micromap of Proportions Sheltered and Bed Ratios



Sources: PIT data, 2018; HIC data, 2018

The data in exhibit 4 indicate that the proportion sheltered tends to be lower than the bed ratio—the bed ratio exceeds the proportion sheltered in 43 out of 49 states.

The exhibit 4 data also reveal a positive relationship between the proportion sheltered and the bed ratio; the Pearson correlation coefficient between the two measures is .778 (p-value < .0001). The positive relationship between the proportion sheltered and the bed ratio reflects the fact that one might expect a greater proportion of homeless persons to be sheltered when more beds are available relative to the homeless population.

Conclusion

In this article, I introduce readers to HUD's Point in Time (PIT) data, which provide estimates of the sheltered and unsheltered homeless population and subpopulations and characteristics of the homeless population. I also discuss HUD's Housing Inventory Count data, which includes annual data on the beds, units, and programs designated to serve homeless populations.

I critique the PIT data, which have been criticized for undercounting the true homeless population, particularly the unsheltered homeless.

I present data analysis examples where I compute 3 state-level measures: the rate of homelessness per 10,000 residents, the proportion of the state homeless population that is sheltered, and the ratio of beds available to shelter the homeless relative to the homeless population.

I then examine how these three measures vary with January average temperatures for the month of January (the month in which the PIT data are collected). I find that January average temperatures are inversely related to the proportion of the homeless population that is sheltered and the ratio of beds relative to the homeless population. I find little relationship between January average temperatures and state rates of homelessness.

Acknowledgment

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Evaluation Tradecraft

Evaluation Tradecraft presents short articles about the art of evaluation in housing and urban research. Through this department of *Cityscape*, the Office of Policy Development and Research presents developments in the art of evaluation that might not be described in detail in published evaluations. Researchers often describe what they did and what their results were, but they might not give readers a step-by-step guide for implementing their methods. This department pulls back the curtain and shows readers exactly how program evaluation is done. If you have an idea for an article of about 3,000 words on a particular evaluation method or an interesting development in the art of evaluation, please send a one-paragraph abstract to marina.l.myhre@hud.gov.

Toward Implementation of a National Housing Insecurity Research Module

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Abstract

This article provides a summary of the motivation, process, and status of a collaborative federal effort to develop a housing insecurity survey module that is transferable across household surveys and studies. The module will serve as the basis of a validated and transferable composite index of housing insecurity. This index is intended to be suitable for use in a variety of survey and evaluation instruments that have previously excluded or insufficiently specified housing problems.

Researchers, policymakers, and program leaders regularly invoke the concept of housing insecurity in marshaling evidence to inform decisionmaking and improve outcomes. In the absence of a unified definition and measure, however, the transactional costs of building evidence in this field can be high, given the time and effort required to cultivate and choose among a variety of potential measures. Similarly, making use of evidence requires a detailed investigation of each study's unique definition and measures. This fragmented approach to building, applying, sharing, and understanding evidence on housing needs, tradeoffs, and correlates stands in contrast to the widely understood, standardized continuum of food security measured by the transferable U.S. Household Food Security Survey Module.

Abstract (cont.)

This article expands on previous research on the need for a housing insecurity index and addresses why traditional measures of housing cost burden and quality are insufficient for constructing a measure that is transferable across household surveys. This article then introduces the U.S. Department of Housing and Urban Development's (HUD) efforts to design a national housing insecurity research module that was implemented as a follow-on to the 2019 American Housing Survey (AHS) and identifies how the module's design is expected to inform the development of a validated index of housing insecurity. Discussion includes factors related to scale development that influenced the module's design; the basis of the module's sampling frame; and plans to assess the validity of a resulting index using contextual questions about stress and basic needs tradeoffs, food security index scores, and core affordability and quality measures from the most comprehensive national housing survey in the United States.

Problem: Why Traditional Measures are Insufficient for Constructing a Housing Insecurity Index that is Transferable Across Household Surveys

Housing insecurity is a concept that is regularly used by researchers, policymakers, and program leaders to inform decisionmaking and improve various outcomes. There is no consensus in the research literature, however, as to how housing insecurity should be defined and measured. Different definitions focus on aspects of the home (for example, affordability, residential stability, housing quality, and safety) and neighborhood (for example, neighborhood quality and safety) that make housing situations more or less stable and secure. In short, researchers and policymakers lack common definitions and measures as they conduct research on housing problems and the relationship between housing and other outcomes like health and education. This section expands on previous research on the need for a housing insecurity index and addresses why traditional measures of housing cost burden and quality are insufficient for constructing a measure that is transferable across household surveys and suitable for use in a variety of survey instruments.

Our Toolbox is Incomplete

Researchers, program designers, program evaluators, and other local and federal policymaking bodies are often in search of a vetted means of measuring and describing an array of housing problems, their correlates, and their consequences. Some research is intimately focused on specific housing problems like crowding, cost burden, or housing quality—all of which have a variety of definitions and measures. Many other researchers are seeking a vetted means of gauging whether an individual or household is more or less housing secure and how that level of housing insecurity may be related to or explain other observed outcomes. Others are curious about housing insecurity as a dependent variable; for example, to learn more about which intervention types or doses are

likely to improve housing security. The transactional costs of building evidence in this field can be high, given the time and effort required to cultivate and choose among a variety of potential measures. Similarly, making use of evidence requires a detailed investigation of each study's unique definition and measures.

The various quests described, often make their way to the doorstep of the U.S. Department of Housing and Urban Development (HUD), commonly in the form of a quick turnaround request to staff in the Office of Policy Development and Research (PD&R) for a short, vetted list of housing insecurity questions to include in large- or small-scale surveys and program evaluations. Requesters (both internal and external) often seek a short-form means of identifying housing problems with predictable or theoretical correlation with other outcomes, such as child development, health, education, self-sufficiency, employment, crime, homelessness, and community development. A series of questions from PD&R staff typically ensues: Which aspect of housing insecurity? Why not other elements? How many questions? What is the population of interest? What is the level of inquiry?

While these types of probing and exploratory questions are good standard practice for any research endeavor, the process of searching for good housing insecurity measures presents an additional challenge. As has been well-documented in recent research reports (for example, Cox et al., 2019; Cunningham, Leopold, and Posey, 2016; Leopold et al., 2016), there is no consistent definition of housing insecurity that captures its various dimensions across a continuum of security. The lack of uniformity in the measurement of housing needs, tradeoffs, and correlates stands in contrast to the widely understood standardized continuum of food security measured by the transferable U.S. Household Food Security Survey Module. A validated composite index of housing insecurity would bring a valuable and much-desired tool to the research and policy development world, a practical and policy-relevant alternative to the variety of definitions and measures that currently compete (or amicably coexist) in existing research. Namely, a composite, transferable index of housing insecurity suitable for use in a variety of survey and evaluation instruments could significantly improve research that has previously excluded or insufficiently specified housing problems.

Traditional Measures Inform the Conceptual Framework for a Continuous Housing Insecurity Index

To begin, it is instructive to review the ways in which existing measures of housing problems provide a starting point for developing such an index. Researchers have long been engaged in the development of definitions and measures of housing insecurity. These measures inform both the conceptual scope of a housing insecurity index and provide precedent for constructing new measures over a continuous scale. A few examples illustrate the variety of measurement approaches employed.¹ The concept for “worst case” housing problems in HUD's longitudinal Worst Case Housing Needs Report to Congress was developed in the early 1980s from discussions among Senate appropriations staff, the Office of Management and Budget (OMB), and HUD (HUD, 1991). HUD produces biennial estimates of very low-income renter households without federal

¹ These examples tend to coalesce around themes of housing affordability, stability, and quality. Other approaches measure narrower or broader conceptual themes.

rental assistance experiencing severe housing affordability or quality problems using data from the American Housing Survey (AHS).² In addition to affordability and quality measures, other approaches integrate measures of housing instability such as frequent moves or temporary housing situations. For example, Children's HealthWatch developed a survey to track health outcomes of low-income children and families as a function of housing insecurity, measured by frequent moves, living in temporary doubled up or crowded conditions, or being behind on rent (Children's HealthWatch, 2018). Similarly, the Urban Institute launched a Well-Being and Basic Needs Survey (WBNS) in December 2017 that identified housing problems using various measures drawn from the AHS, the American Community Survey (ACS), the National Health Interview Survey (NHIS), and the Survey of Income and Program Participation (SIPP) on tenure and structure type, rental assistance, difficulty affording housing or utilities, and forced moves (Karpman, Zuckerman, and Gonzalez, 2018).³ Each of these approaches captures important dimensions of housing problems and provides useful insights about their consequences.

Existing measures also provide a framework for thinking about particular elements of housing insecurity across a continuum. Affordability measures like cost burden, or quality measures like physical adequacy or crowding, are often conceptualized in this way. The percentage of a household's gross income consumed by gross rent is a continuous measure of cost burden from 0 to 100 percent.⁴ Categorically, cost burden over 50 percent of household income is a common indicator of severe affordability problems, while burdens between 30 and 50 percent typically indicate moderate affordability problems. Housing quality can also be measured across a scale. For example, HUD uses AHS data to identify whether a home has severe or moderate physical problems, defined by type and number of functional and maintenance inadequacies (Watson et al., 2017). Crowding measured by persons per room offers another continuous scale (Blake, Kellerson, and Simic, 2007). Continuous or scaled measures like these describe household trends across time, geography, and other demographic dimensions and assess outcomes associated with increasingly severe housing problems.

Some researchers have begun examining ways to use existing data to construct multi-dimensional housing insecurity scales. Routhier (2019) made a case for measuring housing insecurity with a multidimensional index, arguing that freestanding concepts overlook the exacerbating effects of overlapping housing problems. Using factor analysis of AHS data, Routhier found four distinct dimensions of housing insecurity: unaffordability, physical problems, forced moves, and crowding. A positive correlation is found within and across dimensions, with 22 percent of renters nationally experiencing three or more overlapping problems, undercutting the notion that households trade off between dimensions. Cox et al. (2017) similarly argued that single-dimension measures do not adequately capture the multidimensionality of housing insecurity, particularly considering differences across geography. Analyzing AHS data, Cox et al. (2017) found seven dimensions of housing security. Four dimensions are similar to Routhier's (2019) findings, coalescing around

² HUD categorizes households by relative income adjusted for household size, for programing purposes. Extremely low-, very low-, and low-income categories represent households with incomes not exceeding 30 percent, 50 percent, and 80 percent of the local area's median family income (AMI), respectively (Watson et al., 2017).

³ Both the Children's HealthWatch Survey and WBNS also measure respondents' level of food security across a continuum using the U.S. Department of Agriculture's (USDA) food security module.

⁴ For more information on very high rent burdens, see Eggers and Moumen (2010).

affordability, instability, unit safety, and unit quality concepts. Cox et al. (2017) additionally argued for including neighborhood quality, neighborhood safety, and homelessness elements.

Traditional Measures Alone are Insufficient for Constructing a Transferable Housing Insecurity Index

Although these traditional measures are informative, we contend they are insufficient for constructing a transferable housing insecurity index. The indices proposed by Routhier (2019) and Cox et al. (2017) offer insight into the insufficiency of single-dimension population estimates of housing problems, but require the harnessing of a large amount of data from dozens of survey questions—more questions than can practically be included in survey instruments where housing insecurity is just one of many areas of inquiry. In contrast, USDA's short-form food security module, which consists of only six questions, has spurred a growing body of research that examines food security as one element of a larger area of inquiry (for example, Children's HealthWatch, 2018; Karpman, Zuckerman, and Gonzalez, 2018). In the same way, housing research would benefit from a validated measure of housing insecurity based on a reasonable number of survey questions that are transferable across household surveys. In short, a composite, transferable index of housing insecurity suitable for use in a variety of survey and evaluation instruments could significantly advance research that has previously excluded or insufficiently specified housing problems. The next section will introduce HUD's efforts to design a national housing insecurity research module collected as a follow-on to the 2019 AHS.

Opportunity: Designing a National Housing Insecurity Research Module

PD&R has initiated a project to develop and leverage a common language of housing insecurity through a pilot household-level survey module that integrates several conceptual dimensions. As core AHS variables provided necessary data for Routhier (2019) and Cox et al.'s (2017) analysis of existing housing insecurity measures, a new multidimensional research module provides an opportunity for future scale analysis to refine our understanding of how various housing insecurity concepts relate to one another or overlap to exacerbate housing problems.⁵ This section outlines the goals of the housing insecurity research module and details the process PD&R undertook to define the scope of the module.

Defining the Goals of a Housing Insecurity Research Module

The research module was designed for inclusion in the 2019 AHS and is ultimately intended to inform development of a streamlined module that is transferable to other household-level surveys. The resulting index is intended to (1) provide a validated method for calculating household-level scores across a scale of housing insecurity; (2) improve evaluations and survey instruments that have previously excluded or insufficiently specified housing problems; (3) help researchers build a

⁵ The USDA food security module was initially designed to account for multiple dimensions and evolved into a unidimensional measure following scale analysis of pilot tests. See "Chapter 2: History of the Development of Food Security and Hunger Measures" (National Research Council, 2006).

more robust and coherent body of knowledge around housing needs, tradeoffs, and correlates; (4) enhance the quality and consistency of policy-relevant research; and (5) amplify visibility of the continuum of housing needs.

Process of Developing the Scope of the Research Module

This effort is similar in many ways to the process employed by the U.S. Department of Agriculture (USDA) in developing their transferable U.S. Household Food Security Survey Module.⁶ That process included a staff review of literature on the conceptual basis for food security measures and practical questionnaire development, an expert convening on conceptual frameworks and implementation strategies, cognitive assessment and field testing of the inaugural food security questionnaire, survey administration in the annual Current Population Survey, and ongoing analysis to refine the scale and definition of food security.⁷ The scale development literature similarly advises researchers to begin with a clear conceptual framework, proceed to generating a pool of potential survey items⁸ and soliciting expert review, consider inclusion of validation items, and determine an appropriate sampling frame (Carpenter, 2018; DeVellis, 2017). PD&R staff have endeavored to accomplish several of these tasks. Namely, staff reviewed literature on housing insecurity concepts, measures, and related outcomes; reviewed scale development literature and sought advice from measurement analysts; developed a working definition of housing insecurity; compiled and drafted transferable survey questions in line with this conceptual definition; identified an implementation strategy modeled on the topical module framework of the AHS; hosted an expert roundtable to vet the scope and content of a pilot housing insecurity module; engaged partner agencies in revising the module instrument and implementation plans; completed cognitive testing of the module in partnership with the U.S. Census Bureau (Virgile et al., 2019);⁹ and solicited public comment on HUD's plan to implement a follow-on housing insecurity module with the 2019 AHS that will inform development of a composite housing insecurity scale.¹⁰ The next steps in the process include administering the research module to a development sample, evaluating item performance, and analyzing which items are best suited for a final scale (Carpenter, 2018; DeVellis, 2017).

A key outcome of this deliberation and development process was crafting a definition of housing insecurity that would frame the scope and content of the research module questionnaire. This conceptual work is an important first step in developing a scale (Carpenter, 2018; DeVellis, 2017).

⁶ USDA has developed a set of survey modules for calculating household food security scale scores in formats that are adaptable to different survey contexts. See <https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/survey-tools/>.

⁷ More history on food security scale development is available at <https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/history-background/>.

⁸ Items refer to individual survey questions.

⁹ Census subject matter experts and survey methodology experts provided significant input on module improvements during the questionnaire revision and testing process. See Virgile et al. (2019).

¹⁰ The 2019 American Housing Survey 60-day Notice of Proposed Information Collection was published on September 11, 2018: <https://www.govinfo.gov/content/pkg/FR-2018-09-11/pdf/2018-19707.pdf>. The 30-day Notice was published on March 20, 2019: <https://www.federalregister.gov/documents/2019/03/20/2019-05303/30-day-notice-of-proposed-information-collection-2019-american-housing-survey>. Household surveys are expected to be administered through the fall of 2019.

Our proposed definition focuses on stable occupancy in a quality affordable housing unit. More specifically, “housing insecurity” is defined as a significant lapse for a given household of one or more elements of secure housing, where “secure housing” is stable occupancy of a decent, safe, and affordable housing unit. “Affordable” implies that shelter costs are manageable over the long term without severely burdening or compromising other consumption that normally is essential for health and well-being. “Stable occupancy” implies that the household does not face substantial risk of involuntary displacement for economic or noneconomic reasons. Finally, “decent and safe” implies that the unit has physical attributes that satisfy functional needs for well-being related to health, security, and support for activities of daily living. Such attributes include appropriate facilities for excluding external threats, providing climate control, storing and preparing food, maintaining physical and mental hygiene, and developing human potential.

As important as defining what would be included in the scope of the research module was defining dimensions to exclude. Most notably, aspects of the neighborhood or environment that one encounters beyond the confines of the structure or property were excluded from the scope and content of the module. Three concerns drove this decision. First, including neighborhood factors blurs the conceptual focus on housing needs and would significantly expand the scope and questionnaire length of a pilot module. Second, neighborhood amenities and location are a major part of the bundle of housing services that drives housing price, which will be captured by the affordability and quality components of the module. Finally, the negative association between neighborhood amenities and affordability means that including both would reduce the explanatory power of a composite housing insecurity indicator.

Other approaches or measures of housing insecurity may be more detailed and comprehensive than our research module. While the deliberation and vetting process we employed to produce this pilot supports our proposed dimensions as essential components of housing security, Cox et al. (2019) and Leopold et al. (2016) advocate for developing an index that is perhaps more comprehensive than ours (including multiple neighborhood dimensions, for example). The following section sets forth additional details about the content and design of the research module and how it is expected to inform development of a composite, validated, and transferable housing insecurity scale.

Toward Implementation of a National Housing Insecurity Research Module

As noted previously, other researchers have begun to produce and propose indices of housing insecurity based on the analysis of existing AHS measures of housing problems. HUD, however, is in the unique position to design a new method of data collection in tandem with the AHS that is specifically tailored with scale development and transferability in mind. We consider our pilot module to be a “research module” because it will provide the basis for further analysis of the quality of piloted survey questions and an evidence base for how the dimensions of housing insecurity fit together across a continuum. It is our hope that the housing insecurity research module represents an opportunity to expand knowledge about building and analyzing composite indices in the housing field. To that end, this section explains the scale development factors that

influenced the module's design; the basis of the module's sampling frame; and plans to assess the validity of a resulting index using contextual questions about stress and basic needs tradeoffs, food security index scores, and core AHS affordability and quality measures.

Motivating Scale Development Factors Influencing Module Design

During this process, we learned several important question design and scale development tenets. First, we learned that many existing housing questionnaire items are ill-suited for transferable scale development purposes. For example, existing housing survey questions often seek to identify a single objective estimate that requires administering a long series of detailed survey questions, such as identifying each component of gross housing cost expenditures. Long series of questions are counter to the goal of selecting a reasonable number of survey questions to detect an underlying level of housing insecurity and order households along a continuum. The research module presents the opportunity to develop new or revised ways of asking about affordability, stability, and quality concepts.¹¹ In contrast to a detailed series of objective questions designed to determine whether a problem occurred, for instance, the research module presents an opportunity to also test subjective questions, in addition to concise objective questions, that may better capture the stress or anxiety associated with housing problems. In this way, the research module is designed to move us toward meaningful development of item composites, rather than a mere assembly of existing items (DeVellis, 2017).

Traditional measures of crowding provide a prime example of this opportunity. Survey questions used to calculate crowding often require several separate questions about the number of residents and the physical size of the housing unit. Responses to those questions then require some quantitative calculation, such as persons per room or bedroom or square footage per person, to identify the level of crowding across a continuum. The research module will provide us with new options for asking about crowding in the “decent and safe” section of the module. New questions will ask respondents for their opinions about crowding in their home in a more concise way, allowing for comparison between quantitative measures of crowding in the AHS core. For example, we propose to ask research module participants:¹² *“Thinking about the number of people in your home and the space you have, are there more people staying here than can live comfortably in this unit?”*¹³ An alternative research question will allow respondents to select multiple problems associated with crowding under the hypothesis that more associated problems indicate greater housing insecurity:

¹¹ Although some questions in the research module are original, many are modified versions of measures from various existing studies or surveys, including the Delinquent Payments and Notices AHS module (Census, 2017), Recent Mover AHS module (Census, 2017), Healthy Homes AHS module (Census, 2015), Problems/Breakdown AHS module (Census, 2013), Southeastern Pennsylvania Household Health Survey (Pollack, Griffin, and Lynch, 2010), Behavioral Risk Factor Surveillance Survey (Bossarte et al., 2013), National Survey of America's Families (Urban Institute and Child Trends, 2007), Milwaukee Area Renters Study (Desmond and Shollenberger, 2015), Children's HealthWatch Survey (Children's HealthWatch, 2018), Bailey et al.'s (2016) housing insecurity study, HUD's study of Housing Needs of American Indians and Alaska Natives in Tribal Areas (Pindus et al., 2017); Entner Wright et al.'s (1998) doubling up study; Arcury et al.'s (2012) migrant farmworker housing study, and Datar, Nicosia, and Shier's (2013) study of parent perceptions of neighborhood safety.

¹² The final research module implemented with the 2019 AHS will be published with the AHS core questionnaire on Census's AHS website: <https://www.census.gov/programs-surveys/ahs.html>.

¹³ Modeled on a similar question included in HUD's study of Housing Needs of American Indians and Alaska Natives in Tribal Areas (Pindus et al., 2017).

“Thinking about the number of people in your household and the space you have, are any of the following problems a major issue in your household? [Mark all that apply] 1. Not enough personal space, 2. Not enough privacy, 3. Too noisy, 4. Too much conflict, 5. None of the above.”¹⁴

A related lesson learned from our expert convening was to use the research module to test more questions than will be included in the final scale to ensure adequate coverage across the multiple dimensions of housing insecurity to allow for selection between tested measures. The initial module PD&R presented to expert conveners in August 2017 consisted of 13 questions, with 4 to 5 questions per dimension. We learned, however, that scale analysis of more questions would provide greater opportunity for developing an evidence base for narrowing the list of questions that adequately capture a continuum of severity across multiple dimensions. Prior to pretesting, scale construction guides recommend generating more than two or three times the number of items that will be needed for a final scale (Carpenter, 2018; DeVellis, 2017; Hinkin, Tracey, and Enz, 1997). In short, more data provides a richer platform for analyzing options for a potential index, and a longer research module allows for greater power to detect items that cover the continuum of problems across multiple dimensions.¹⁵ Therefore, the research module was designed to sometimes ask similar questions in different ways to allow for assessment and selection between items. In a similar vein, we designed questions to provide adequate coverage across two important subgroups of interest: renters and owners. Therefore, the final research module includes approximately 63 questions for renters and 55 questions for owners.

Further, we designed the module with some hypotheses in mind about where we might expect certain experiences to fall along a continuum within each dimension of housing insecurity and endeavored to write questions along that continuum. We employed a variety of universe screens and skip patterns to target increasingly severe experiences while reducing respondent burden and cognitive complexity. For example, in the “affordability” section of the module, participants will be asked to respond to a series of questions indicating difficulty affording housing costs, such as: *“Overall, [in the last 12 months / since you’ve lived here] how difficult was it for you to afford your [rent/mortgage] payments? 1. Very difficult, 2. Moderately difficult, 3. A little difficult, 4. Not at all difficult.”¹⁶* Those with “very difficult” or “moderately difficult” responses will then be asked a follow up question indicating the frequency of that difficulty: *“How often [in the last 12 months / since you’ve lived here] was it difficult to afford your [rent/mortgage]? 1. Only 1 or 2 months, 2. Some months but not every month, 3. Almost every month, 4. Every month.”* Respondents with greater difficulty affording costs with higher frequency are expected to have higher housing insecurity scores within the affordability dimension than respondents with little or infrequent difficulty.

The development of the research module highlighted the difficulties inherent in anchoring

¹⁴ For research on crowding, including its measurement and effects, see Ahrentzen (2003), Blake, Kellerson, and Simic (2007), Booth, Johnson, and Edwards (1980), Gove, Hughes, and Galle (1979), Myers, Baer, and Choi (1996), and Sandel and Wright (2006).

¹⁵ Similar to the process employed by USDA in developing the food security scale, we plan to engage scale design experts to analyze research module data using psychometric methods and produce a report of statistically supported options for a narrower set or sets of questions for a housing insecurity scale. We anticipate this analysis will be conducted between 2019 and 2021.

¹⁶ Modeled on a similar question in the Southeastern Pennsylvania Household Health Survey (Pollack, Griffin, and Lynch, 2010).

respondents to a consistent time period across question domains. While some of the questions we ask are about a household's housing situation "right now," most refer to the time period of the "last 12 months." For instance, in the "stable occupancy" section of the module, we are interested in the number of times the household has moved in the last 12 months, a measure related to health outcomes. Detailed questions about multiple residences were more difficult to ask. For example, respondents are asked about eviction threats and notices and foreclosure notices in their current unit and, if they've moved in the last year, in their previous unit.¹⁷ If they've lived in their current unit for 12 months, they are asked to think about "in the last 12 months," and if they have lived there for less than 12 months, they are asked to consider the time "since you've lived here." We sought to balance collecting accurate information by cognitively anchoring respondents to specific housing units with the goal of collecting complete information for the entire 12 months.

This challenge also affected questions about housing affordability and housing quality. For most questions in those domains, we ask respondents to answer about their current place of residence. This approach is similar to that used in the "worst case needs" tabulations of housing cost burden and housing inadequacy. For the housing cost burden measures, average monthly household income is used in the calculation, but housing costs are average monthly costs for the current home. Housing inadequacy estimates are also for the current home. In this sense, "worst case needs" for a given year are anchored in the unit respondents live in at the time of the interview. Anchoring on the unit at the time of interview reduces the cognitive burden of respondents having to average housing affordability and housing quality across multiple housing units if they have lived in multiple units over the last year. It also ensures that questions are asked about one household, as respondents who have moved multiple times may have lived in multiple households of varying composition over the previous year.

Finally, the multidimensional design of the research module affected our expectations about how a resulting index may ultimately be scored across a continuum. Although current literature suggests that problems within some dimensions of our proposed definition of housing insecurity are more common than others (for example, HUD's Worst Case Housing Needs reports suggest that severe affordability problems are more prevalent than severe quality deficiencies), we propose that housing insecurity under any one dimension (affordability, stable occupancy, or decent and safe housing) could be understood as housing insecurity in general. Therefore, we envision scoring survey responses for each dimension of secure housing separately. Further scale analysis will provide additional insight into the feasibility of scoring households across a single latent dimension of housing insecurity. The following section discusses the sample design for the module, which is based on policy-relevant demographic factors and scale development requirements.

Sampling Frame and Opt-in Strategy

An important aspect of the module development process was defining the target population for the research module. Given that the module is longer than a standard topical module appearing in the AHS, PD&R partnered with Census to structure an implementation plan to implement the research module as a separate but close-in-time follow-on to the administration of the regular AHS survey. This strategy will mitigate respondent burden for the regular AHS, allow for appropriate sample

¹⁷ Questions are dependent on tenure of the current and previous unit.

targeting for the research module, and allow for linkage with key affordability, stable occupancy, and housing quality questions in the core AHS.

Our goals in designing the sampling frame were multifold. First, we wanted the selection criteria to ensure coverage of different household types, such as owners and renters, households with roomers, and so on, so that the pilot could be validated—and a resulting index would be relevant—across household types. In our consultation with scale development experts, we also learned the importance of adequate coverage of rare events for scale calibration. Each item in the index series will provide information about the scale. Therefore, the sample plan would need to target enough households expected to say “yes” to rare events so that the “tail” of the scale can be developed. For example, we hypothesize that the lowest income renters with recent moves will be more likely to experience severe housing insecurity than other households (for example, Desmond, 2016; Sandel et al., 2018). Therefore, sufficient coverage of this population is especially important during the piloting stage.

Finally, we sought to target policy-relevant demographic groups. The USDA Economic Research Service (ERS) uses a means test for food security, 185 percent of the federal poverty line, plus an initial screener question about having enough to eat in the last 12 months. This strategy targets a policy-relevant demographic for food assistance programs. By analogy, HUD-defined income limits and fair market rents are designed to account for program-relevant geographic variation in incomes and housing costs. Most housing assistance programs target low-income households, a relative measure based on how household income compares with median incomes in the local area.¹⁸ Compared with the poverty threshold commonly referred to in the food security field, relative income based on geography is more commonly used in the housing context because housing costs vary so widely across geography.¹⁹

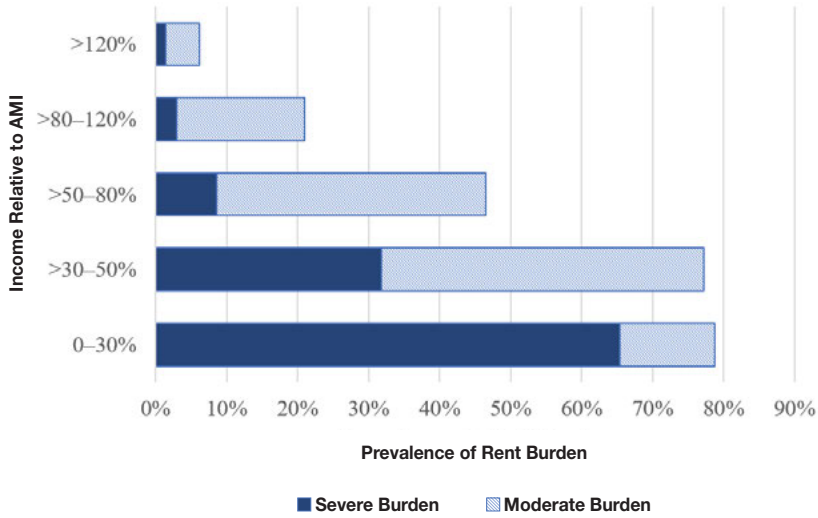
We conducted additional analysis to determine the income thresholds that were likely to capture households experiencing housing insecurity. For example, HUD’s Worst Case Housing Needs report provides useful housing cost burden estimates by program-relevant income levels. As shown in exhibit 1, very low-income and extremely low-income renters are highly likely to experience rent burdens, although renters up to 80 percent of area median income (AMI) are still fairly likely to be moderately burdened. As shown in exhibit 2, cost burden prevalence is somewhat less for owners. Elderly owners at the lowest income levels, however, may have greater risk of experiencing affordability problems than younger owners (Goodman and Ganesh, 2017).

¹⁸ By statute, HUD programs are designed to target families with low incomes, below 80 percent of AMI (42 U.S.C. §1437a). Many programs require or set aside most assistance for families with even lower incomes (for example, 42 U.S.C. §1437f(o)(4); 42 U.S.C. §1437n(a), (b), and (c)).

¹⁹ Unlike the food security module, the housing insecurity research module will rely on a means test opt-in approach without a second sufficiency screen. Given the multidimensional nature of the module, a second screen that allows households at any income level to opt in to the module based on insufficiency in any one dimension may screen out households that experience other types of housing insecurity (for example, they are secure in terms of affordability, but insecure in terms of decent and safe housing). After the data are collected, we intend to analyze questions to determine if there is a second survey question that predicts housing insecurity among those at higher income levels that may be a good candidate for a second opt-in screen.

Exhibit 1

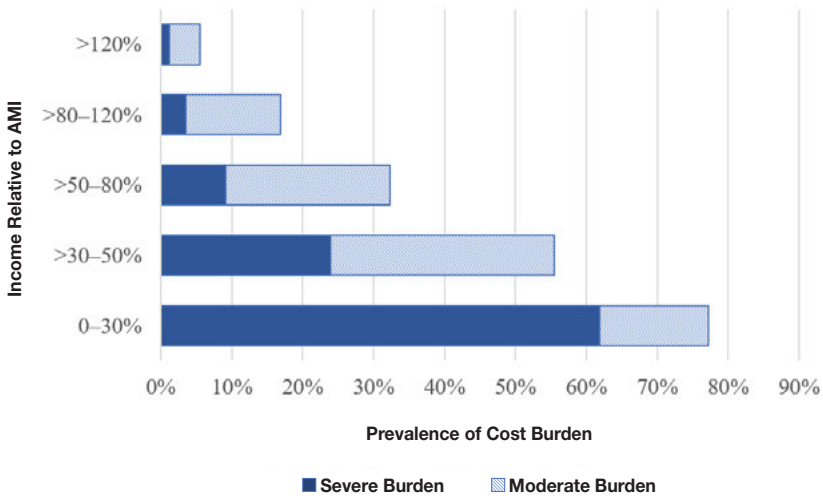
Prevalence of Rent Burden by Relative Income (Renters)



AMI = Area Median Income.
Source: 2017 Worst Case Housing Needs Report

Exhibit 2

Prevalence of Cost Burden by Relative Income (Owners)



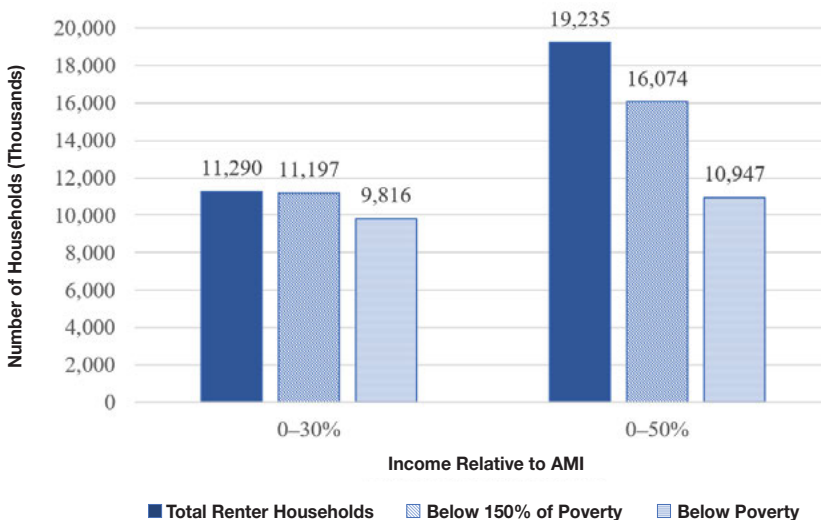
AMI = Area Median Income.
Source: 2017 Worst Case Housing Needs Report

From a policy and program relevance perspective, the 80 percent of AMI threshold represents a reasonable means test for selecting households for the module. Owners and renters below this threshold are likely to experience either moderate or severe cost burdens, offering a good representation of our population of interest with enough variation to identify households along a continuum of housing security. The 80 percent of AMI threshold also represents the threshold for “low-income” that is used to determine eligibility for various types of housing assistance. Although most households receiving HUD assistance have incomes below 30 percent of AMI, including some cases up to 80 percent of AMI in the research sample will be useful for calibrating housing security across a continuum. Households above HUD’s low-income threshold are less likely to experience the types of housing problems within the scope of the research module. From a practical perspective, broadening the sample to higher income groups would also result in fewer lower-income cases in the sample.

From an implementation perspective, however, defining sample criteria that varies across geography is less practical for developing a module intended to be easily transferable across household surveys. It is practically difficult for Census to apply geographically varying income opt-in criteria to survey administration. Therefore, we identified a poverty-based threshold designed to capture low-income households. HUD’s Worst Case Housing Needs report provides some helpful information about the relationship between poverty levels and HUD’s AMI thresholds. As shown in exhibit 3, almost all extremely low-income renter households had incomes below 150 percent of the poverty line, as did 84 percent of very low-income renters.

Exhibit 3

Number of Renter Households by Relative Income and Poverty Status



AMI = Area Median Income.
Source: 2017 Worst Case Housing Needs Report

Further regional analysis suggested that households with incomes below three times the poverty line (by household size) represents a threshold reasonably sufficient to capture low-income households nationally. Therefore, households up to this income level will be eligible to opt-in to the research module. To enhance scale development and program relevance, the majority of the sample will target households with incomes below two times the poverty line. Further, the sample will target more renters than owners to account for differences in tenure distribution by income²⁰ and higher rates of housing problems like cost burden among renters compared to similarly situated owners. The sample will also account for variation in population size and tenure across the nine Census divisions, resulting in the target sample distribution set forth in exhibit 4.

Finally, for future scale analysis to have the power to detect statistically-supported options for developing a housing insecurity index, we looked to scale development literature and consulted scale development experts to determine the appropriate sample size for the research module. The sample size does not need to be large enough to test the scale for invariance across subpopulations during the piloting stage, but it does need to be large enough to account for the fact that we are essentially creating two scales: one for renters and another for owners. Similarly, models with more parameters, such as our anticipated multidimensional model, may require larger sample sizes than unidimensional scales (Carpenter, 2018). Further, larger sample sizes tend to offer more reliable index results. While there does not seem to be strong consensus in the literature for determining what sample size is adequate for scale development in every context, the literature on subject to item ratios (for example, using a 20:1 rule of thumb ratio) was instructive in determining the appropriate sample size for the research module.

Research by Osborne and Costello (2005) examined the effects of subject-to-item ratios on producing correct factor structures in exploratory factor analysis. They found that larger samples tended to produce solutions that were more accurate, with samples with a 20:1 subject-to-item ratio producing more accurate solutions compared with samples with lower ratios. Samples with a 20:1 ratio were also found to have a lower misclassification rate. Smaller samples ran into problems with converging and producing factor solutions. Osborne and Costello (2004) also found that the best principal components analysis outcomes occur where large sample sizes and high subject-to-item ratios are present.

Given the foregoing considerations, the research module will target a sample that meets a subject-to-item ratio of 20:1 and ensures a sample that is 55 percent renter and 45 percent owner. To estimate an adequate sample size, we first estimated the maximum number of items that renters and owners would receive, considering research module items and comparison questions in the AHS core. For renters, we estimated 63 items in the research module and 35 comparison items in the AHS core for a total of 98 items. For owners, we estimated 55 items in the research module and 35 comparison items in the AHS core for a total of 90 items. Accounting for subject-to-item ratio targets and adjusting for tenure distribution targets to increase the probability of adequate coverage of households expected to experience more severe forms of housing insecurity, the sample will target 1,800 owner cases and 2,200 renter cases for a total of sample of 4,000 cases. Exhibit

²⁰ The 2017 Worst Case Housing Needs Report identified a 58/42 split between renters and owners with very low incomes (see Tables A-1A, 1B) (Watson et al., 2017). Similarly, there is about a 60/40 split of renters to owners among households with household incomes less than three times the federal poverty line.

4 shows the number of households in each tenure and income group targeted for the research module sample.

Exhibit 4

Target Module Sample Size by Tenure and Poverty Level

Tenure	Renter		Owner	
	<2x	2-3x	<2x	2-3x
Poverty x Tenure (n)	1,837	363	1,312	488
Poverty x Tenure (%)	84%	17%	73%	27%
Tenure (n)	2,200		1,800	
Tenure (%)	55%		45%	
Total (N)	4,000			

Exhibit 5 shows the overall distribution of the target sample by tenure and poverty level, compared to the distribution of U.S. households by tenure, poverty level, and worst-case needs status. Comparing the target sample to the distribution of all households, about 80 percent of the research sample will target the distribution of American households with incomes below twice the poverty line. The remaining 20 percent of the target sample will be drawn from the distribution of American households above that level, with incomes up to three times the poverty line.

Exhibit 5

Distribution of Target Sample Compared to U.S. Households

Tenure	Renter			Owner		Total
	<2x	>=2x	>=2x	<2x	>=2x	
Worst Case Needs Status	Yes	No	N/A	N/A	N/A	
Share of U.S. Households	7%	12%	18%	15%	48%	100%
Share of Target Sample	46%	9%	33%	12%		100%

N/A = data not available

Source: 2015 American Housing Survey

Assessing Index Validity

Beyond crafting survey questions and a target sampling frame, the module development process included plans to assess the validity of a resulting index. The AHS is the most comprehensive national housing survey in the United States. Therefore, a key advantage of matching the research module to the AHS is the ability to link module responses to core AHS affordability and quality measures. This strategy serves dual purposes. First, it will allow us to compare core measures to research measures for suitability in a resulting index. Second, leveraging respondent data from the AHS provides a means of vetting subjective research questions against a longer series of objective questions and calculations from the AHS core, for example, comparing subjective research questions about stress associated with affordability problems to quantitative cost burden calculations from the AHS core.

Because the AHS is drawn from a longitudinal sample of housing units, linking data between the AHS core and the research module will be most useful if the household composition remains the same between the time the AHS core and follow-on research module are administered. Therefore, the research module will be implemented close in time to the core survey and will require that at least one household member from the core survey still lives in the household. We are also requesting the same respondent for the core and follow-on modules but allowing for other respondents to help achieve sample size targets for the research module.²¹ Respondents will also be offered an incentive to increase response rates for the follow-on research module.²²

An additional point of comparison for the research module will be household food security index scores. One of the topical modules to be included in a split sample of the 2019 AHS is the USDA food security module. The research module sample will be drawn from the same split sample of U.S. households as the food security module. This strategy will allow us to use food security scores as a point of comparison while building the housing insecurity scale. While we don't anticipate a perfect correlation between these two scores, we would expect some correlation. For example, we hypothesize that households with severe housing affordability problems may experience greater food insecurity than households living in more affordable housing. Implementing the research module in tandem with the AHS will provide the opportunity to assess this relationship and the mitigating role of federal assistance in developing a housing insecurity scale. Implementing the module in tandem with the AHS will also provide the opportunity to examine housing insecurity in relation to shelter poverty,²³ a relationship currently under examination with regards to food security (Steffen, Carter, and Coleman-Jensen, 2018; Steffen and Carter, 2019).

Finally, the research module includes contextual questions about stress and basic needs tradeoffs. Contextual questions will provide deeper insights into module responses and provide additional points of comparison for assessing the validity of a resulting index. For example, at the beginning of the research module, respondents will be asked to rate their overall stress level and health status with: "On a scale of one to 10 where one means you have "little or no stress" and 10 means you have "a great deal of stress," how would you rate your average level of stress during the past month?"²⁴ and "Would you say your health in general is excellent, very good, good, fair, or poor? 1. Excellent, 2. Very good, 3. Good, 4. Fair, 5. Poor."²⁵ We hypothesize that more severe housing insecurity will be associated with higher general stress levels and poorer overall health ratings. Similarly, we've added some contextual questions to the module that may be associated with the experience of shelter poverty. For example, we expect households experiencing severe housing insecurity in terms of affordability may also experience difficulty with affording other necessities like medical or transportation

²¹ It is possible we may miss some mobile households from our sample if the entire household is replaced between the core interview and research module interview. We plan to administer the research module close in time to the core interview to mitigate this potential.

²² Administratively, Census was not able to provide respondent incentives at the opt-in decision point. Rather, the incentive will be mailed after follow-on completion.

²³ Shelter poverty measures the amount of residual income for non-shelter expenses that remains after paying for housing. Households are classified as shelter poor when they do not have enough money to meet a specified amount on nonshelter expenses after paying for housing costs (Stone, 1993).

²⁴ American Psychological Association (APA) Stress in America survey (APA, 2017).

²⁵ National Health Interview Survey (NHIS), PHStat (CDC, 2016).

expenses. In this way, the research module allows for additional points of comparison to vet a resulting index while also providing opportunities to learn more about the relationship between housing insecurity and other hardships.

Next Steps

Consistent with scale development guidelines, the next steps in this project include administering the research module to the target sample, evaluating item performance, and engaging in scale analysis to select which items may be best suited for a final scale. Accordingly, the research module is currently being implemented nationally in tandem with administration of the 2019 AHS. Interviews are expected to be conducted through the fall of 2019. Following data collection, we encourage feedback from scale developers and housing insecurity researchers and policymakers as the index development process proceeds. With the data from the housing insecurity research module, HUD aims to use data reduction techniques like exploratory factor analysis and principal components analysis to identify a smaller set of questions that can be used in a validated index of housing insecurity. Further assessment and calibration of a scale developed through this process would be required over time. HUD hopes that a composite housing insecurity scale could eventually be a tool for federal agencies and external researchers to track trends in housing insecurity, build evidence about a variety of associated outcomes, and improve research about prevention and intervention programming.

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Foreign Exchange

Foreign Exchange, a department of Cityscape, reports on what the U.S. Department of Housing and Urban Development's Office for International and Philanthropic Innovation has learned about new departures in housing and development policy in cities and suburbs throughout the world that might have value if applied in U.S. communities. If you have a recent research report or article of fewer than 2,000 words to share in a forthcoming issue of Cityscape, please send a one-paragraph abstract to Katherine.C.Marinari@hud.gov.

The Future of Multigenerational Housing in Existing Communities: Insights for Transatlantic Cities

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Alexander Nasserjah

German Marshall Fund of the United States

Abstract

In June 2018, the German Marshall Fund's Cities program, in partnership with AARP (American Association of Retired Persons), convened a group of 13 experts from the United States and Europe to explore a specific dimension of multigenerational housing in transatlantic cities around the question, "How can the existing housing stock in established communities be adapted with new housing models and technological innovations?" Over the 2-day workshop, participants discussed alternative housing models and technological innovations that offer the opportunity to connect multiple generations, reduce isolation, and improve integration. This policy article is a synthesis of those discussions and an expansion of key points relating to housing solutions for multigenerational cities. The article begins by presenting a brief overview of the key trends and drivers in the housing market, followed by four alternative housing models discussed in the workshop, and ends in laying out the pathway policymakers and practitioners can move from ideas to action by deciding what type of housing models may be appropriate for their communities. As cities across the United States continue to search for new ways to develop housing that better suits their communities, it is our hope that this article is a useful resource in exploring why it is important to build multigenerational housing, what alternative housing models exist, and how to implement models best suited for those communities.

Abstract (cont.)

This policy paper was originally published by the German Marshall Fund of the United States on July 26, 2019. For the original publication visit: <http://www.gmfus.org/publications/future-multigenerational-housing-existing-communities-insights-transatlantic-cities>.

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Why Transatlantic Cities Need Multigenerational Housing

In November 2017, the Urban and Regional Program (URP) of the German Marshall Fund of the United States (GMF) convened 150 of its transatlantic leaders for its annual BUILD conference, which took place in Detroit, MI. GMF partnered with American Association of Retired Persons (AARP) on a breakout session titled “Multigenerational Cities: Aging as Innovation.” This session brought together a cross-sector group to discuss the importance of building multigenerational cities, and to share thoughts on the policies, plans, and practices that contribute to age-friendly cities. From this discussion, GMF and AARP gleaned that transatlantic urban leaders viewed housing and mobility as key factors to achieving age-friendly cities.

As a followup to BUILD, GMF and AARP convened a group of 13 transatlantic experts from their networks to explore a specific dimension of multigenerational housing in transatlantic cities: How can the existing housing stock in established communities be adapted with new housing models and technological innovations? This is an important part of the overall discussion of affordable and accessible housing challenges facing many cities. The workshop had a specific focus on existing neighborhoods and housing stock to emphasize the importance of adapting what is already there rather than building new. Given the large amount of housing stock in cities on both sides of the Atlantic that is not fit to support aging in place, this should be a priority for policymakers and planners in building more age-friendly communities.

Over 2 days, participants discussed alternative housing models and technological innovations (such as smart home systems and wearable devices) that offer the opportunity to connect multiple generations, reduce isolation, and improve integration. The group worked to identify good practices and specific conditions that would enable implementation, all with an eye to the transferability to both the United States, United Kingdom, and European contexts. It was clear from the outcome of the workshop that the rapid pace of technological change will continue to influence the ability of people to age in place and thrive in their existing communities. While urban leaders must be plugged in to how technology can support age-friendly policy objectives, the group identified an opportunity to focus additional transatlantic engagement around alternative housing models that serve multiple generations.

This policy report synthesizes and expands on the key points from this year-long dialogue on

housing solutions for multigenerational cities. The first section presents a brief overview of the key trends and drivers that suggest that alternative housing models are important levers for enhancing multigenerational cities. It then presents the four models discussed in the June 2018 workshop, including examples of good practice, policy enablers, and factors to consider for transatlantic transfer. The final section lays out a pathway for moving from ideas to action that policymakers and practitioners can consult to determine what type of housing models may be appropriate for the unique context of their communities. This policy report is intended to be a primer for the future exploration of specific models and the enabling of policies that can provide further support and direction to transatlantic urban and regional leaders.

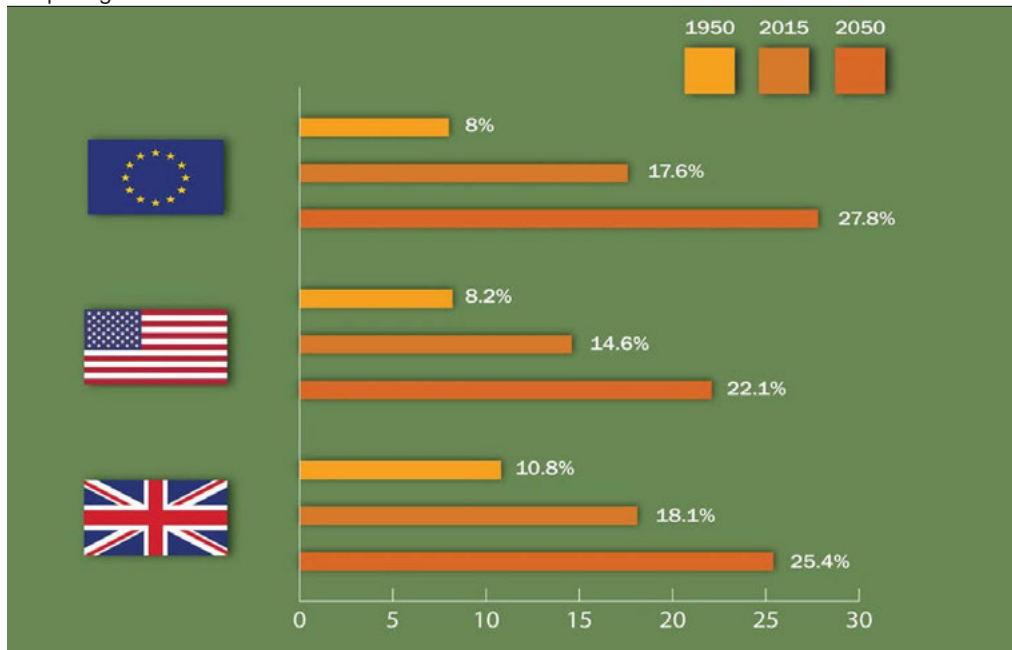
Why Does Multigenerationalism Matter in Transatlantic Cities?

People Are Aging

McKinsey Global Institute asserts that aging and demographic change is one of the four most significant global trends that impact economies, politics, and societal change (Dobbs, Manyika, and Woetzel, 2015). This widely recognized global trend is particularly relevant in the United States and Europe where there has been a steady growth of the population in the 65 years and over demographic since 1950. Aging is part of the normal human process; however, the post-war or “baby-boomer” bubble moving into retirement age has brought new attention to this age group.

Exhibit 1

United States/United Kingdom/European Union Comparative Percentage of Total Population of People Aged 65+ Over Three Time Periods



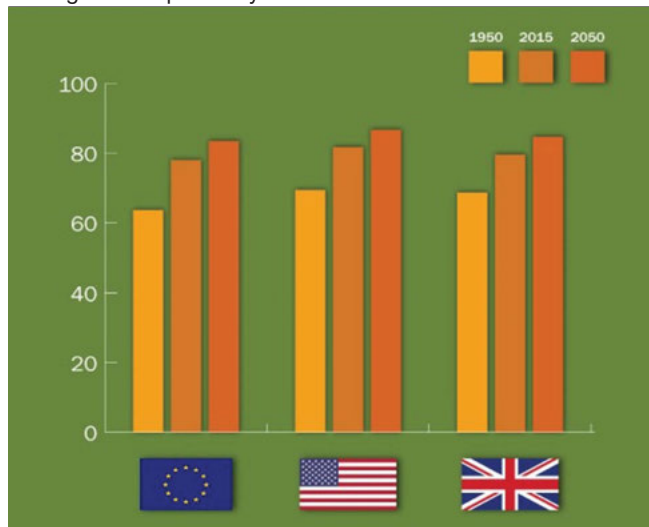
Source: United Nations Department of Economic and Social Affairs Population Division, “Profiles of Ageing 2017”

People Are Living Longer

Across the board, adults in the United States and Europe are living longer. Life expectancies in both regions are expected to increase by approximately 5 years by 2050 when one-fifth of the U.S. population and over one-fourth of the European population will be 65 or older. Advances in medicine and supportive technology are also enabling people to be healthier in their longer life. Both trends point to the need to build suitable housing for aging populations that helps them remain in their communities and expand access to affordable and safe housing.

Exhibit 2

United States/United Kingdom/European Union Comparative Average Life Expectancy



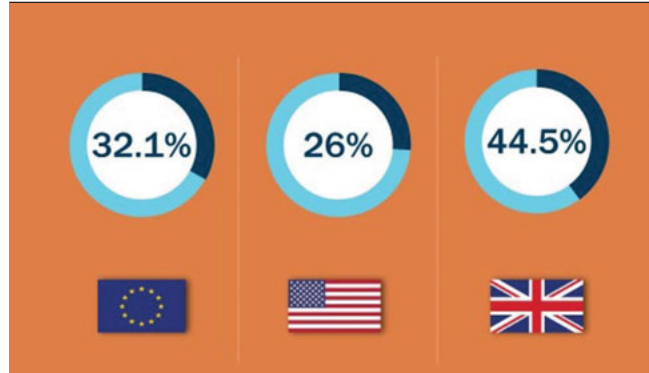
Source: United Nations Department of Economic and Social Affairs Population Division, "Profiles of Ageing 2017"

More People Are Living Alone

Today, of those who are 65 and older, nearly one-third in Europe and one-fourth in the United States live alone. The trend is not just limited to this age group. In the United States, the number of single-person households has increased by 20 percent since 1960 (U.S. Census Bureau, 2018). In the European Union (EU), there is an increasing trend of people living in smaller households, especially in northern European countries; between 2005 and 2013, the share of EU households with one or two persons increased by 4 percent. Many people live alone by choice, but increasingly the high cost of living in urban areas is increasing the burden of rent and mortgages on small households. By creating housing choices that promote multigenerational living, there is the opportunity to address economic pressures while leveraging the social benefits of shared living.

Exhibit 3

Percentage of Older People Who Live Alone



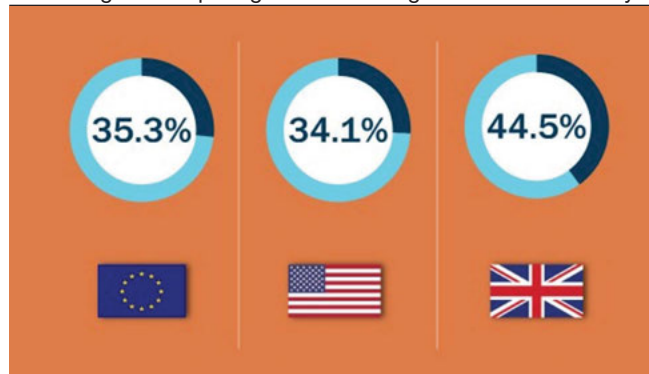
Sources: Eurostat, "A Look at the Lives of the Elderly in the EU Today," (November 27, 2015); Renee Stepler, "Smaller Share of Women Ages 65 and Older Are Living Alone," (February 18, 2016)

Cities for Multiple Generations

In the United States and Europe, cities continue to grow due to migration and immigration; by 2050, 87 percent of the U.S. population and 82 percent of the European population will live in urban neighborhoods. This population growth is multigenerational with adults aging in place or moving to cities, younger people moving to cities for education and job opportunities, and more families choosing to stay and raise their children in urban areas. On the U.S. side, cities are experiencing two trends regarding the 65 and older demographic. First, the historic trend of seniors moving to the Sun Belt is shifting to population growth in other metropolitan areas, with the population of seniors in most cities in the United States growing by 7 percent between 2011 and 2014 (Kotkin and Cox, 2016). Second, 77 percent of people aged 50 and older in the United States want to remain in their communities as long as possible (Binette and Vasold, 2018). The multigenerational nature of cities brings many benefits to both the economy and society.

Exhibit 4

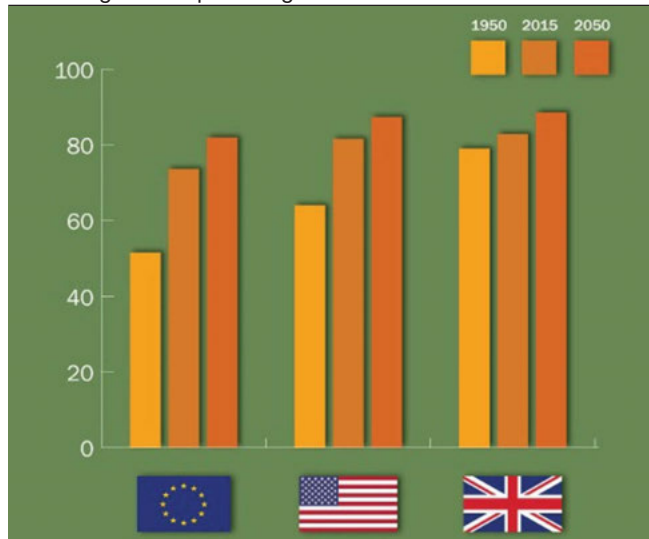
Percentage of People Aged 18-34 Living at Home with Family



Source: Eurostat, "Share of Young Adults Aged 18-34 Living with Their Parents by Self-Defined Current Economic Status," (March 18, 2019); Jonathan Vespa, "Jobs, Marriage and Kids Come Later in Life," (August 9, 2017)

Exhibit 5

Percentage of People Living in Urban Areas



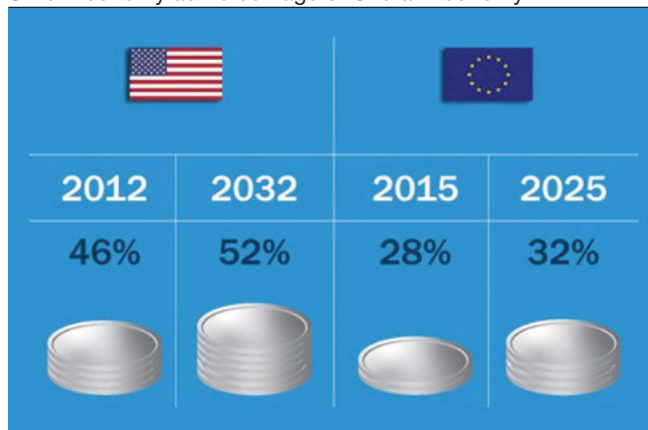
Source: United Nations Department of Economic and Social Affairs, "2014 Revision of the World Urbanization Prospects," (July 10, 2014)

Economic Benefits

In the United States and Europe, the “silver economy” (people aged 50 and older) accounts for a significant portion of each region’s annual gross domestic product (GDP). As their populations continue to age over the next 10 years, the silver economy’s contribution will grow. By 2025, Europe’s silver economy population will account for 32 percent of the annual GDP. By 2032, the silver economy will account for more than half of the U.S. annual GDP. Leveraging multigenerationalism in urban areas can shift the narrative surrounding the aging from a drain on the economy to an asset, as posited in the silver economy. Allowing older adults to live in and contribute to their cities through expanded housing choices will ensure the silver economy’s potential is fully realized.

Exhibit 6

Silver Economy as Percentage of Overall Economy



Sources: European Commission, "Silver Economy Study: How to Stimulate the Economy by Hundreds of Millions of Euros per Year," (May 3, 2018); AARP, "The Longevity Economy," (September 2014)

Social Benefits

Aside from the silver economy, multigenerational cities have many societal benefits. For families with younger children, grandparents provide childcare for working parents. Volunteer and mentoring programs provide opportunities for generations to engage and learn from each other. Older adults can also be powerful contributors to local economies by pursuing new entrepreneurial ventures as second careers, by mentoring young professionals, and by investing in local businesses (Lee, 2017).

The trends are clear: aging is a powerful and positive opportunity for U.S. and European cities. Public, private, and civic sectors, however, must align their efforts not only to support age-friendly policies but also to enhance the multigenerational nature of cities. As recognized by the URP's network of urban leaders, housing is a critical lever for achieving this. Multigenerational housing can be achieved through housing models that enable people of all ages to live together and share space in different ways.

Expanding Multigenerational Housing Opportunities in Existing Communities

This article focuses on strategies to increase the supply of multigenerational housing options in existing communities. In keeping with the principles of compact and sustainable urban development, it is essential to focus development in existing communities as opposed to on the urban periphery. Not only does this facilitate the preservation of social and economic ties to place, but it also makes efficient use of existing housing stock through building retrofits and underutilized land. Focusing on infill development and retrofits also aligns with how people are living, especially

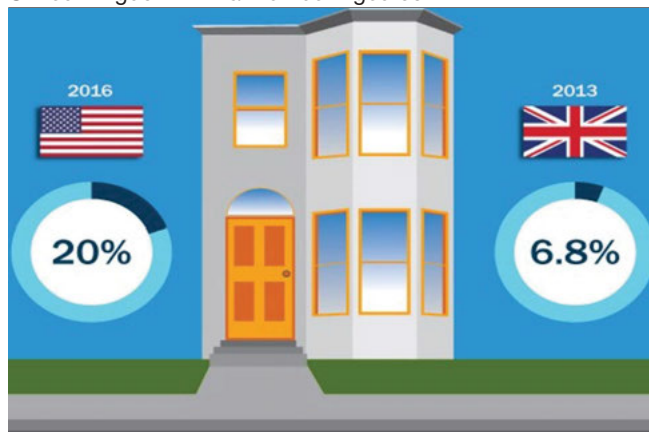
in Europe and the United Kingdom. In 2016, over 41 percent of the EU's population lived in apartments. Following are some additional factors to support new multigenerational housing development in existing communities.

People Already Live Multigenerationally

As of 2016, 20 percent of Americans lived in multigenerational households, which are defined as having at least two adult generations or grandparents and grandchildren younger than 25. Across Western Europe and the United States more than one-third of households have a member who is 60 years or older; the percentages are even higher in southern European countries and in rural areas of Eastern Europe where there are traditionally larger, multigenerational households (Eurostat, 2018). The transatlantic trend toward multigenerational households can be attributed to cultural norms among certain ethnic and minority populations, economic reasons due to rising housing costs, and social supports to aid with childcare or eldercare. As more people see the benefits of multigenerational living, there will be more demand for housing that can accommodate different needs.

Exhibit 7

Multigenerational Households in the United States and the United Kingdom with a Member Aged 60+



Sources: D'vera Cohn and Jeffrey S. Passel, "A Record 64 Million Americans Live in Multigenerational Households," (April 5, 2018); Gemma Burgess, Charlotte Hamilton, Michael Jones, Kathryn Muir, "Multigenerational Living: An Opportunity for UK House Builders?" (July 2017)

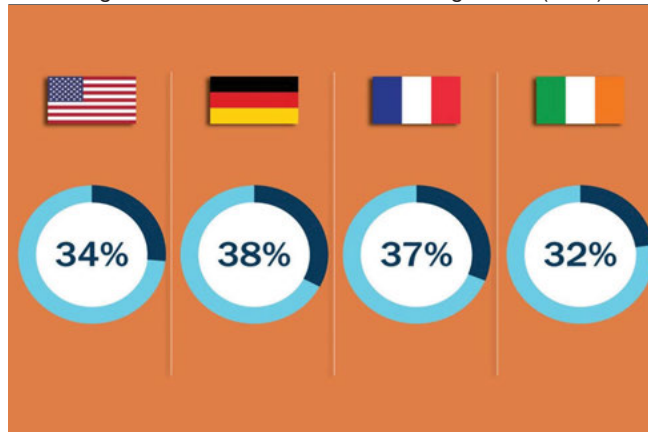
More People Could Live in Multigenerational Housing

Across the EU and the United States, there are two trends that suggest there is an opportunity for additional shared living in multigenerational settings. In the United States, 79.5 percent of householders age 65 and older owned their homes in 2016 (U.S. Census Bureau, 2017). In 2016, approximately 16.6 percent of the EU's population was living in an overcrowded household,

whereas more than 34.8 percent was living in under-occupied dwellings.¹ With the trend of the increasing percentage of single-person households on both sides of the Atlantic, there is an opportunity for older and younger generations to share existing housing units. This would increase the efficiency of urban housing and address the issue of under-occupied housing, while also offering social benefits and housing cost-sharing.

Exhibit 8

Percentage of Households with Members Aged 60+ (2018)



Source: United Nations Population Division, "Household Size & Composition, 2018," (2018)

Exhibit 9

Percentage Household Size Composition (2017) (United States/Germany/France/Ireland)

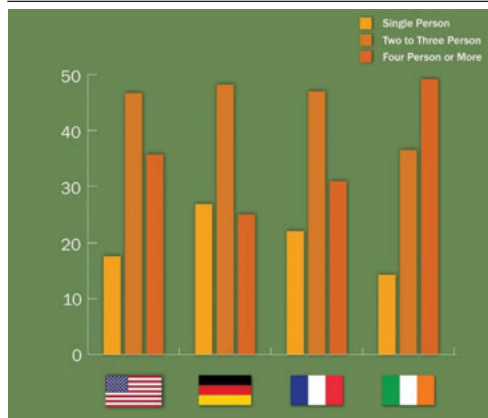
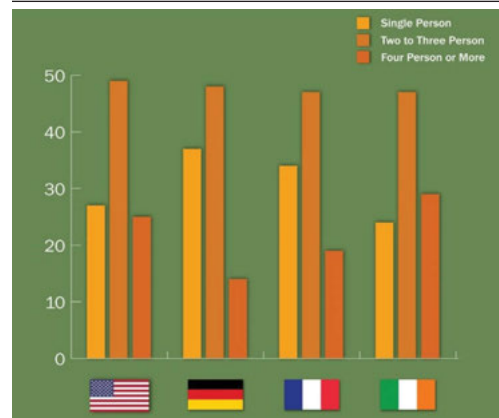


Exhibit 10

Average Household Size of New (Average Size) Houses Built (United States/Germany/France/Ireland)



Sources: United Nations Department of Economic and Social Affairs Population Division, "Household Size and Composition Around the World 2017," (2017); United Nations Population Division, "Household Size & Composition, 2018," (2018)

¹ More than two-thirds of the population in Ireland, Cyprus, Malta, and Belgium lived in under-occupied housing in 2016, whereas the share was more than half in Spain, Luxembourg, the United Kingdom, and the Netherlands. At the other end of the range, the proportion of the population living in under-occupied housing was less than 10 percent in Latvia, Hungary, and Romania.

Developing Multigenerational Housing Communities Not Without Challenges

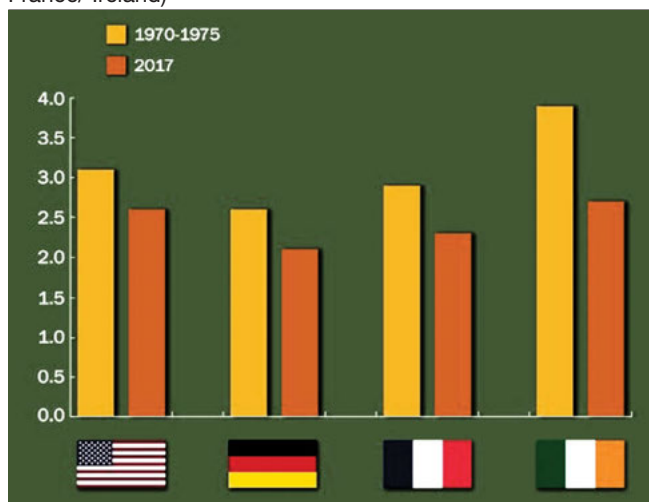
There are distinct reasons why different housing models that cater to multiple generations are not being constructed across the United States and Europe. This policy paper examines those challenges and offers ideas for how to adapt policy and regulation on both sides of the Atlantic. One of the biggest challenges that is outside of the purview of policymakers and local leaders is the mismatch in supply and demand in the housing market. With household sizes across the United States, the EU, and the United Kingdom getting smaller, the real estate market is responding in different ways on both sides of the Atlantic. In the United States, the size of new houses being built has remained the same or, in some cases, the size of new houses being built is increasing.

Europe is ahead of the United States on this point. Housing unit sizes in the United Kingdom have been decreasing since the mid-20th century (Collinson, 2018). In Europe, the number of square meters of housing per person has largely remained constant or decreased in urban areas. Careful engagement with real-estate developers, architects and planners is an essential part of the strategy for creating the enabling conditions for multigenerational housing that rely on alternative models.

The remainder of this paper presents the alternative housing models that can help achieve the twin goals of supporting multigenerationalism and effectively adapting existing housing to meet new needs and realities. The next section gives an overview of the models with insights on how they are implemented in U.S., European, and U.K. cities. The following section then provides building blocks for policymakers and practitioners to consider in assessing the unique needs of their communities and how alternative housing models can address them. These building blocks offer suggestions to consider in a policy-planning process and in implementing ideas—moving from ideas to action.

Exhibit 11

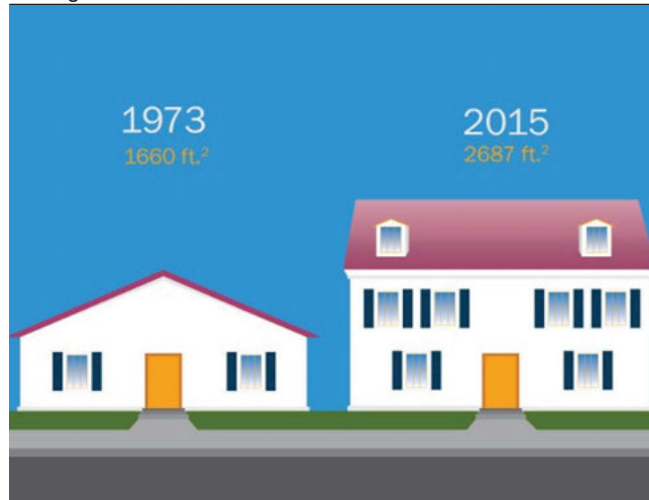
Average Household Size (United States/Germany/
France/ Ireland)



Sources: United Nations Department of Economic and Social Affairs Population Division, "Household Size and Composition Around the World 2017," (2017); United Nations Population Division, "Household Size & Composition, 2018," (2018)

Exhibit 12

Average Size of New Houses Built in the United States



Source: Mark J. Perry, "New US Homes Today Are 1,000 Square Feet Larger Than in 1973 and Living Space per Person has Nearly Doubled," (June 5, 2016)

Exploring the Models

As discussed earlier, the shifting demographics in transatlantic cities are also impacting housing needs and preferences across the age spectrum. With the cost of living in most urban areas already high, it is important to create alternative models for housing that will enable people to age in their homes or communities for as long as possible. Failure to do so risks displacement to areas with weak transportation infrastructure, medical and social services, as well as damage to the fabric of the community. This section presents different alternative housing models that provide opportunities to expand multigenerational living in existing communities. These models are drawn from U.S. and European practice; in some cases, the models are working on both sides of the Atlantic but under different contexts.

Extensive domestic resources are available on these models in situ, but the transatlantic opportunities for knowledge and policy transfer are available to bring additional perspectives and considerations to the implementation of new models. In some specific cases, one side of the Atlantic has solved a particular challenge in a unique way that may unlock barriers to implementation on the other. The models presented in the following exhibits include accessory dwelling units, co-housing, shared housing, and short-stay hotels. These models largely fall along a spectrum of engagement intensity and can be adapted to different scales of existing units from single-family structures to multifamily buildings.

While each model is unique, there are several common factors that are relevant for transatlantic audiences to bear in mind.

Models are not inherently multigenerational; for example, co-housing can be formed with individuals of the same age, like student housing. Emphasizing the opportunities for these models to facilitate multigenerational living creates an intentional connection with citywide age-friendly policy and planning frameworks. Incentivizing multigenerationalism within the development of the housing will be key to ensuring that these benefits are realized.

Implementing these models will in some cases require adjustments to rules, regulations, and building codes to enable or incentivize development. These range from simple yet fundamental requirements, such as relaxing minimum unit sizes and parking requirements, to more substantial regulatory reforms, such as fundamentally redefining a dwelling unit to accommodate shared facilities.

The alternative nature of the models will require consumer education and exploration of demonstration projects or models to spur demand. Policymakers and planners cannot simply live by the mantra of “if you build it, they will come.” Some models have a specific set of values and requirements around communal living that guide their approach; consumers will need to have a clear understanding of these parameters and expectations.

Similarly, the insurance and finance fields also need to increase their awareness and familiarity with these products to support their development, since traditional loan and insurance products are not appropriate or sufficient in many cases.

The exhibits on the following pages provide an overview of each model, offering U.S. and European perspectives. The models and how each one contributes to multigenerational communities are also discussed. Furthermore, we highlight issues that may impact their implementation and discuss how these models are relevant to U.S. and European cities. Finally, reference case studies and additional resources to dive deeper into the model are included.

The range of alternative housing models described in the exhibits illustrates the potential to efficiently and compactly use space in existing communities that bring multiple generations together for shared living and other social benefits. The exhibits shown previously showcase some considerations and possible obstacles to overcome when attempting to transfer this model from one international context to another. The following section explores a framework for considering how to further explore and implement the models at the local level.

Exhibit 13

Accessory Dwelling Units

What is the Model?

Accessory Dwelling Units (ADUs) are secondary housing units on the site of the primary unit that can be rented out at an affordable cost. These can take advantage of already existing housing stock by coming in the form of over-the-garage apartments, finished basement units, or tiny houses situated in the backyard. ADUs are legally the same property as the main home, but they provide flexibility for homeowners to house a caregiver, older family members who desire independence, young people in need of affordable housing, or others who may provide services to the main homeowner.

As discussed among the experts in the transatlantic group German Marshall Fund of the United States (GMF) and American Association of Retired Persons (AARP) convened, there are spatial constraints in many European cities that have limited the development of ADUs as separate structures on a single-family lot. There are some examples of ADU-like units within an existing building in a basement or attic space.

Opportunity This Model Offers

The main opportunity this model offers is the chance to maximize already existing space like basements and garage units to create a variety of efficient housing options. By providing a variety of efficient housing options, older individuals can have access to more accessible spaces that are easier to maintain and navigate.

Additional benefits include the ability to live independently while living near others, as well as generating more income for the primary homeowner.

Things to Consider for Transatlantic Transfer

In the European context, the availability of space for development will drive whether an ADU model is suited for a separate structure or within an existing building. In space-constrained cities, more focus should be given to creating in-home ADUs. European cities with larger single-family lots and more suburban-style development patterns could accommodate an ADU model common to what is trending in the United States. On both sides of the Atlantic, there are regulations that restrict density and other factors that limit the development of ADUs.

What are the Key Regulatory/ Policy Enablers?

Local municipalities are responsible for ordinances and regulations on new building projects. In most parts of the United States, local rules, excessive requirements/fees, or administrative hurdles stymie the uptake of ADUs. Some localities, like Portland, have relaxed zoning laws to encourage ADU creation. Ireland is now considering a new “granny flat” legislation to allow older adults to convert their homes into two units and offering grant funding to support the conversion. Additional case-study research on the zoning limitations to ADU development in European cities would be beneficial for further analyzing policy enablers.

Case Studies

- Orange Splot in Portland, OR (<http://www.orangesplot.net/#>) is a housing development company and general contractor whose mission is to develop new models of affordable and green housing in Portland.
- Hawaii ADU (<http://www.hawaiiadu.com/about/>) is a “one-stop-shop” for high-quality, affordable, and efficient ADUs. Their goal is to maximize property space and innovate for the good of the community.
- Crest Homes in San Diego, CA (<https://www.crestbackyardhomes.com/>) San Diego has committed to accelerating the development of ADUs around the city by laying out clear guidelines and blueprints. Crest Homes offers a variety of ADU units to suit individually tailored needs.

More Resources

- AARP report on Creating Room for ADUs: <https://www.aarp.org/livable-communities/housing/info-2015/accessory-dwelling-units-model-ordinance.html>
- For more on ADUs and the rules surrounding them, see <https://accessorydwellings.org>

Exhibit 14

Co-Housing (1 of 2)

<p>What is the Model?</p>	<p>Co-housing models focus on building communities around shared spaces that bring residents out of their homes to connect with one another. Shared spaces like community dining areas, recreational areas, and gardens can all contribute to frequent interaction among neighbors. Some co-housing developments also include a suite that can house a caregiver as a cost-efficient way to provide support to multiple residents as they age. Residents of co-housing developments commit to be a part of the community to everyone's mutual benefit. This model is useful in promoting diverse, multigenerational communities that benefit all who participate.</p>
<p>Opportunity This Model Offers</p>	<p>Co-housing surrounds independent households with intentionally structured communities. Each household retains its independent incomes and private lives but is committed to collaborating with neighbors on community activities and the management of shared spaces. This model allows for the creation of multigenerational communities that include older people, families, and younger people. Building co-housing communities around shared values like sustainability and inclusivity can create a positive atmosphere that brings residents together. Whenever one might need assistance with babysitting, transportation, or household maintenance, the co-housing community is designed to bring the community together for each other.</p>
<p>Things to Consider for Transatlantic Transfer</p>	<p>Across Europe, co-housing has been a popular option for those seeking diverse, tight-knit communities. The first co-housing community can be traced back to Denmark, where the concept gained popularity since its start in the 1970s. Increasingly there are government-sponsored initiatives to support co-housing development through financial incentives. For example, Germany's government supports multigenerational co-housing developments that provide common activity spaces and health services as well as promote community engagement. The United States has seen an increasing interest in co-housing because of community-led initiatives rather than government support.</p>
<p>What are the Key Regulatory/ Policy Enablers?</p>	<p>Countries like Denmark, Germany, and Ireland have national-level support for co-housing-type programs. In the United States, the creation of co-housing communities is ultimately up to those interested in living in them. Should the creation of a community in the United States require new development, it is up to the local municipalities to decide how to implement it.</p>
<p>Case Studies</p>	<ul style="list-style-type: none"> • Mehrgenerationenhäuser (Multigenerational homes) in Germany (www.mehrgenerationenhaeuser.de) is a federally subsidized program that focuses on accommodating demographic change and integrating recent immigrants in municipalities. This is done by the creation of multigenerational homes that promote dialogue, strengthen citizen participation, and bring the community together. <ul style="list-style-type: none"> • ASB Mehrgenerationenhaus, Lohfelden, Germany (http://www.asb-mehrgenerationenhaus.de) is a place for children, adolescents, adults, and seniors to enjoy everyday life by helping and learning from one another. Services like childcare, migration assistance, and counseling are provided by the many volunteers on staff. • Munksøgård in Denmark (http://www.munksoegaard.dk/index.html) is an organic community focused on integrating environmentally healthy practices in their establishments and operations. Young adults, families, and seniors are all welcome residents in the co-housing community. • Milagro Cohousing in Arizona, United States (http://milagrocohousing.org) is a multigenerational co-housing community with 28 energy-efficient adobe homes, located near the Tucson mountains. This community is committed to a sustainable green design that is friendly to people and the earth.

Exhibit 14 (cont.)

Co-Housing (2 of 2)

More Resources

- This PBS Newshour video provides a profile of U.S. and European international co-housing communities:
 - <https://www.pbs.org/newshour/show/cohousing-communities-help-prevent-social-isolation>
 - For more on cohousing in the United States, visit the Cohousing Association of the United States: [https:// www.cohousing.org](https://www.cohousing.org)
 - There are numerous co-housing organizations and networks in Europe that provide information about their work; however, not all this information is available in English. For more information on cohousing in the United Kingdom, visit U.K. Cohousing: <https://cohousing.org.uk/>
 - The Institute for Creative Sustainability in Berlin has information about its local co-housing initiatives in English at <https://id22.net/en/>
-

Exhibit 15

Home-Sharing (1 of 2)

What is the Model?

The term home-sharing has taken on a variety of meanings during the last years, especially due to the rise of vacation rental services that have adopted this terminology. Here the more formal definition is used, which pertains to a housing model: home-sharing brings together two or more unrelated residents to share a home for mutual benefit. Homes can include apartments, condominiums, mobile homes, or traditional single-family houses. Home-sharing arrangements are unique to the needs and skills of the people being paired together and written agreements are usually created to outline how the mutual benefit is defined (for example, chores around the house, shopping, deliveries, and so on). Even within this formal definition, there is a spectrum of ways to implement home-sharing—from structured services that make matches to online portals that homeowners use on their own. For example, there are nonprofit home-sharing or housing organizations that provide services to homeowners and home-share seekers. The range of services depends on the mission of the organization but can include full-service support assisting homeowners throughout the entire process (screening, interviewing, and matching). Many organizations facilitate the home-sharing agreement and continue to support the match after it has been made. Alternatively, homeowners can work independently to find a person through local channels or use an online platform. The following case studies provide different examples of these types of home-sharing organizations and services.

Opportunity This Model Offers

Home-sharing is a solution that addresses the needs of people of all ages in need of affordable housing, and older people who require some support to live independently. Since many homes in the United States and across Europe are privately owned, many older adults want to age in place but have challenges with keeping up a home, feel isolated living alone, or need some light support to continue to live independently. Home-sharing creates an affordable housing option for the renters, ensures the homeowner covers their housing costs, and provides both with mutual benefits that can increase their quality of life. Not only can home-sharing help with the burden of paying for a large space, but older people who own the space can also receive payment in the form of household maintenance, cooking, yard work, pet care, or transportation. For those who are older, having a helping hand around the house can go a long way in improving their quality of life.

Exhibit 15 (cont.)

Home-Sharing (2 of 2)

Things to Consider for Transatlantic Transfer

Whenever there is an exchange of services, labor laws play a strict role in the European Union (EU). This can be a major barrier for more informal home-sharing agreements where the exchange of services is not clearly outlined or when services are exchanged for zero rent. The EU and the United States also face issues when determining the taxable income that would be generated by the homeowner. In some cases, this is addressed by limiting the renters to students in need of affordable housing who agree to exchange household services.

What are the Key Regulatory/ Policy Enablers?

Enabling a successful home-sharing program requires a careful examination of key issues with zoning and rental regulations, taxable income policies, government benefit programs, and labor standards. The local and national contexts on either side of the Atlantic will shape the extent of policy and regulatory reform needed to enable home-sharing. Key considerations include:

- Zoning ordinances that do not unduly restrict unrelated people from inhabiting one dwelling unit.
- Additional income from rent received does not impact an older person's eligibility for government services and programs.
- Exchange of services in return for low-cost rent is allowed under labor laws.

Case Studies

As discussed earlier, there is a range of types of home-sharing support organizations and services. The following case studies provide an example of each.

- HomeShare Vermont, United States (<https://www.homesharevermont.org>) is working to improve lives and communities by bringing together people across Vermont to share their homes. It offers full-scale services through every step of the home-share agreement.
- HIP Housing, California, United States (<http://hiphousing.org/about/>) enables people with unique situations, either due to income or circumstance, to live independent and self-sufficient lives in safe, low-cost homes. It provides matching services depending on the individual needs of each person.
- Wohnen für Hilfe (Housing for Help), Cologne, Germany (<https://www.stadt-koeln.de/service/produkt/wohnen-fuer-hilfe-1>) was founded by the city of Cologne to support new forms of housing, specifically ones that pair people with certain needs with students in need of accommodation.
- Nesterly (<https://www.nesterly.io>) is an online platform for intergenerational home-sharing. The goal is to make it safe and easy for households to share an extra room with a young person for over a month. This is solely an online service for matching people looking for home-sharing opportunities.

More Resources

- Homeshare International is a worldwide network of home-sharing programs: <https://homeshare.org>
 - For more information on home-sharing in the United States, see the National Shared Housing Resource Center: <http://nationalsharedhousing.org>
 - For more information on the United Kingdom's network for home-sharing schemes, see Homeshare UK: <https://homeshareuk.org/>
-

Exhibit 16

Extended-Stay Hotels

What is the Model?

Extended-stay hotels are a modern play on the residential hotel design. They incorporate services the hospitality industry provides with affordable and efficient housing units in a hotel format. While still just a concept, similar ideas have already been put into practice, ranging from high-end hotels designed for longer stays to an affordable option for those looking for an all-in-one package. This model can be an attractive option for older people who desire a smaller space that is easier to manage, or for younger people who are looking for somewhere affordable and flexible.

Opportunity This Model Offers

The extended-stay hotel model would create highly efficient housing that can suit a variety of demographics. Older people who desire independent living but can no longer manage a large home will find the compact space much more suitable. Younger people who need affordable housing will also find this as an attractive option for them. Aside from providing efficient units, adding the benefits of the hospitality industry like concierge services and room services, can make this model beneficial to people who are busy, require minimal assistance, and look to be part of a community.

Things to Consider for Transatlantic Transfer

In Europe, this model is very applicable due to a need for more housing in dense areas. Zoning and development laws can present a major barrier for this model in the United States since rezoning old hotels into housing stock would change the original purpose of the building. By combining these spaces with the commercial industry to include storefronts and office space, it would make the model a lot more attractive to municipalities for zoning purposes.

What are the Key Regulatory/ Policy Enablers?

Zoning and land-use policy is the main vehicle for enabling the adaptive reuse, modification or new construction of extended stay hotels, which will vary by jurisdiction on either side of the Atlantic. The location of the property and its zoning will determine if the use is permissible or if special approval is needed. As this is a developing alternative housing model, it is important that case studies be developed and disseminated to explore the feasibility and impact of this model.

Case Studies

While there is an increasing trend toward the development of extended-stay hotels or executive apartments in Europe, there are no successful case studies of developments that focus on multigenerational housing (as opposed to short-term vacation or travel).

- Hotel Louisville (<http://www.hotellouisville.org>) is a 12-story high-rise in downtown Louisville, Kentucky that operates as a safe and clean transitional living shelter for women and families, in addition to providing hotel rooms for tourists and travelers. The hotel is mostly staffed by the men and women who have completed or are participating in the hotel's recovery and training programs. With a focus on helping the homeless, Hotel Louisville houses a diverse range of residents while providing resources that allow people to re-enter the job market.

Ideas to Action: Planning Framework for Multigenerational Housing Models

As outlined earlier, there are considerations for policymakers and planners in transatlantic cities to consider when exploring alternative housing models for multigenerational communities. While there is a growing awareness about the opportunities for multigenerational housing, there are also unique local barriers to production and utilization that require careful navigation. The benefits

to the public and private sectors should trigger an interest in jointly creating opportunities for alternative, multigenerational housing models. This section provides a short road map to navigating the opportunities and challenges of supporting the growth of multigenerational housing models in existing communities. While not a comprehensive list of every scenario that a local stakeholder could encounter, it offers a set of building blocks for a successful policy planning and coalition building process.

Phase 1: Exploration

The first phase of the roadmap is undertaking preparatory activities to assess how alternative housing models can advance an age-friendly policy and planning framework while meeting local needs and preferences. These recommendations are designed as an inquiry process and are not sequential; the order and pace of the process should be adapted based on local contexts and resources.

1. **Connect the opportunity with vision.** How does a multigenerational housing strategy contribute to the city's overall vision and age-friendly policy goals? Whether the city has articulated an age-friendly policy or a series of policy or planning objectives that are related in a city-wide planning document, it is important for policymakers to connect the opportunity to the existing policy, assuming that was based on sound analysis and public input. Being able to clearly articulate how alternative housing models connect to existing policy and planning priorities is a key point to building consensus to experiment with something new. Alternatively, if there is not a specific reference to alternative housing models or multigenerationalism in the city's plan, connections can be made to city-wide policies that support affordable housing, compact development, reuse of underutilized properties, mixed-income neighborhoods, or multigenerational cities.
2. **Define the opportunity with data.** Most local governments collect or have access to basic demographic data, including age and life expectancy, and to building-permit data to understand their communities. Some localities engage in population forecasting for long-term planning and trend analysis. Using existing data sets to understand the city's multigenerational profile and housing stock is an important first step to defining the opportunity with data. Key questions to explore include:
 - a. What does demographic change look like in the community overall and for different subgroups?
 - b. How are household sizes and needs changing over time?
 - c. What is the homeownership and renter profile in the community?
 - d. What are the rates and profiles of rent-burdened households?
 - e. What is the typical unit size being built?
 - f. Have there been recent building permits for nontraditional housing development projects?

- g. Where are the gaps between what is currently available and being built, and the housing needs and preferences today and in the foreseeable future?
3. **Define the opportunity with people.** Data and past policy can only reveal so much. It is important to find out what constituents say and whether they see the value in multigenerational living. Directly engaging different constituencies about their housing needs, barriers, and perspectives is a critical part of informing the inquiry. It is important to ask about the perceptions of multigenerationalism; these insights will provide rich information on the work that may need to be done to bring people together on this topic and educate consumers. In addition to residents, the business and development community must be engaged: What are the real estate and development community saying about the housing and development trends in the city? Do they have experience with building alternative housing models or the willingness to try if there was a supportive regulatory environment? There are numerous other stakeholder groups that can also be engaged to understand the opportunities and challenges of implementing alternative housing models to serve multiple generations. Input from social service providers, community facility operators, and the faith community should be sought, and the engagement strategy must be thoughtful, ensuring an inclusive process that offers multiple ways to engage based on the characteristics of the stakeholders. Activities can include: holding focus groups or small group meetings, conducting in-person and online surveys, and using planned outreach and engagement to conduct informal surveys.
4. **Change the narrative.** The process to understand needs, also creates an opportunity to change the local narrative around aging and multigenerationalism. As discussed earlier, too often older people are viewed as a burden instead of an asset. Recent studies have highlighted how older adults can share their expertise and leadership experience, including serving as business and entrepreneurship mentors and volunteers. Efforts such as AARP's Disrupt Aging campaign in the United States and the World Health Organization's planned Global Campaign to Combat Ageism can provide useful guidance on changing the local narrative around aging. These efforts can also build a constituency and align allies for multigenerational alternative housing models.

Phase Two: Ideas to Action

After an initial inquiry, policymakers and planners can begin to move from ideas to action through the next series of building blocks. One crucial aspect of this phase is understanding the needs of constituents and the opportunities for development. There are additional considerations policymakers should consider in proceeding with selecting the appropriate models for their city.

5. **Match the models.** Insights from data and in-person feedback should paint a picture of the needs of a multigenerational constituency and suggest the types of alternative housing models and other planning supports that may be best suited to the city. It is important to draw on insights from the exploration phase to match needs and to consider the feasibility of the models. An important element to the matching process is assessing the readiness of the implementers of the models, including real-estate developers, bankers, and insurers.

In addition, the spectrum of models introduced in the previous section suggests the type of civil society and non-governmental organization (NGO) infrastructure needed for implementation. The most effective way of applying these models is to continue the practice of engagement from the exploration phase to get input, test assumptions, and get feedback. Growing the constituency and potential beneficiaries from the models will be needed to help overcome any barriers to development identified in the next step.

6. **Identify opportunities and challenges to planning/implementing the model.** A related step is identifying the potential opportunities and challenges to implementing the alternative housing models, such as regulatory barriers or policy constraints. Conducting a SWOT (strengths, weaknesses, opportunities, and threats) analysis can be a useful exercise to scan the horizon for potential issues. Some questions to consider under the analysis include the following:
 - a. Strengths: What are the existing assets that can support the implementation of alternative housing models (people, policies, and so on)?
 - b. Weaknesses: What are the barriers in the existing regulations or planning guidelines that would prevent this model from being implemented?
 - c. Opportunities: How does multigenerational housing fit into the city's existing policy and planning priorities?
 - d. Threats: What are the potential barriers from various sectors to the implementation of this model?
7. **Build coalitions of likely and unlikely allies.** The SWOT analysis can reveal different stakeholder groups, businesses, institutions, and organizations that may be key to delivering the alternative housing model pursued. A stakeholder mapping exercise can expand that analysis and identify key influencers and implementers needed to tackle potential barriers to implementation. Mapping templates that assess the interest and power of stakeholder groups can be useful in identifying unlikely allies among these. Cross-sector partnerships can also aid in narrative-change efforts and demonstrate the alignment of different interests under an age-friendly, multigenerational cities agenda.
8. **Engage in participatory design and action planning to tackle administrative, regulatory, and financial barriers to production.** Drawing on the coalition-building process, engagement can move to the next level by discussing the specific alternative housing model and what might need to change within planning, policy, or regulation to enable its development. It is important to use a broad set of engagement strategies and participation tools to be inclusive of potential user groups and any unique needs they have to participate effectively. The housing model and the policy changes needed to enable it should be set in a broad context to establish how it will advance already agreed community priorities. For example, if the community has prioritized affordable housing or senior housing, then the linkage to the model should be made. The trade-offs and opportunity costs of not acting must also be outlined. Data, maps, and other concrete metrics can be helpful in making the case.

9. **Engage with peer cities.** There are several transatlantic cities that have made policy and planning moves to support age-friendly and multigenerational cities—whether implementing specific alternative housing models, shifting the public narrative around aging, or developing age-friendly planning frameworks. The opportunity for peer-to-peer learning can produce insights on how those cities approached the policy change, addressed any roadblocks encountered and measured long-term success. There are many reports on best practices, and these can be a starting point for engagement. Diving deeper into lessons learned will take the exercise beyond the page of a report. Strategies to engage can include the following:
 - a. **Own contact:** Existing networks can be combed for contacts that may work in cities with age-friendly policies, or examples of alternative housing models with a multigenerational focus. Ask contacts for an introduction to the appropriate local expert.
 - b. **Through a network:** The World Health Organization’s Global Network of Age-Friendly Cities and Communities Network is a great example of an affinity network that can provide a wealth of resources to cities looking to learn more. GMF can also be a resource for connecting professionals to city leaders active in this space and the transatlantic working group that informed the development of this report.
 - c. **Through a professional association or NGO:** AARP’s Livable Communities program continually produces a variety of valuable resources. Professional associations like the American Planning Association and the Royal Town Planning Institute in the United Kingdom have conference topics and materials on their websites that highlight best practices.
10. **Take action.** After an inclusive and comprehensive engagement process to assess what models are needed and feasible for the community, it is time to move to implementation. This stage will look different for each community, but it may begin with ensuring the enabling framework within local laws and regulations is set. Other actions may include identifying particular properties, financial incentives, and engaging with the development community to encourage adoption. The capacity built through the planning process will ultimately be helpful in creating the network of allies and supporters to move from ideas to action.

Conclusion

As demographics in transatlantic cities shift, it is imperative to address the impact this will have on housing needs across the generations. More and more Americans and Europeans are aging, living longer, living alone, and living in urban areas. Age-friendly, multigenerational housing in existing communities can reduce social isolation, improve housing affordability, and enable people to not just age in place, but also thrive in place. The four alternative housing models discussed in the transatlantic working group and expanded in this article illustrate a concrete set of options for local leaders to explore as they confront housing challenges and demographic change in their communities.

The intent for this report is to document and advance the conversation begun at GMF's BUILD 2017. It provides a useful starting point in two areas: to explore the transatlantic applicability of the alternative housing models for multigenerational living and to uncover the policies that will enable their successful development in U.S. and European cities. On this latter point, additional case studies and research are needed to identify barriers to implementation and refine policy or regulatory solutions. As the United States and Europe will continue to confront demographic change and affordable housing challenges into the future, further transatlantic engagement and exploration of multigenerational housing models in U.S. and European cities will be needed.

Acknowledgments

About GMF

The German Marshall Fund of the United States (GMF) strengthens transatlantic cooperation on regional, national, and global challenges and opportunities in the spirit of the Marshall Plan. GMF contributes research and analysis and convenes leaders on transatlantic issues relevant to policymakers. GMF offers rising leaders opportunities to develop their skills and networks through transatlantic exchange, and supports civil society in the Balkans and Black Sea regions by fostering democratic initiatives, rule of law, and regional cooperation. Founded in 1972 as a nonpartisan, nonprofit organization through a gift from Germany as a permanent memorial to Marshall Plan assistance, GMF maintains a strong presence on both sides of the Atlantic. In addition to its headquarters in Washington, D.C., GMF has offices in Berlin, Paris, Brussels, Belgrade, Ankara, Bucharest, and Warsaw. GMF also has smaller representations in Bratislava, Turin, and Stockholm.

About the Sponsor

AARP is a nonprofit, nonpartisan organization that empowers people to choose how they live as they age. AARP Livable Communities supports the efforts of neighborhoods, towns, cities and rural areas to be great places for people of all ages. We believe that communities should provide safe, walkable streets; age-friendly housing and transportation options; access to needed services; and opportunities for residents of all ages to participate in community life.

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Graphic Detail

Geographic Information Systems (GIS) organize and clarify the patterns of human activities on the Earth's surface and their interaction with each other. GIS data, in the form of maps, can quickly and powerfully convey relationships to policymakers and the public. This department of Cityscape includes maps that convey important housing or community development policy issues or solutions. If you have made such a map and are willing to share it in a future issue of Cityscape, please contact alexander.m.din@hud.gov.

FEMA Puts New Data on the Map for Policymakers

Anna Weber

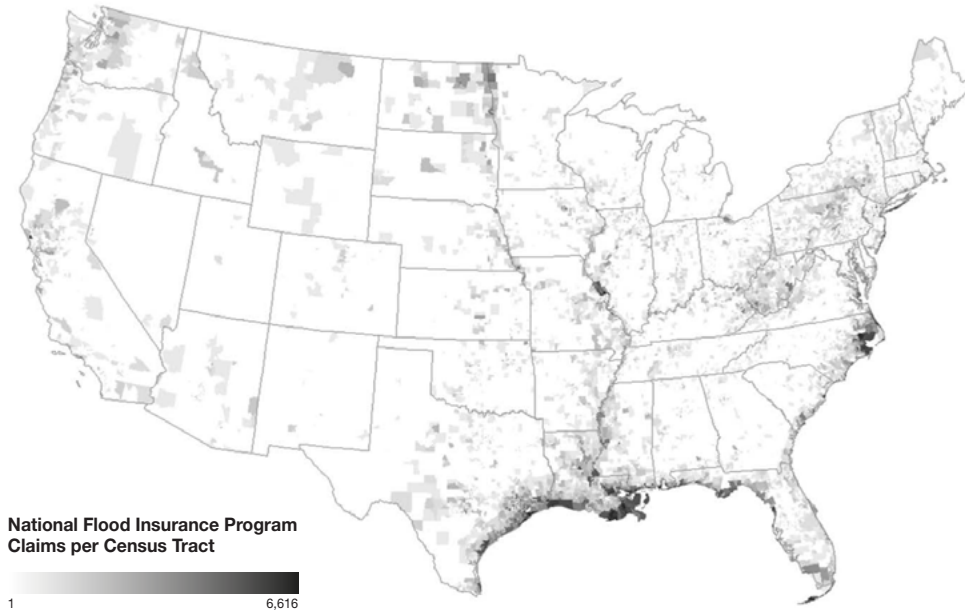
Natural Resources Defense Council

From record-breaking river levels that lasted for months in the Midwest to Tropical Depression Imelda, which produced torrential rains in Texas, 2019 was a major year for flooding across the United States. The year also marked a milestone in the availability of data on flood damages, when the Federal Emergency Management Agency (FEMA) released two large National Flood Insurance Program (NFIP) data sets on June 11.

Created by Congress through the National Flood Insurance Act of 1968, the NFIP currently insures some 5 million properties in more than 22,000 communities in the United States (Horn, 2019). The FEMA June 2019 data release is the first time that the public has been able to access NFIP data at an individual claim level (see exhibit 1). The claim data set (FEMA, 2019a) includes approximately 2.4 million records dating back to the program's creation; these records include payment amounts, dates, and building characteristics. FEMA also released a policy data set with 10 years of policy transaction details (FEMA, 2019b).

Exhibit 1

Cumulative NFIP Claims per Census Tract in the Contiguous United States, as of March 31, 2019

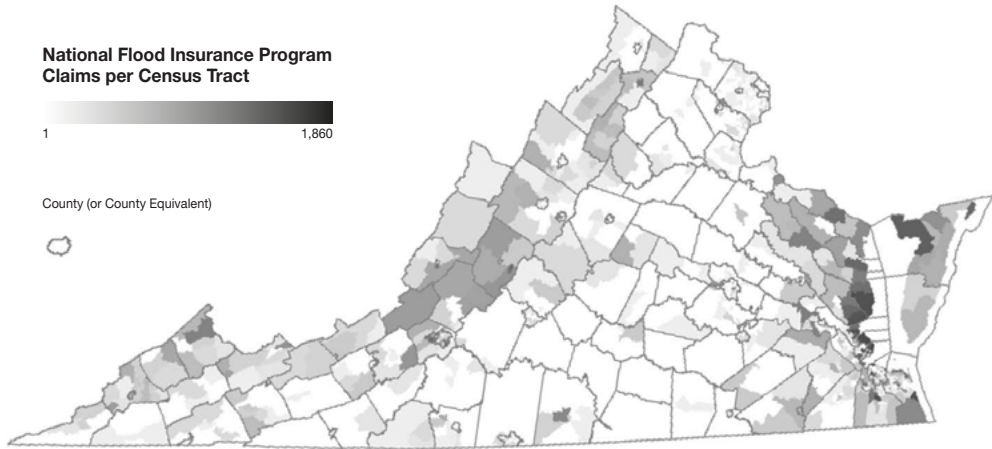


Source: FEMA, 2019a

Historically, such detailed NFIP data was unavailable to the public. FEMA has made summary statistics available (aggregated by county, state, or year), and the public is able to access the locations of designated flood zones via print or digital maps. The newly released data sets, however, go beyond the previously available information, providing claim dates, payment amounts, policy fees and coverage, FEMA-designated flood zones, and other characteristics of insured buildings and flood losses. For the first time, policymakers and other interested parties can, for example, easily access the data necessary to identify the areas of a state with concentrations of NFIP claims (see exhibit 2). This can be considered along with demographic data, disaster assistance data, or other information to assess where and why flood claims have been made and can contribute to a general understanding of flood risk and resilience.

Exhibit 2

Cumulative NFIP Claims per Census Tract in Virginia, as of March 31, 2019



Source: FEMA, 2019a

To protect the privacy of policyholders, FEMA redacted certain geographic information before publishing the data. Claims can be identified geographically by Census tract or ZIP Code, but not by block or address. Although the claims data set does include latitude and longitude, the coordinates are truncated to one tenth of a decimal degree—a relatively low level of precision that means that many claims in a particular municipality can share the same coordinates. As a result, the FEMA data sets are primarily useful for analysis at the national, state, or regional scale, but not at a local or sub-local scale. Even in urban areas, where Census tracts have relatively small geographic footprints (such as in Hampton, VA, shown in exhibit 3), the FEMA data are likely not sufficient for local mitigation planning or individual decisionmaking. In addition, the FEMA

Exhibit 3

Cumulative NFIP Claims per Census Tract in the City of Hampton, VA, as of March 31, 2019



Source: FEMA, 2019a

data sets do not provide any way to link claims together (for example, to identify repeatedly flooded properties) or to link policies to claims. Also, the scope of NFIP data does not include other important flood-related information, such as flood damages on uninsured properties or on properties insured by private, non-NFIP policies. Finally, individual renters or homeowners cannot access their own home's claim history unless they are current NFIP policyholders.

The newly released data sets allow researchers, local officials, and the public to access important information about flood risk and damages. FEMA is committed to releasing updates on a regular basis and has in fact already released additional data as of mid-September 2019 (FEMA, 2019a; 2019b). The NFIP claim and policy records make up only part of the larger flooding story, however. Additional data from FEMA and other sources are necessary to make the most informed decisions possible about reducing future flood risk.

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Impact

A regulatory impact analysis must accompany every economically significant federal rule or regulation. The Office of Policy Development and Research performs this analysis for all U.S. Department of Housing and Urban Development rules. An impact analysis is a forecast of the annual benefits and costs accruing to all parties, including the taxpayers, from a given regulation. Modeling these benefits and costs involves use of past research findings, application of economic principles, empirical investigation, and professional judgment.

Project Approval for Single-Family Condominiums

Daniel Marcin

U.S. Department of Housing and Urban Development

Alastair McFarlane

U.S. Department of Housing and Urban Development

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The purpose of the Project Approval for Single-Family Condominiums final regulation¹ is to reduce regulatory barriers and provide equal access to Federal Housing Administration (FHA)-insured loans for borrowers for the purchase of condominiums. This regulation is potentially beneficial to lower-income households in high-density areas, as condominiums can be an affordable form of property there. Since 2001, approximately 84 percent of borrowers insured by FHA have been first-time homebuyers. Despite the advantages of condominiums, however, FHA's share of condominium loans declined to 2.1 percent of all FHA-insured loans in 2018 from a high of 8.4 percent in 2001. In comparison, the condominium share of all Fannie Mae loans is just under 10 percent and has been since 2014. FHA's condominium share is at a post-2000 low, while Fannie Mae's condominium share of its portfolio is just a few tenths of a percent off of its post-2000 high. Currently, FHA must approve condominium projects to allow borrowers to use an FHA-insured loan to finance the purchase of a condominium unit in that project. The terms of this approval

¹ "FR-5715-P-01 Project Approval for Single-Family Condominiums," 24 CFR 203. *Federal Register* 81 September 28, 2016. <https://www.regulations.gov/docket?D=HUD-2016-0108>.

will be described later. Only one-fourth of all condominium projects that have been approved for FHA-insured loans retain that approval, which requires reapplication every 2 years. The decline in FHA-approved condominium projects tracks the decline of FHA-insured condominium loans. This regulation, which simplifies the FHA condominium project approval process, may address the discrepancy in the level of scrutiny given to FHA-insured condominium lending versus other types of property.

This regulation was encouraged by the Housing and Economic Recovery Act (HERA) of 2008 through an amendment to the National Housing Act, which provided authority for the U.S. Department of Housing and Urban Development (HUD) to insure condominium units under the single-family program. The regulation establishes more regulations concerning four aspects of the Direct Endorsement Lender Review and Approval Process (DELRAP) for single-family condominiums. First, the regulation establishes parameters regarding which kind of condominium projects are eligible for approval for single-family unit mortgage insurance through FHA. Second, the regulation changes the frequency with which approved condominium projects need to be reapproved, from 2 years to 3 years. Third, the regulation changes the minimum required experience standards for condominium DELRAP mortgagees to permit supervision by experienced personnel and establishes quality control levels. Finally, by providing that only completed condominium projects or phases may be approved, this regulation reduces regulatory burden by eliminating the need to perform an environmental review before the completion of the project.²

Project Approvals

Under the new regulatory regime, as mentioned earlier, a condominium project must be certified by FHA before FHA will insure any loans to purchase a unit within that project. Requirements for approval of a project include characteristics of a project's tenants, including the owner-occupancy rate and the shares of commercial and residential tenants, and quality of management. If a condominium project is not already certified, then it goes through one of two distinct approval processes: HUD Review and Approval Process (HRAP) and DELRAP. The major difference between the two processes is the reviewer. For HRAP, project approval applications, annexations, and recertification submissions are reviewed and processed by FHA staff. For DELRAP, these tasks are reviewed and processed by the staff of a qualified Direct Endorsement (DE) lender. Under the FHA DE program, these approved lenders may originate, underwrite, and close FHA-insured mortgage loans without FHA's prior review or approval, except in some circumstances.

Requiring project approval, regardless of the requirements themselves, will constitute paperwork costs. The regulation formally introduces more rigorous criteria for approval. An approval package must be prepared and reviewed, and approximately every fifth one is submitted to quality control. The annual number of applications per year will accurately reflect the potential burden when multiplied by a cost per application. FHA estimated an incremental annual paperwork burden of 48,000 hours. The median hourly wage of "Property, Real Estate, and Community Association Managers" in 2017 was \$28.21 (Bureau of Labor Statistics, 2018). The opportunity cost of labor

² A full version of the Regulatory Impact Analysis can be viewed at <https://www.regulations.gov/document?D=HUD-2016-0108-0093>.

to employers is greater than the wage paid to the employee and includes taxes, employee benefits, management, equipment, and rental. A “loaded” wage reflecting the full cost could be as high as \$56. The total cost of additional paperwork would be approximately \$2.7 million annually (\$56 x 48,000).

DELRAP Approval Authority

Allowing DE lenders to participate in the approval process of condominium projects represents a relative benefit for the condominium industry. The DELRAP approval process provides flexibility, and although it can be costlier than HRAP, DELRAP allows condominium projects and lenders to move forward more quickly than if only FHA were able to approve projects. During a tight market, DELRAP can ease the bottlenecks on FHA approval of projects and bring additional condominiums on the market for FHA-insured borrowers.

Other potential impacts are possible within this broad positive impact. HUD had the discretion to set the requirements for DELRAP lenders. Applying more stringent requirements would result in benefits, costs, and transfers. First, more stringent restrictions on which lenders may submit approvals will reduce the number of faulty applications, therefore reducing the risk and losses borne by FHA and indirectly to the U.S. Treasury. On the other hand, more stringent regulations would also reduce the number of DE lenders³, who provide an important supplement to HRAP. Transfers could occur from those lenders that do not meet the standards to those that do, or perhaps to non-FHA lenders.

It is not clear at this stage whether changes to DELRAP authority or approval requirements will have a larger effect on the number of approved condominium projects. What is clear is that, since 2009, the number of approved condominium projects has been declining. As of April 2, 2018, more than 41,000 condominium projects had ever been approved at any time. Currently, however, only 9,888 remain approved, and 33,710 have let their approval lapse. Of the condominium projects that lapsed, about one-half were only approved for one 2-year cycle; most of these did not seek reapproval, and a very small fraction were rejected or withdrew their applications. It seems unlikely that DELRAP will turn the tide of declining condominium project approvals; according to the Office of Policy Development and Research’s (PD&R’s) review of condominium project data, not a single condominium project that was initially submitted by a lender has ever renewed its approval. Several projects initially submitted by a condominium association have been renewed by lenders.

Although the use of DELRAP authority may increase efficiency, the restriction of this authority to a small subset of lenders raised concerns about market power. PD&R explored measures of market power to gauge whether there is any risk of an adverse anticompetitive effect from the rule. Knowing the proportion of DELRAP approvals relative to total approvals provides an indicator as to whether borrowers have alternatives to DELRAP lenders. Submitting and non-submitting lenders make 37 and 63 percent of FHA condominium loans, while making 33 and 67 percent of all FHA loans, respectively. Submitting lenders do not have an outsized share of FHA condominium loans

³ Some lenders may not feel it is worth it to participate with more stringent regulations and may drop out.

relative to their position in the overall FHA market. FHA borrowers interested in condominiums have a good chance of selecting a DELRAP lender but could easily avoid one if there were any adverse impacts of the rule.

Project Requirements

Condominiums are distinguished from single-family properties by the condominium owner's interest in a common area.⁴ The common area adds an element of downside risk that is not present to the same extent for single-family homes. Other condominium units within the same project could be a source of negative spatial or fiscal externalities. For example, a condominium association may be financially responsible for the maintenance of an elevator, a playground, landscaping, or a pool. Failure to maintain the common area or unexpectedly raising fees would have an adverse impact on the value of a condominium unit. A decline in a home's market value can increase the likelihood of loss mitigation or foreclosure, which impose costs on both FHA and the lender. Codifying standards for condominium projects reduces the uncertainty surrounding negative externalities that may arise, by ensuring the financial soundness and viability of condominium projects.

There is precedent for imposing requirements on projects (NAR, 2017). Government-sponsored enterprises, or GSEs, such as Fannie Mae and Freddie Mac, impose restrictions on the characteristics of projects; in fact, they appear in some occasions to be stricter than FHA. For example, both Fannie Mae and Freddie Mac have stricter limits concerning when manufactured housing units can be treated as condominiums.

The regulation does not explicitly alter most of the condominium project requirements, but it does provide a range of limits. Generally, the ranges contain the current requirements, except for limited instances of FHA-insured loan concentration. The regulation sets ranges for minimum owner occupancy, maximum commercial space, and FHA-insured loan concentration. By releasing notices, HUD will be able to vary the standards for eligibility within the range to remain flexible and responsive to the market. If HUD decides to vary the upper and lower limits of the range itself, the regulation provides a procedure that includes notice and an opportunity for public comment.

Project Requirement: Minimum Ratio of Owner Occupants

This regulation establishes a range of minimum owner-occupancy of 30 to 75 percent, within which HUD sets a minimum. The current requirement is that at least 50 percent of the units must be owner-occupied or sold to owners who intend to occupy the units, or 35 percent in limited, low-risk situations with additional oversight. Establishing a minimum proportion of owner-occupants is partially motivated by homeowners being more likely to participate in maintaining common areas than a renter. Decisions of the condominium association board may not be favorable for FHA borrowers if owner-occupants do not constitute a majority. To clarify, this requirement sets bounds on a minimum percentage for approval; in other words, the minimum owner-occupancy percentage set by HUD for project approval will never exceed 75 percent. Condominium projects could still receive approval with owner-occupancy percentages as high as 100 percent.

⁴ The physical structure of a building is not the defining characteristic of a condominium property.

Owner-occupied units constitute, on average, 54 percent of all condominium units. Although the average project will not be affected, it is possible that a proportion of condominium projects will be below the minimum.⁵

Although the current FHA standard of 50 percent owner-occupants is strict, it is aligned with informal industry practice, which is often stricter. Both city governments and conventional lenders insist on percentages as high as 70 percent owner-occupants, based on Fannie Mae and Freddie Mac guidelines. Fannie Mae imposes an owner-occupancy minimum that varies between 51 and 70 percent for non-owner-occupied properties, but will consider waivers (NAR, 2015). FHA makes the requirement easier to meet by expanding the definition of owner-occupancy to the extent permitted under the requirements established under the Housing Opportunity Through Modernization Act of 2016.

Project Requirement: Ratio of Commercial and Residential Units

The regulation provides for HUD to set a standard for the maximum commercial/nonresidential space within a range from 25 percent to 55 percent of the total floor area. Limiting nonresidential space reduces the risk of FHA-insured units bearing the consequence of an adverse economic shock on the commercial tenant(s). The existing limit imposed by FHA is a maximum of 25 percent with exceptions to 49 percent. The cost of setting a limit would be borne by projects/units that would not meet the eligibility criteria and on any business denied a lease for a project to be certified.

Currently, Fannie Mae requires eligible projects to devote no more than 30 percent of space to commercial purposes. HUD recognizes that there are many potential benefits of mixed-use development and has provided for a ceiling that may range from 25 to 55 percent.⁶ Mixed-use developments have become very popular to develop recently, and it is possible that both businesses and residents are more likely to succeed in this type of community. It is too early for HUD to have evidence concerning the effects of ratio requirements on communities, however.

Project Requirement: FHA Concentration

HUD is allowed to set the maximum percentage of units with FHA-insured mortgages in a condominium project between 25 and 75 percent of the total units in the project. The existing limit imposed by FHA is 50 percent with exceptions to 100 percent. Limiting the FHA-insured loans of any project avoids the concentration of risk in one project. The cost of this risk management policy could be excluding a borrower from an FHA-insured loan. HUD, however, does not expect a ceiling in this range to be binding except for atypical condominium projects: during the last 15 years, the market share of FHA-insured condominiums has varied from 3 to 8 percent of the total (NAR, 2015). An internal actuarial review of FHA policy by HUD showed that the maximum FHA concentration requirements rarely bind.

⁵ From the available statistics, HUD estimates that the proportion of those not meeting owner-occupancy requirement is very small. Using the standard error (1.3 percent) as an estimate of the standard deviation and assuming a normal distribution, it would be safe to assume that only a small proportion of condominiums (approximately 2 percent) would face a binding constraint. Most that do would be close to meeting the limit.

⁶ As in Mortgagee Letter: 2012-18, HUD could continue to offer exceptions to the requirement.

Length of Approval

HUD settled on 3 years as the lifetime of a condominium project's approval. A greater duration carries the benefit of reducing administrative costs, but carries the risk that approval information is out of date. The current practice is 2 years. This regulation reduces re-approval costs by approximately one-third.⁷

The impact of this regulation is the present value of all costs paid for re-approval. The cost-saving is the difference between the present value of reapproval costs under the two rules. The cost of a DELRAP approval has been estimated to be between \$500 and \$2,000 by private lenders, an average of \$1,250. HUD uses this amount to estimate the present value of costs of re-approvals, including HRAP. Over 30 years, the present value of the reduced cost is approximately \$4,000 (\$3,000) at a discount rate of 3 percent (7 percent). Cost-savings at this level would occur only if approval is done regularly over a 30-year cycle.

The annualized cost reduction is \$200 during a 30-year time horizon. The annualized cost reduction is higher for shorter time horizons but spread over fewer years. For example, over 5 years, the annualized cost savings is approximately \$300. The annualized cost reduction does not vary significantly with the discount rate (3 or 7 percent). The average number of approvals during the past 2 years is approximately 5,000.⁸ In addition to those 5,000 first-time approvals, 1,600 projects have been re-approved in each of the past 2 years. The reduced frequency of approval would lead to a cost reduction of approximately \$1 million per year over 30 years or \$1.5 million per year over 5 years.

Reduced frequency of re-approval may result in more mortgages being issued in condominiums that no longer conform to HUD's minimum standards, thereby increasing the risk of losses borne by FHA. More mortgages could be insured in a project that, otherwise, would have been ineligible. HUD determined that the addition of 1 year would not be a significant risk.

There may also be significant cost savings from HUD's clarification of recertification rules; an applicant may choose to merely update previously submitted information instead of resubmitting all information. The exact amount of savings will depend on how HUD implements this procedure.

Single-Unit Approval

At HUD's discretion, single-unit approval (permitting a loan in a condominium project without a rigorous approval of the project) will be permitted. Before HERA, the similar but less stringent "spot approval" process was allowed and was the norm. Condominium loans made through "spot approval" were riskier than FHA-insured loans for the purchase of other types of property. Because of the demonstrated risk, a post-HERA mortgagee letter banned the endorsement of spot

⁷ The provision will not reduce the cost of an individual re-approval, instead it will reduce the aggregate cost of all re-approvals. For one property, the answer is slightly more complex and involves discounting over the lifespan of a mortgage. The reduction will be slightly less than one-third for an individual condominium, a reduction of 32 percent (31 percent) with a discount rate of 3 percent (7 percent) over 30 years.

⁸ FHA only records the most recent 2-year reapproval in its data. One can reasonably assume that the number of reapprovals in the past 5 years averaged at least 5,000.

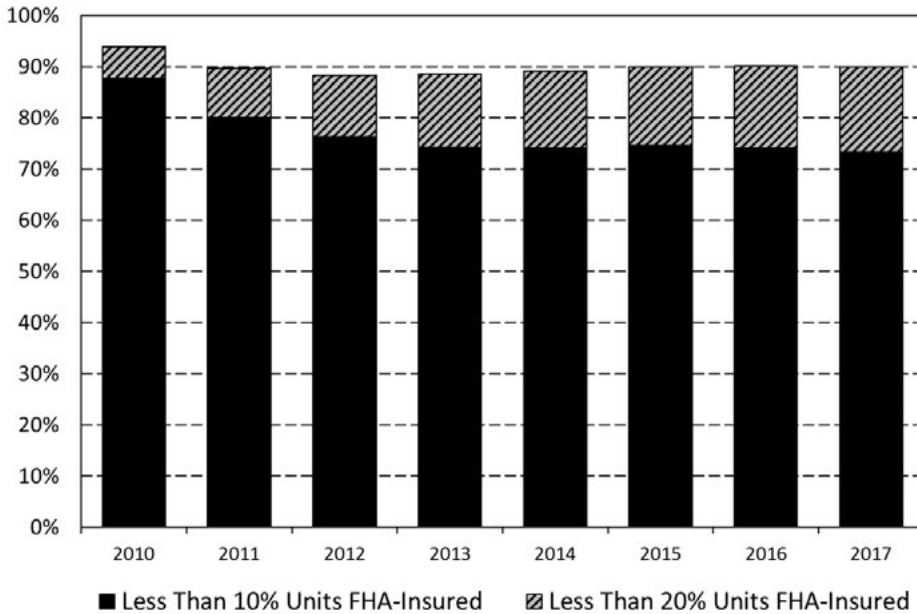
loans in 2009. The action was successful. After ceasing spot loan approval, FHA-insured condo loans became less risky than non-condo loans. Regardless of the risk reduction, the banning of spot approval was perceived as overly restrictive (Harney, 2014). This regulation reintroduces the possibility of single-unit approval in unapproved projects, but only if the condominium project meets a set of eligibility requirements, which were not in place for the earlier spot loans. Thus, the new regulation is less restrictive when compared with current practice but more restrictive when compared with the condominium approval process before 2009. The new regulation is a compromise between the competing objectives of risk-reduction and expanding homeownership.

When FHA changed its condominium policy in late 2009, some suspected that the new restrictions would ultimately harm the condominium industry. Some claimed that the removal of the “spot” loan process and additional restrictions on FHA condominium project approval made the financing of condominium mortgages more difficult, especially for FHA’s traditional consumer base—low-income homebuyers, first-time homebuyers, and people of color. Without spot approval, condominium projects needed to attain FHA approval if sellers wanted to sell to FHA-qualified buyers. The additional restrictions on condominium projects and the 2-year recertification process were claimed to have resulted in fewer condominium projects being FHA-approved.

The regulation allows single-unit approvals but only under certain circumstances. Single-unit approvals are limited to 0–20 percent of the units within one project; they are not allowed for manufactured home projects, or if HUD is aware of any circumstances that would adversely affect the viability of the condominium. Given that the FHA-insured percentage of condominiums rarely rises beyond 10 percent, it is not likely that the cap will be restrictive. Most projects do not have a significant proportion of FHA-insured units. Under a 20-percent cap, 90 percent of currently approved projects could have employed a single-unit loan approval. Under a much more restrictive 10-percent ceiling, 73 percent of current projects could have avoided the project-approval process through single-unit loans. Exhibit 1 illustrates the concentration of projects with less than 10 percent and less than 20 percent FHA-forward loan occupancy since FY 2010.

Exhibit 1

FHA Insurance Concentration Among FHA Approved Condominium Projects



FHA = Federal Housing Administration.
 Source: HUD Office of Risk Management and Regulatory Affairs

The reintroduction of a single-unit approval process should create two volume effects. One is a pure expansionary effect: because barriers to entry are reduced, units in more projects will be eligible for FHA insurance. The other is a substitution effect: projects that would have otherwise sought full approval from FHA may opt for the less burdensome process of single-unit approval.

From an informal review of market data, HUD has been unable to identify any obvious and quantifiable market effects of the regulation. The regulation may lead to a gentle increase in condominium construction, sales, and prices by giving FHA a greater stabilizing role in the condominium market. Although FHA loans represent only a fraction of the entire market, they have had a major impact on stabilizing the housing and mortgage market (Quercia and Park, 2013). Increasing FHA's flexibility in the condominium market and ability to respond to adverse economic shocks could lead to an observable change in condominium activity.

The question of whether the regulatory change will reverse the negative trend in the condominium share of FHA insurance endorsements is key. A fall (or rise) in the FHA share of condominiums could indicate that the regulatory action has a restrictive (or expansive) effect on the market. The FHA share of condominium loans has declined since 2009. It is not obvious, however, that the decline in FHA condominium activity is the direct result of FHA's regulatory actions in 2009, rather than a continuation of a longer-term trend in FHA's share of condominiums.

Analyzing only the FHA-specific condominium share misses some important trends. In general, FHA's share of the market increases (or decreases) with mortgage credit rationing (or accessibility).

A downward trend of FHA-insured condominium loans could mean nothing more than that alternative sources of condominium loans are becoming more affordable.

The 2009 limitation has not appeared to harm the U.S. condominium market. In the years directly succeeding the implementation of restrictions on spot loans, there is no obvious change in the evolution of the condominium share of existing sales. The condominium share of existing home sales has remained roughly the same from 2000 to 2017, varying between 11 and 12 percent of total sales.⁹ Any potential market impacts of restricting supply may have been mitigated by the existence of condominium associations that already meet the FHA project requirements.

Finally, and perhaps most importantly, the new single-unit approval process is more restrictive than the previous spot approval process. Even if banning the spot loans had had a detrimental impact on condominium lending, the expansion as a result of the new regulation would be lesser than the contraction from banning spot approval.

Exhibit 2

Existing Home Sales (2000–2017)

Year	Total Sales (Count)	Total Change from Previous Year (%)	Condo/CoOp Sales (Count)	Condo/CoOp Change from Previous Year (%)	Condo/CoOp Percent of Existing Sales (%)
2000	5,152,000		571,000		11.1
2001	5,296,000	+3	601,000	+5	11.3
2002	5,631,000	+6	657,000	+9	11.7
2003	6,183,000	+10	732,000	+11	11.8
2004	6,784,000	+10	820,000	+12	12.1
2005	7,072,000	+4	896,000	+9	12.7
2006	6,480,000	-8	801,000	-11	12.4
2007	5,652,000	-13	713,000	-11	12.6
2008	4,913,000	-13	563,000	-21	11.5
2009	5,156,000	+5	590,000	+5	11.4
2010	4,190,000	-19	480,000	-19	11.5
2011	4,260,000	+2	477,000	-1	11.2
2012	4,660,000	+9	528,000	+11	11.3
2013	5,090,000	+9	603,000	+14	11.8
2014	4,940,000	-3	591,000	-2	12.0
2015	5,250,000	6	608,000	+3	11.6
2016	5,450,000	+4	619,000	+2	11.4
2017	5,510,000	+1	614,000	-1	11.1

Sources: National Association of Realtors and U.S. Statistical Abstract 2012

⁹ Examining a proportion helps to control for factors affecting the entire condominium market (market-wide changes in demand or supply).

Exhibit 3

Trends in Condominium Loans, 2000-2018

Year	Number of FHA Condo Loans	Share of All FHA Loans (%)	Comparison: Fannie Mae Condo Share, by Acquisition Year (%)	Comparison: Fannie Mae Condo Share, by Origination Year (%)
2001	67,900	8.4	6.7	6.6
2002	68,600	8.0	6.7	6.7
2003	51,200	7.8	6.6	6.7
2004	41,300	7.0	7.0	7.0
2005	22,300	6.3	7.2	7.2
2006	17,900	5.7	8.4	8.6
2007	13,900	5.0	9.0	9.0
2008	33,800	5.3	9.7	9.7
2009	65,800	6.6	7.2	7.3
2010	72,900	6.6	7.5	7.4
2011	37,900	4.9	7.8	8.0
2012	24,300	3.3	8.1	8.1
2013	21,500	3.1	9.1	9.1
2014	16,100	2.7	9.6	9.6
2015	19,700	2.6	9.7	9.8
2016	22,700	2.6	9.5	9.5
2017	21,400	2.4	9.7	9.7
2018	16,200	2.1	9.4	9.3

FHA = Federal Housing Administration

Sources: Federal Housing Administration and Fannie Mae Loan Performance Data

A concern is whether the single-loan approval process would raise the risk to FHA of loss mitigation and paying insurance claims to lenders. Intuition into the possible effect on risk can be gained by examining the performance of spot loans (allowed before FY 2010).¹⁰ All types of forward mortgages in the 2006 and 2007 portfolio performed poorly, but condominium loans, which occurred under spot approvals, were among the worst performing subsets. FHA may have permitted loans for projects that were inherently risky (Harney, 2014) because FHA lacked the capacity to carefully examine every loan and its associated condominium project. HUD, and subsequently the taxpayer, bears most of the costs when an FHA-insured loan moves into foreclosure.

Despite the potential of increased risk from allowing single-unit approvals, we believe that other provisions of the regulation will diminish the risk. Formalizing the HRAP and DELRAP, by setting

¹⁰ Before FY 2010, spot loans were the exclusive channel for FHA insurance. All endorsements after FY 2010 are HRAP and DELRAP project approval loans.

standards for condominium projects and lenders, should reduce financial risk by subjecting projects to a full-fledged review by experienced lenders. The claim experience of HRAP and DELRAP condominium project approval loans (as distinguished from the earlier spot-approval loans) yields claim rates slightly more favorable than other FHA single-family forward mortgages.

Environmental Review and Completed Projects

Only completed projects are eligible for HRAP or DELRAP under the regulation. Legally phased projects may be approved, but all units must be built out, and the phases must be separately sustainable. HUD and DE lenders save costs because Environmental Review of completed projects is not required. Other regulatory provisions are in place to guard against environmental damage that may otherwise result from not completing an environmental review.

Not requiring Environmental Review by DE lenders of under-construction projects will reduce the cost to the private sector of participating in the approval process. Between 1,000 and 5,000 condominium projects seek initial approval each year. Since 2010, more than 90 percent of first-time condominium project approvals have been for projects that were completed at least 1 year prior. None of these condominiums would experience a policy change because of the environmental review. The remaining 10 percent, however, might have initiated an environmental site assessment, or at the very least, considered starting the FHA approval process while still under construction. This affected minority amounts to between 100 and 500 projects every year, or an average of about 300 on an annual basis since 2010. HUD's Office of Environment and Energy estimated a range of costs for environmental assessments. For disaster relief, Phase I environmental assessments, which are necessary in the case of site contamination, cost about \$7,000; however, Part 50 Environmental Reviews, a less thorough environmental assessment conducted by HUD, require only 3 estimated hours of work at an hourly cost of \$83,¹¹ or \$250 per review. Avoided reviews numbering 300 at \$7,000 each would save \$2.1 million; 300 avoided reviews at \$250 per review saves only \$75,000.

Summary of the Rule's Economic Impacts

Monitoring current trends in the housing and mortgage market, evaluating past FHA policy actions, and readjusting policy is essential to achieve the balance between the cost of assuming additional risk against the private loss to excluded borrowers. Completely eliminating spot-loans for condominiums in 2009 was justified by the risk that they posed for FHA. The regulation represents a slight readjustment in favor of borrowers by easing some of the burdensome aspects of the condominium approval process. Caution is maintained, however, and the regulation includes some safeguards against increased risk to FHA from insuring condominium loans.

Many provisions of the regulation (single-unit approval, flexible standards, a longer interval for condominium approvals, and exceptions for environmental review) will reduce the compliance costs of condominium lending. By reducing costs of participating in the FHA loan process, HUD's

¹¹ Loaded wage is double the median wage \$41.73 (<https://www.bls.gov/oes/current/oes172081.htm>) of an environmental engineer.

condominium rule is expected to have a gentle and positive impact on FHA's condominium loan volume and share with a maximum impact ranging from 20,000 to 60,000 loans. Expansionary market impacts such as greater construction and sales are possible. There are elements of the rule and of the housing market, however, that will limit any expansionary impacts stemming from the rule. First, the quantified impacts of the rule are small relative to the housing market. The order of magnitude of the net savings from the rule (\$900,000) is negligible when compared to the dollar volume of real estate market transactions. Second, the unmeasured expansionary impacts due to single-unit approval will be limited by risk-management features of the rule. Single-unit approval does not represent a reversal to spot approval, and HUD does not anticipate FHA-insured condominium lending to return to former levels. Third, any expansion of FHA into the condominium market will be partially offset by a contraction of its single-family business as borrowers attracted to FHA-insured condominium loans substitute away from FHA-insured single-family mortgage loans.

Another benefit of this rule is to ensure project viability. The newly introduced requirements are more flexible, less prescriptive, and more reflective of the current market. A further benefit will be realized by granting competent lenders a role in condominium project approval, thus reducing any administrative delays associated with a peak load of applications. DELRAP will also benefit buyers, sellers, and mortgage lenders who would like to use or offer FHA loans in instances where a condominium association does not pursue FHA approval.

Many of the economic impacts of the regulation are transfers: from lenders in riskier projects to FHA, from lenders not eligible to lenders eligible to participate, and from unapproved projects to approved projects. Projects that meet the eligibility requirements may gain relative to those that do not. Lenders who meet the DELRAP eligibility criteria may gain relative to those that do not.

FHA must ensure that it does not overextend itself with excessive financial risk in pursuing its mission to provide opportunities for homeownership. FHA is therefore obliged to execute a delicate balance of assisting borrowers without jeopardizing the solvency of its programs. In the case of condominium mortgages, risk management for FHA requires that the condominium units be within buildings that are financially sustainable. The flexibility introduced by the regulation is advantageous only as long as FHA adjusts the standards to changing market conditions.

Monitoring current trends in the housing and mortgage market, evaluating past FHA policy actions, and readjusting policy is essential to achieve the balance between the cost of assuming additional risk against the private loss to excluded borrowers. Completely eliminating spot-loans for condominiums in 2009 was justified by the risk that they posed for FHA. FHA's declining share of condominium loans, however, could indicate that the policy response overcorrected in favor of risk management and against access to condominium loans. The proposed rule represents a slight readjustment in favor of borrowers by easing some of the burdensome aspects of the condominium approval process. Caution is maintained, however, and the proposed regulation includes some safeguards against increased risk to FHA from insuring condominium loans.

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SpAM

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Crosswalking ZIP Codes to Census Geographies: Geoprocessing the U.S. Department of Housing & Urban Development's ZIP Code Crosswalk Files

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Disclaimer: The views expressed in this article are those of the author and do not represent the official positions or policies of the Office of Policy Development and Research, the U.S. Department of Housing and Urban Development, or the U.S. Government.

Allocating ZIP Code Data to Other Geographies

Although ZIP Codes are a commonly used geographic unit for mapping and spatial analysis, they frequently distort data (Beyer, Schultz, and Rushton, 2007; Cudnick et al., 2012; Dai, 2010; Grubestic and Matisziw, 2006; Hipp, 2007; Krieger et al., 2002; Montalvo and Reynal-Querol, 2017; Wilson, 2015). ZIP Codes are designed for efficient mail delivery, not for geographic analysis. The large area that ZIP Codes cover make them susceptible to data aggregation problems that corrupt local geographic patterns. Due to the irregular—and often contorted—shapes of ZIP Codes, smaller geographic boundaries are ignored when overlain with smaller geographies, to which population

counts are disproportionally distributed between the multiple areas that are cross-cut. The U.S. Department of Housing and Urban Development (HUD) provides several crosswalk files to estimate incident counts at different geographic scales from data at the ZIP-Code level.

Our previous article offers a conceptual discussion of allocating ZIP Code data to other geographies (Wilson and Din, 2018). In this article, we explore the composition of HUD's crosswalk and demonstrate how to geoprocess the ZIP Code to census county and tract crosswalk files. Finally, we compare the estimates from the crosswalk process with the actual data to gauge the level of accuracy as an indicator of reliability.

Data

Rodents remain a widespread public health nuisance around world. They are a signal of poor environmental conditions that threaten the physical health of residents (Davis and Fales, 1949; Gardner-Santana et al., 2009). Rats pose serious health risks because they can rapidly transmit infectious diseases in dense neighborhoods. They are a substantial problem in various New York City neighborhoods and are a particular threat to restaurants and, most importantly, local supplies of pizza (Crowley, 2018).

Community associations, businesses, and city governments attempt to eradicate or manage rodent populations with a variety of techniques, sometimes collaborating with each other through a wide range of rat control programs (Biehler, 2009; Glass et al., 2009). For these groups to effectively combat rodents, they first need to identify the geographic range of the problem (Gardner-Santana et al., 2009; Getis and Boots, 1971; Lambert, et al., 2008); any rodent management program has an inherent geographic scope of their home-range. The range and density of rodent populations is difficult to measure due to the complexities of directly tracking mobile creatures¹. The use of ZIP Code-level data is not ideal for measuring the most affected neighborhoods due to the size and limited spatial range of habitats of rodents. Without more detailed geographic analysis, it is difficult for officials to effectively target mitigation efforts.

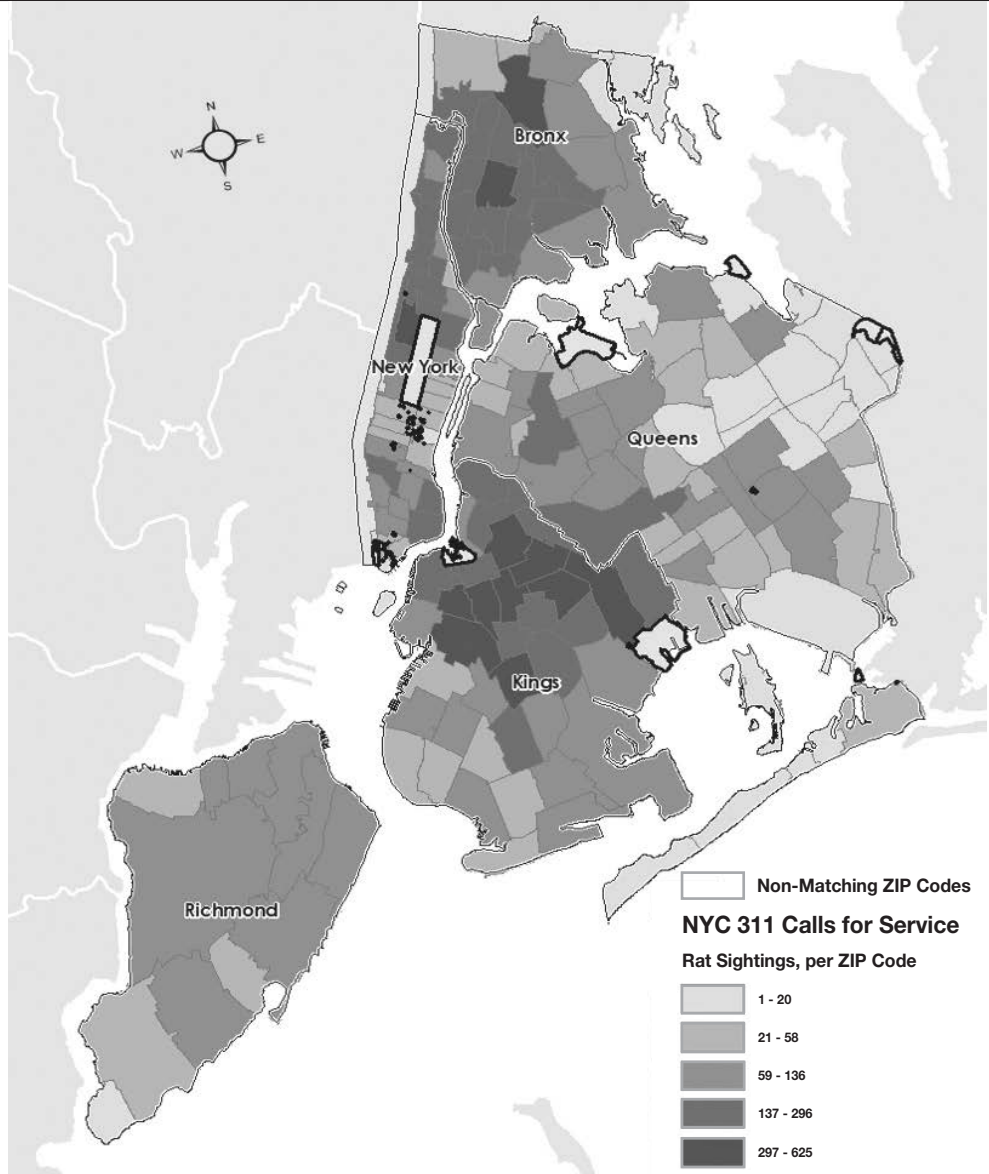
Citizen-produced 311 calls are useful for identifying the geographic patterns of many things occurring in everyday life, such as potholes to be fixed, vandalism, and public nuisances including rat sightings. These microdata are known as Volunteered Geographic Information (VGI) and provide a view of the events in everyday life that are difficult to impossible to capture otherwise (Elwood, 2008; Elwood, Goodchild, and Sui, 2012). Increasingly available 311 call data are a source of information that uses citizens as sensors for the locations of certain events. We exploit New York City (NYC) Open Data's 311 data² for the 2017 calendar year as a proxy to identify the geographic variation of rodents across New York City neighborhoods to determine more local patterns.

¹ Typically, rodents are tracked with radio frequency or other geographic positioning systems that require the use of delicate, complex, and expensive technology. Further, personnel and equipment are needed to capture the rodents, to which laboratories are needed to outfit the rodents with the tracking equipment and then analyze various biometric signatures to find from which colony each specimen is. Finally, and particularly in urban environments, personnel are needed on a regular basis to go and track the locations of each rodent because the dense urban cover blocks the signals when attempting to measure them from locations other than near the rodents' home-ranges.

² <https://data.cityofnewyork.us/Social-Services/Rat-Sightings/3q43-55fe>

Exhibit 1

Rat Sighting Call Frequencies by ZIP Code, 2017



NYC = New York City

The data from 311 Calls in New York City have multiple geographic identifiers that make it possible to compare the results of allocating crosswalked data to the actual counts of sightings by different geographies. We use the latitude and longitude coordinates to aggregate the sighting locations to the census tracts so that we can compare the estimated incidents with the actual count of incidents. This comparison allows us to evaluate the accuracy of county and tract estimates produced by the cross-walk process.

The 311 rat sightings locations were aggregated by ZIP Code, with 184 (70 percent) of the 263 ZIP Codes having at least one reported sighting—see exhibit 1.³ The 67 ZIP Codes with zero sightings reported—highlighted by a thick black outline—are either (1) parks, (2) industrial sites, or (3) single buildings or blocks, most of which are concentrated in Midtown and Lower Manhattan. The map illustrates that rat sightings are primarily concentrated in the Upper East Side of Manhattan, central and north Bronx, and north Brooklyn. The ZIP Code layer with the summary counts of rat sightings will be used to later verify the crosswalk results.⁴

The detailed 311 New York City rat sighting data are particularly useful for (1) testing the accuracy of the HUD crosswalk files, especially in smaller geographies, and (2) demonstrating how resulting estimates can identify highly infested areas for effective extermination. During 2017, 19,152 rat sightings were reported to 311. Records that did not have a value for the Incident ZIP Code, Latitude, or Longitude fields were removed, reducing the data to 18,990 records, a reduction of 0.8 percent. The New York City 311 data were complete.

General Approach to Crosswalking the ZIP Code Files

Linking ZIP Code data to any of the ZIP Code crosswalk data sets is not a one-to-one assignment with any of the available geographies HUD offers.⁵ Rather, a many-to-many approach must be used to ensure each record's proportion in a crosswalk file is associated with the corresponding geography each ZIP Code is contained within or with which it overlaps. The larger geographies—for example, counties or Core-Based Statistical Areas (CBSAs)—will contain most ZIP Codes within their jurisdictional boundaries, with a small number cross-cutting into neighboring jurisdictions. In this instance, each jurisdiction will at least be associated with one crosswalk record.

As an example of what happens when there is a one-to-one match using the census tract file, simply linking a ZIP Code record to one of the several tracts it overlaps will leave many of the corresponding tracts without any data.⁶ This occurs because tracts are typically smaller than ZIP Code areas. Exhibit 2 shows the census tracts in the five NYC counties after a one-to-one match with the ZIP Code crosswalk records. The dark gray areas are the tracts that were assigned to the ZIP Code with the highest residential ratio. The light gray areas are tracts that were not associated with a ZIP Code record, but nevertheless do overlap with a ZIP Code because they are within or cross-cut at least one other ZIP Code record. These geographic “holes” occur because the ZIP Codes in those areas are larger than all the corresponding tracts within, to which the ZIP Code only gets assigned to one tract. Consequently, when a ZIP Code is assigned to one tract, all the adjacent tracts associated with that same ZIP Code are not assigned any of the address ratios used for analysis.

³ After the join, the frequency field sum of 311 calls were checked to ensure it matched the number of records in the filtered 2017 data.

⁴ The crosswalk process can be done entirely outside of the Environmental System Research Institute (ESRI) software suite or any geographic information system (GIS). While the crosswalk is a geo-process, the data processing is performed within the attribute table as opposed to checking the geometries of the involved geographies. A GIS is only needed for visualization purposes.

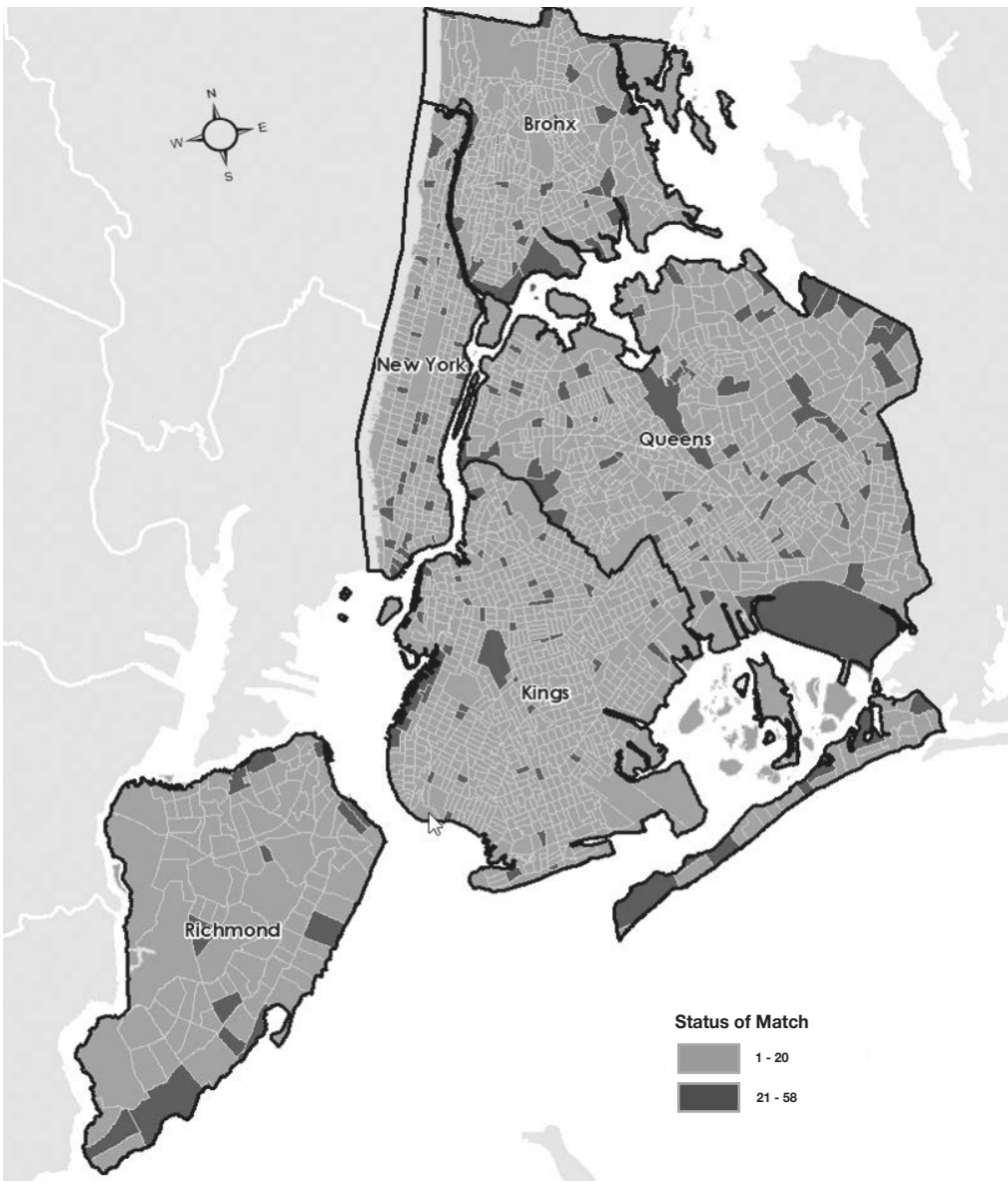
⁵ HUD officers provide ZIP Code crosswalks for Census (1) tracts, (2) counties, (3) county subdivisions, (4) Core-based Statistical Areas, (5) CBSA divisions, and (6) Congressional District geographies.

⁶ In dense urban areas, ZIP Codes can be associated with a large number of census tracts. For example, Brooklyn ZIP Codes 11234 and 11236 crosswalk (intersect) with 46 census tracts each.

Unless the analytical objective is to identify tracts with a particular residential ratio, a proportion assignment solution with a many-to-many match should be used to assign ZIP Code ratios to all overlapping tracts. With a one-to-many assignment, the data can be summed so that a total proportion of addresses can be calculated and used to estimate the likely number of events that occurred in each geography. The crosswalk data can then be linked to other data, such as the U.S. Census Bureau's place name geography, then easily mapped, tabulated, or spatially analyzed.

Exhibit 2

ZIP Code Assignment of Highest Residential Ratio



Crosswalking Data from ZIP Codes to County Geographies

Crosswalking ZIP Codes is a simple operation that involves (1) filtering out records for a specific geography, (2) adding additional geographic information to contextualize the data, (3) joining all relevant data sets to the crosswalk file, (4) summing the proportions for a total proportion of addresses, and (5) estimating incident counts per geography.⁷ This process is the same for any of the HUD crosswalk geographies, whether census tracts, counties, Congressional Districts, or other geographies.

Filtering

The ZIP Code to county crosswalk file was first filtered to include only records in the state of New York, reducing the crosswalk file from 52,901 to 2,478 records. These records were then matched to ZIP Codes for all of New York State to ensure that they overlapped with the five boroughs in NYC. The 311 ZIP Code data were then joined to the crosswalk data using the ZIP Code field as the linking ID field. Once joined, a new field is calculated that is the product of the ZIP Code frequency and the `tot_ratio` field to produce an estimate for 311 rat calls for service.

Because ZIP Codes cross-cut multiple counties, duplicate ZIP Code records appear in the crosswalk file, indicating multiple overlaps. Most ZIP Code addresses are contained within a single county, however, there are numerous instances in which addresses with the same ZIP Codes are in several counties; the five boroughs of New York City are no exception. The ZIP Code field contains the ZIP Code, and each ZIP Code corresponds with a county Federal Information Processing Standard (FIPS) Code in the County field. The `res_ratio`, `bus_ratio`, `oth_ratio`, and `tot_ratio` fields⁸ are really proportions of each address type in a ZIP Code in a county—see exhibit 3 for structure of the crosswalk file.

The proportions can be understood vertically or horizontally. For a vertical example, ZIP Code 10463 in exhibit 3 is split between Manhattan (36061) and the Bronx (36005). Among residential addresses (`res_ratio`), 89.7 percent of addresses in ZIP Code 10463 are located in Manhattan and 10.3 percent are located in the Bronx, adding up to 1.0 (100 percent) of addresses. The proportions in the remaining ratio fields (`bus_ratio`, `oth_ratio`, and `tot_ratio`) are interpreted the same way. Any ZIP Code that shows complete address proportions of 1.0 across all four address type ratio fields will have all addresses in a single county.

For a horizontal example, the Bronx (36005) contains 89.7 percent of residential, 92.0 percent of business and 90.0 percent of other addresses from the 10463 ZIP Code, with a total of 89.8 percent of the ZIP Code in this borough. For any ZIP Code that is split between larger geographies, the proportions in the ratio fields can vary between which ZIP Code part has the highest proportion. This inconsistency does not occur with ZIP Code 10463, or for any ZIP Code in the five boroughs of NYC. Note, there are instances where one ZIP Code in a larger geography will have the more

⁷ The crosswalk process can be done entirely outside of the ArcGIS or any geographic information system because the data processing is performed with the attribute table by geographic name, as opposed to spatially overlaying the sighting locations with the ZIP Code boundaries. That is, no GIS is needed and can be done in any statistical, database, or spreadsheet software program.

⁸ Residential, Business, Other, and Total, respectively.

residential addresses, while another ZIP Code will have more business and other addresses.

There are few instances among the five NYC boroughs where one address type is completely in one ZIP Code, but other address type proportions are split between two counties. For example, ZIP Code 11208 is in Brooklyn (36047) and Queens (36081), with residential and other addresses split between both counties but business addresses are completely in Brooklyn.

Exhibit 3

Structure of the HUD ZIP Code to County Crosswalk File

ZIP	County	Res_Ratio	Bus_Ratio	Oth_Ratio	Tot_Ratio
10458	36005	1.000000000	1.000000000	1.000000000	1.000000000
10459	36005	1.000000000	1.000000000	1.000000000	1.000000000
10460	36005	1.000000000	1.000000000	1.000000000	1.000000000
10461	36005	1.000000000	1.000000000	1.000000000	1.000000000
10462	36005	1.000000000	1.000000000	1.000000000	1.000000000
10463	36061	0.103139795	0.079906905	0.096541787	0.102085916
10463	36005	0.896860205	0.920093095	0.903458213	0.897914084
10464	36005	1.000000000	1.000000000	1.000000000	1.000000000
10465	36005	1.000000000	1.000000000	1.000000000	1.000000000
10466	36005	0.998516521	1.000000000	0.998856489	0.998607741

In this analysis, the total proportion of addresses (tot_ratio) in a ZIP Code is assigned to a county to estimate the number of 311 calls reporting a rat sighting in a census tract. The total proportion is used because rat sightings can be associated with any type of address. If the data were for home inspections, the residential proportion (res_ratio) would be more appropriate to use. These proportions represent all the individual addresses in a ZIP Code, either for a single detached unit or a building with multiple units. Because data from the USPS master address file are used for matching and standardizing addresses, all individual addresses are recorded and not just the address of the building with any number of individual addresses.

The crosswalk file should always be used, and thought of, as the “left” file in joining data. This is because ZIP Codes intersect multiple geographies for which data will be estimated, and the estimates will then be summarized by geographic place to produce the estimates.

Geographically Contextualizing the HUD Crosswalk File

At this stage, using the cross-walk files to identify ZIP Codes in certain counties or states can be cumbersome because there are no place names to easily identify the places the data represent, just identifier codes that people do not easily recognize. If an entire state or subset of counties is selected for crosswalking, those records can be identified and selected using a query function to extract only those records that correspond with the study area. In our analysis, we selected those records that are within one of the five counties (boroughs) of New York City, which is more helpful when the names of the counties are known instead of the FIPS Codes when selecting those records.

To make the HUD Crosswalk file more useful, other data can be linked to the U.S. Census Bureau's County List file by the corresponding FIPS Code. Adding this data geographically "contextualizes" HUD's crosswalk file by adding the (1) individual state and county FIPS Codes, (2) county name, (3) state abbreviation, and (4) county type to the ZIP Codes and address proportions (exhibit 4). Adding this information makes the HUD crosswalk file more intuitive when geoprocessing and analyzing data, particularly by offering a method to summarize data using recognizable geographic place names.

Exhibit 4

Geographically Contextualized Crosswalk File

HUD Cross-Walk						Census County List					NYC 311 Calls by ZIP		
res_ratio	bus_ratio	oth_ratio	tot_ratio	zip	county	ST_AB	CNTY_NAME	CNTY_STATUS	GEO_ID	ST_FIPS	CNTY_FIPS	POPULATION	COUNT_Complaint_Type
0.10314	0.079907	0.096542	0.102086	10483	36061	NY	New York County	H6	36061	36	061	7641	210
0.161610	0.037333	0.009709	0.148729	11001	36081	NY	Queens County	H6	36081	36	081	3944	5
1	1	1	1	11004	36081	NY	Queens County	H6	36081	36	081	11776	6
1	1	1	1	11005	36081	NY	Queens County	H6	36081	36	081	3533	0
0.056062	0.038334	0.059761	0.054407	11040	36081	NY	Queens County	H6	36081	36	081	2349	0
1	1	1	1	11101	36081	NY	Queens County	H6	36081	36	081	26254	88
1	1	1	1	11102	36081	NY	Queens County	H6	36081	36	081	33944	32
1	1	1	1	11103	36081	NY	Queens County	H6	36081	36	081	36234	85
1	1	1	1	11104	36081	NY	Queens County	H6	36081	36	081	27127	27
1	1	1	1	11105	36081	NY	Queens County	H6	36081	36	081	36906	30
1	1	1	1	11106	36081	NY	Queens County	H6	36081	36	081	38665	57
1	1	1	1	11109	36081	NY	Queens County	H6	36081	36	081	2752	1
1	1	1	1	11201	36047	NY	Kings County	H6	36047	36	047	53041	163
1	1	1	1	11203	36047	NY	Kings County	H6	36047	36	047	78060	178
1	1	1	1	11204	36047	NY	Kings County	H6	36047	36	047	77354	55
1	1	1	1	11205	36047	NY	Kings County	H6	36047	36	047	41125	250
1	1	1	1	11206	36047	NY	Kings County	H6	36047	36	047	83575	333
1	1	1	1	11207	36047	NY	Kings County	H6	36047	36	047	93556	379
0.99911	1	0.998995	0.999154	11208	36047	NY	Kings County	H6	36047	36	047	94410	160
0.00089	0	0.001005	0.000846	11208	36081	NY	Queens County	H6	36081	36	081	94410	160
1	1	1	1	11209	36047	NY	Kings County	H6	36047	36	047	69255	42
1	1	1	1	11210	36047	NY	Kings County	H6	36047	36	047	67067	76

HUD = U.S. Department of Housing and Urban Development. NYC = New York City.

After contextualizing the HUD Cross-walk file, the rat sighting 311 calls are linked together to complete the data set for analysis.

Estimating County Rat Calls for Service per Geography

Once the additional data are linked to the HUD ZIP to County crosswalk file, the number of 311 calls reporting rat sightings can be estimated for each ZIP Code. A new field needs to be created for this estimate, which will be the total address ratio (tot_ratio) multiplied by the number of calls within each ZIP Code (COUNT_Complaint_Type). This estimate will represent the number of calls in each county based on the addresses within each jurisdiction.

Since the crosswalk file has been matched to country level data, some of the estimates will sum to exactly the total number of rat sightings, but estimates will not add to the exact total. This occurs when all the addresses in a ZIP Code are in only one county. For example, Richmond (Staten Island) in NYC. In other counties, such as Kings (Brooklyn), New York (Manhattan), Queens, and the Bronx, estimates will sum to a value less than the total of reported rat sightings in a ZIP Code because some of the counts are in neighboring counties outside one of the five boroughs. Since ZIP Codes do not respect political boundaries, it is possible for counties outside of NYC to have estimated counts. The edge of a project area should always be considered because ZIP Codes can cross into neighboring administrative regions.

The remaining records from the HUD ZIP Code crosswalk file are summarized by county to create a set of descriptive statistics for rat sighting calls for each county. Exhibit 5 shows the results from summing the reported sightings (SUM_Complaint_Type) by ZIP Code and using the previously described estimation method (SUM_EST_Complaint_Type).

Exhibit 5

Summary Statistics of County-Level ZIP Code Counts and Estimates

Cnty_Name	Cnty_Count	SUM_Complaint_Type	SUM_EST_Complaint_Type	MEAN_EST_Complaint_Type	STD_EST_Complaint_Type
Bronx County	25	3735	3713.045	148.52182	91.78859
Kings County	43	7359	7204.375	167.54360	153.98840
New York County	95	4640	4451.438	46.85724	78.34508
Queens County	82	2998	2833.369	34.55328	44.50728
Richmond County	14	783	783.000	55.92857	37.31254

The estimates are very similar to the actual counts because the geographic unit used to estimate the number of rat sightings is at an aggregate to a larger level geography. The CNTY_COUNT field shows the number of ZIP Codes that fall within each county boundary. The SUM_, MEAN_ and STD_EST_Complaint_Type fields provide information on the variation of reported rat sightings between counties. The difference between the county count and estimated sum is due to a small percentage of 311 reports coming from ZIP Code addresses outside the New York City boroughs and NYC's 311 service does not respond to requests made outside of the City.

These summary statistics communicate the spread of estimated calls across each county and provide additional geographic information that the counts alone cannot provide. Without these statistics, there is no information about the distribution of rat calls across each county, minimizing the necessary assumption that calls are evenly distributed across a county. For example, among the counties in exhibit 5, the estimate's standard deviation indicate a wide distribution of calls around the mean. This finding implies that counties contain ZIP Codes with both very many and very few reported sightings.

Crosswalking Data from ZIP Codes to Census Tracts

The crosswalking process to census tracts is the same as crosswalking to counties, but in this case, ZIP Codes are likely to intersect a greater number of geographies. Because census tracts intersect with multiple ZIP Codes, no single tract represents a single ZIP Code. As such, the address proportions need to be summed to provide a complete proportion of addresses for this level of analysis. The structure of the ZIP Code to census tract crosswalk file is the same as the HUD ZIP to county crosswalk file. Because the census tract crosswalk file details multiple tracts to multiple ZIP Codes, more complex relationships are revealed at this geographic level (exhibit 6).

Exhibit 6

Structure of the HUD ZIP Code to Census Tract Crosswalk File

ZIP_CODE	TRACT_CODE	Res_Ratio	Bus_Ratio	Oth_Ratio	Tot_Ratio
11697	36081091601	0.987118644	0.850000000	1.000000000	0.985299031
11697	36081091602	0.012881356	0.100000000	0.000000000	0.014032743
11694	36081091800	0.001121076	0.000000000	0.000000000	0.001018330
11694	36081092200	0.093497758	0.002040816	0.024390244	0.086048880
11694	36081092800	0.129596413	0.024489796	0.039024390	0.120570265
11694	36081093401	0.152466368	0.130612245	0.165853659	0.151934827
11694	36081093402	0.189237668	0.175510204	0.314634146	0.193788187
11694	36081093800	0.329484305	0.573469388	0.321951220	0.341344196
11693	36081094201	0.076448157	0.091269841	0.168141593	0.080534670
11693	36081107201	0.174323588	0.194444444	0.039823009	0.170091896
11693	36081107202	0.000181587	0.011904762	0.000000000	0.000668338
11692	36081094202	0.031427832	0.088435374	0.000000000	0.031624460
11692	36081094203	0.072038282	0.013605442	0.018518519	0.069549104
11692	36081095400	0.204604242	0.360544218	0.166666667	0.206423718
11692	36081096400	0.319322297	0.319727891	0.092592593	0.313279802
11692	36081097202	0.141360579	0.061224490	0.314814815	0.144533663
11691	36081097203	0.069752432	0.011688312	0.056316591	0.067436629
11691	36081097204	0.013738417	0.037662338	0.019786910	0.014707155
11691	36081099200	0.058226914	0.038961039	0.057838661	0.057574185

Exhibit 6 illustrates the complex relationship between one ZIP Code and the census tracts it cross-cuts. The top table in exhibit 7 highlights ZIP Code 36067 and its corresponding census tract crosswalk records. The bottom table highlights the 13 census tracts associated with ZIP Code 36067, and the all other ZIP Codes associated with any of the tracts. Both tables have two additional fields, one showing the number of parts per ZIP Code (ZIP_CODE_PARTS) and the other with the total census tracts associated with each crosswalk record (TRACT_PARTS).

In the top table, ZIP Code 36067 is associated with a total of 13 census tracts, each of which are either completely contained within the ZIP Code, or cross-cut and are shared with neighboring ZIP Codes. The TRACT_PARTS field shows the number of times each of those tracts is cross-cut by any ZIP Code that it overlaps. Those records with 1 in the TRACT_PARTS field indicate that the tract is completely contained within ZIP Code 36067. The rectangles in the last column (TRACT_PARTS) are five tracts that are completely contained in ZIP Code 36076. The remaining tracts cross cut between two to six other ZIP Codes.

Exhibit 7

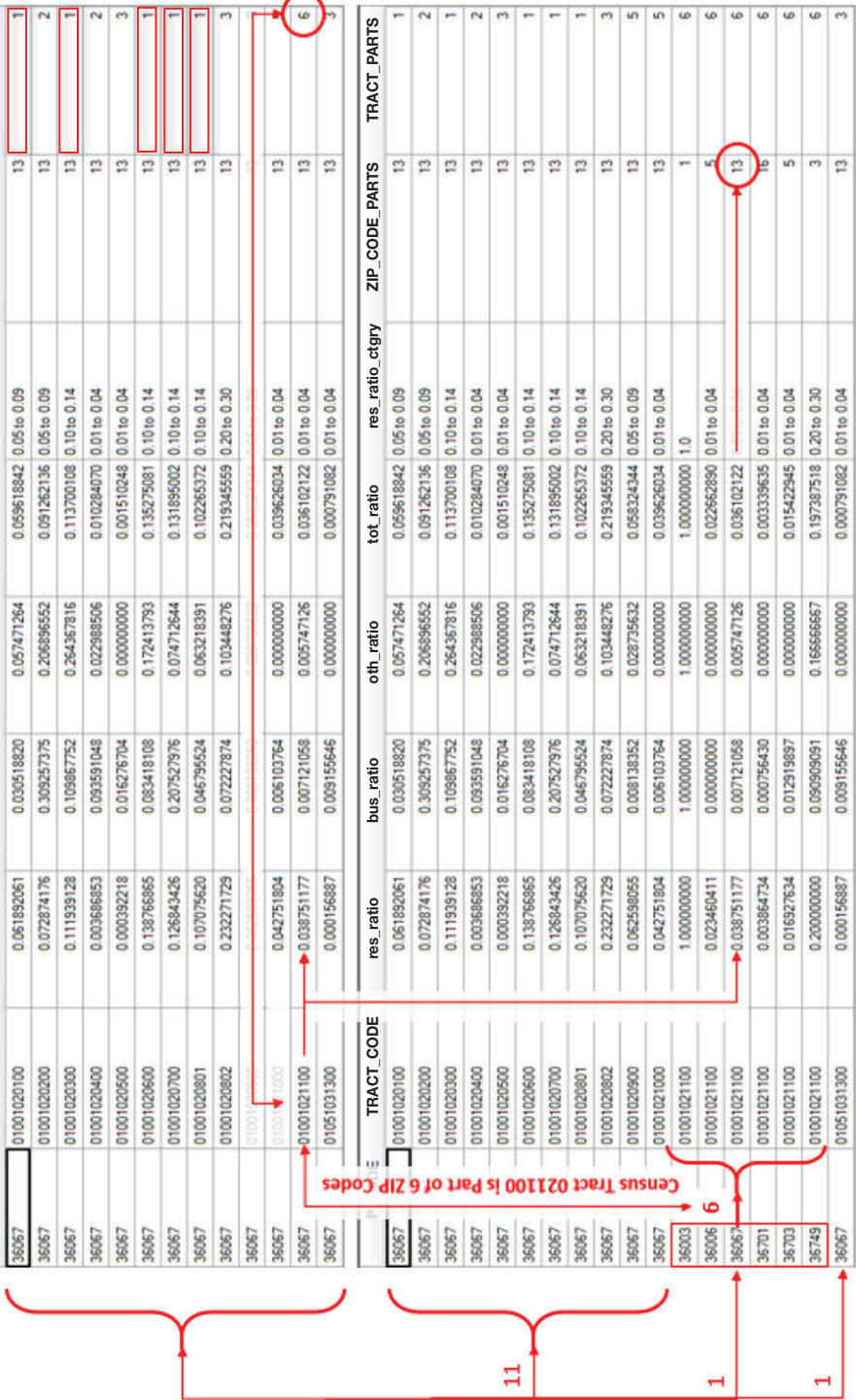
Linkages Between ZIP Codes and Cross-Cut Census Tracts

ZIP_CODE	TRACT_CODE	res_ratio	bus_ratio	oth_ratio	tot_ratio	res_ratio_ctgry	ZIP_CODE_PARTS	TRACT_PARTS
36067	01001020100	0.061892061	0.030518820	0.057471264	0.059618842	0.05 to 0.09	13	1
36067	01001020200	0.072874176	0.309257375	0.206896552	0.091262136	0.05 to 0.09	13	2
36067	01001020300	0.111939128	0.109867752	0.264367816	0.113700108	0.10 to 0.14	13	3
36067	01001020400	0.003686853	0.093591048	0.022988506	0.010284070	0.01 to 0.04	13	2
36067	01001020500	0.000392218	0.016276704	0.000000000	0.001510248	0.01 to 0.04	13	3
36067	01001020600	0.138766885	0.063418108	0.172413793	0.135275081	0.10 to 0.14	13	3
36067	01001020700	0.126843426	0.207527976	0.074712644	0.131895002	0.10 to 0.14	13	3
36067	01001020801	0.107075620	0.046794524	0.063218391	0.102265372	0.10 to 0.14	13	3
36067	01001020802	0.232271729	0.072227874	0.103448276	0.219345559	0.20 to 0.30	13	3
36067	01001020900	0.042751804	0.006103764	0.000000000	0.039626034	0.01 to 0.04	13	3
36067	01001021100	0.038751177	0.007121058	0.005747126	0.036102122	0.01 to 0.04	13	6
36067	01051031300	0.000156887	0.009155646	0.000000000	0.000791082	0.01 to 0.04	13	3

ZIP_CODE	TRACT_CODE	res_ratio	bus_ratio	oth_ratio	tot_ratio	res_ratio_ctgry	ZIP_CODE_PARTS	TRACT_PARTS
36067	01001020100	0.061892061	0.030518820	0.057471264	0.059618842	0.05 to 0.09	13	1
36067	01001020200	0.072874176	0.309257375	0.206896552	0.091262136	0.05 to 0.09	13	2
36067	01001020300	0.111939128	0.109867752	0.264367816	0.113700108	0.10 to 0.14	13	1
36067	01001020400	0.003686853	0.093591048	0.022988506	0.010284070	0.01 to 0.04	13	2
36067	01001020500	0.000392218	0.016276704	0.000000000	0.001510248	0.01 to 0.04	13	3
36067	01001020600	0.138766885	0.063418108	0.172413793	0.135275081	0.10 to 0.14	13	1
36067	01001020700	0.126843426	0.207527976	0.074712644	0.131895002	0.10 to 0.14	13	1
36067	01001020801	0.107075620	0.046794524	0.063218391	0.102265372	0.10 to 0.14	13	1
36067	01001020802	0.232271729	0.072227874	0.103448276	0.219345559	0.20 to 0.30	13	3
36067	01001020900	0.042751804	0.006103764	0.000000000	0.039626034	0.05 to 0.09	13	5
36067	01001021000	0.04751804	0.006103764	0.000000000	0.039626034	0.01 to 0.04	13	5
36003	01001021100	1.000000000	1.000000000	1.000000000	1.000000000	1.0	1	6
36006	01001021100	0.023460411	0.000000000	0.000000000	0.022626890	0.01 to 0.04	5	6
36067	01001021100	0.038751177	0.007121058	0.005747126	0.036102122	0.01 to 0.04	13	6
36701	01001021100	0.003864734	0.000756430	0.000000000	0.003339635	0.01 to 0.04	15	6
36703	01001021100	0.016327634	0.012919837	0.000000000	0.015422945	0.01 to 0.04	5	6
36749	01001021100	0.200000000	0.050909091	0.166666667	0.197987518	0.20 to 0.30	3	6
36067	01051031300	0.000156887	0.009155646	0.000000000	0.000791082	0.01 to 0.04	13	3

13 Cross-cut Census Tracts by ZIP Code 36067

Census Tract 021100 is Part of 6 ZIP Codes



The bracket at the top left identifies the corresponding 13 census tracts (TRACT_CODE) among the 18 listed in the bottom table. The other brackets, lines, and circles highlight the complete relationship between the ZIP Code 36067 and its corresponding tracts from one table to the other. The bottom table also shows that there are five other ZIP Codes that cross-cut at least one of the same tracts cross-cut by ZIP Code 36067. The bottom table—like the top table—shows which tracts are completely contained in the ZIP Code with a value of 1 in the TRACT_PARTS field. Unlike the top table, the bottom table shows which tracts in ZIP Code 36067 are cross-cut by other ZIP Codes. For example, tract 010012021100 in ZIP Code 36067 is cross-cut by five other ZIP Codes (detailed in rows 12 to 17). As shown in both the top and bottom tables, one tract (010012021100) is cross-cut six times by one ZIP Code.

Preparing the ZIP Code to Census Tract Crosswalk File

Even though a ZIP Code intersects multiple census tracts, the records in the HUD Crosswalk file are summarized by tract ID. The geoprocessing remains the same regardless of geographic level. The total proportion of addresses in tract in each ZIP Code can be calculated by summing the proportions from all cross-cut addresses.

There are 18,990 rat sighting calls across 184 ZIP Codes in the five boroughs of NYC. Of the 3,191 tracts in the NYC area, 3,033 (95 percent) ZIP Codes match the HUD crosswalk file.

Census tracts that are outside the city limits and that have no reported sightings at the ZIP Code-level were removed from the analysis. Note that 60 of 153 ZIP Code tracts that were outside the city limits were from either Nassau or Westchester Counties. After removing these tracts, 3,131 remain and were matched with data from the HUD crosswalk file. Of the remaining crosswalk tracts that do not match to a ZIP Code, 66 are in New York County, 17 are in Queens, 13 are in Kings, and 2 are in Richmond, with 0 in the Bronx. After these 93 unmatched records were removed, a total of 3,033 crosswalk file tracts remained for matching with census tract data.

Of the 67 ZIP Codes that did not match in exhibit 7, 49 of the ZIP Codes from the crosswalk tracks also did not match and were removed.

In 2017, a total of 19,580 rat sightings were reported among ZIP Codes within one of five counties of NYC, with the estimates totaling to 18,841—739 less the number reported. Again, the lower estimate is due to a reduction in calls from tracts that do not correspond with an NYC ZIP Code. Of the 739 calls that were not included in the estimate, 151 were dropped due to ZIP Codes not matching to the ZIP Code to Tract HUD Crosswalk file, leaving 588.

Estimating Tract Rat Calls for Service

Exhibits 8 and 9 demonstrate how to calculate the census tract estimates using HUD's crosswalk files. Exhibit 8 shows the calculations for the 11415 ZIP Code, which serves a portion of southern Kings County (Brooklyn). In 2017, there were 21 total sightings reported in the 11415 ZIP Code. The frequency of sightings was then multiplied by the tot_ratio of each census tract. The result is a set of estimated rat sightings for each of the eight tracts that intersect with the 11415 ZIP Code. The estimates range from 3.50 to 0.38 sightings and total to 21, which is the ZIP Code frequency.

Exhibit 8

Rat-Call Estimates for ZIP Code 11415 by Census Tract

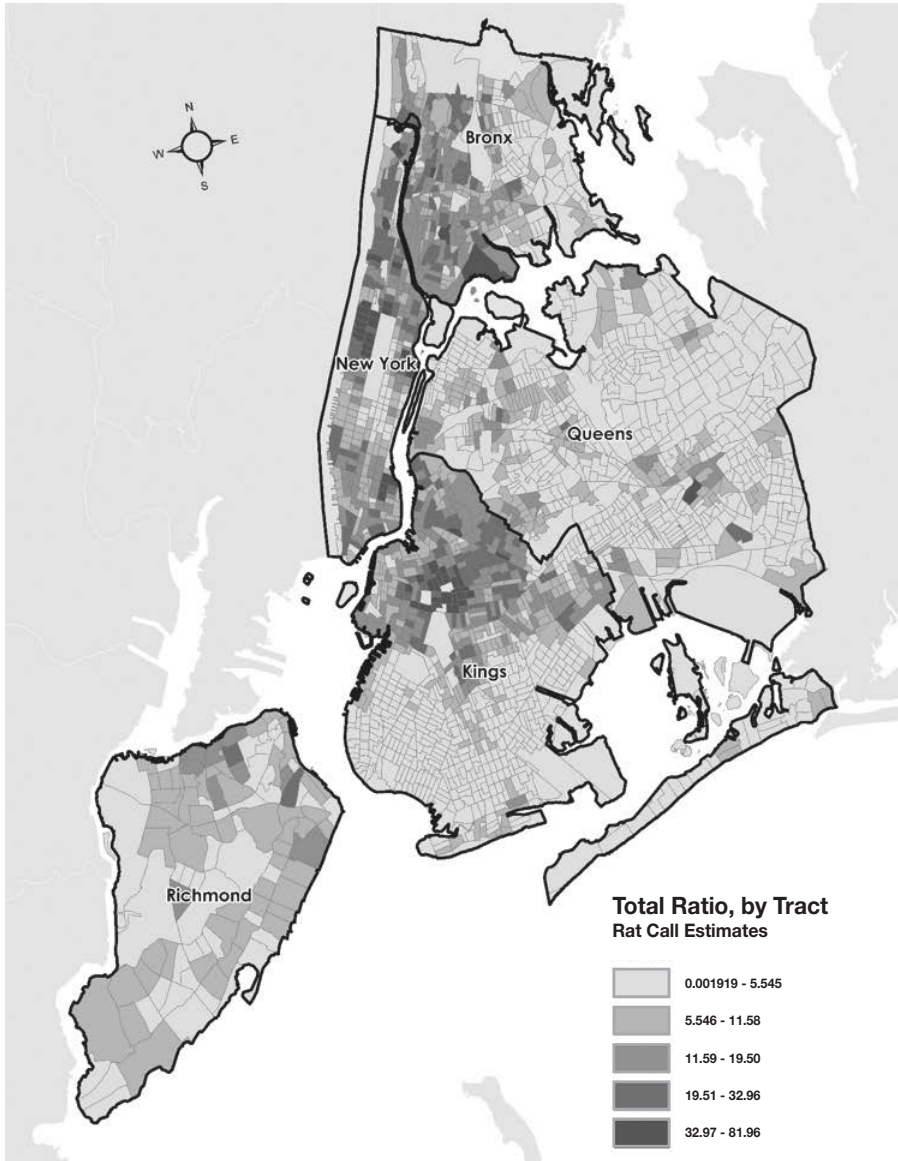
ZIP	TRACT	Tot_Ratio	City	Alias_City	County_Name	EST_Call_Cnt	ZIP_Call_Cnt
11415	36081021600	0.16773620	Kew Gardens	Jamaica	Queens	3.5224603	21
11415	36081014000	0.13861191	Kew Gardens	Jamaica	Queens	2.9108500	21
11415	36081013200	0.01806694	Kew Gardens	Jamaica	Queens	0.3794057	21
11415	36081077500	0.09951624	Kew Gardens	Jamaica	Queens	2.0898411	21
11415	36081013800	0.14986672	Kew Gardens	Jamaica	Queens	3.1472011	21
11415	36081013400	0.19616941	Kew Gardens	Jamaica	Queens	4.1195577	21
11415	36081013600	0.13012143	Kew Gardens	Jamaica	Queens	2.7325501	21
11415	36081077300	0.09991115	Kew Gardens	Jamaica	Queens	2.0981341	21

Because census tracts intersect with multiple ZIP Codes, the resulting table will have multiple records for the same census tract. The calculated estimates are summed by a census tract identifier using a summing function. Exhibit 8 displays the calculations for the 36081021600 census tract which intersects with two ZIP Codes. Exhibit 9 illustrates the mapped results for the estimated rat sightings at the census tract level for the 11415 ZIP Code. Note that in Exhibit 8, while the portion of total addresses within a census tract is likely proportional to the total area within a ZIP Code, the two may differ due to an uneven distribution of addresses.

The resulting estimated rat sightings at the census tract-level are shown in exhibit 9 and are mapped later. Note that the mapped results at the tract-level are comparable to those at the ZIP Code level. The crosswalk file assumes that the reports are evenly distributed across the ZIP Code, thus the results look similar at the tract and ZIP Code level.

Exhibit 9

Rat-Call Estimates, by Census Tract



Assessing the Crosswalk Estimations

With the New York City 311 data containing the coordinates of the call for service locations, we used the geocoded locations of the reported rat sighting to assess the accuracy of the ZIP Code to census tract crosswalk, apportioning to smaller geographies to create the estimates. We aggregated the locations to the counties and census tracts using a spatial join to directly compare

the actual count of rat sighting counts with the estimates in both geographies. We summarized the counts and estimates by counties and tracts to compare the differences between the actual vs. the estimates.

Crosswalking data from ZIP Codes to counties yielded highly accurate results, which is because most ZIP Codes are contained with the county boundary with only a small amount of area falling in neighboring Nassau and Westchester counties. When actualized as geographic boundaries, ZIP Codes often follow closely to the larger jurisdiction's (for example, county or city) administrative boundary. With counties, then, it is expected that the differences between the actual number of calls and the estimates are not very different.

Exhibit 10

Actual Versus Estimated Rat Calls for Service, by County

Cnty_Name	Cnty_Count	SUM_Complaint_Type	SUM_EST_Complaint_Type	DIF_Complaint_Type	PCT_DIF_Complaint_Type
Bronx County	25	3735	3713.045	-21.95455	0.5878058
Kings County	43	7359	7204.375	-154.62516	2.1011708
New York County	95	4640	4451.438	-188.56196	4.0638353
Queens County	82	2998	2833.369	-164.63089	5.4913573
Richmond County	14	783	783.000	0.00000	0.0000000

Notes: CNTY_NAME is the name of the county, not borough. SUM_Complaint_Type describes the actual number of complaints, whereas SUM_EST_Complaint_Type describes the number of estimated complaints. DIF_Complaint_Type is the count difference between actual and estimated complaints, and PCT_DIF_Complaint_Type is the percentage difference between actual and estimated complaints.

The differences are shown in exhibit 10 for each of the counties. Richmond (Staten Island) and the Bronx show very little difference, with no difference in Richmond and about 22 in the Bronx. Kings (Brooklyn), New York (Manhattan), and Queens show a difference between about 154 to 188, no more than 6-percent difference.

For census tracts, however, the results are less accurate because ZIP Codes cross-cut numerous tracts because they do not follow the boundaries closely, and as many as 46 census tracts intersect with a single ZIP Code in NYC. Exhibit 11 shows multiple ZIP Codes cross-cutting the census tracts in Bronx and New York (Manhattan) Counties. ZIP Code 10457, as one example, in the center of exhibit 11 contains 17 tracts and cross-cuts 11 tracts shared with three other ZIP Codes. When the cross-cuts occur, a sizeable number of the tracts are often in multiple ZIP Codes. This means that there is a more even proportion of addresses in each tract, which corresponds with a more equal likelihood of a rat call for service coming from each part of the tract.

Exhibit 11

ZIP Codes Cross-Cutting Multiple Census Tracts

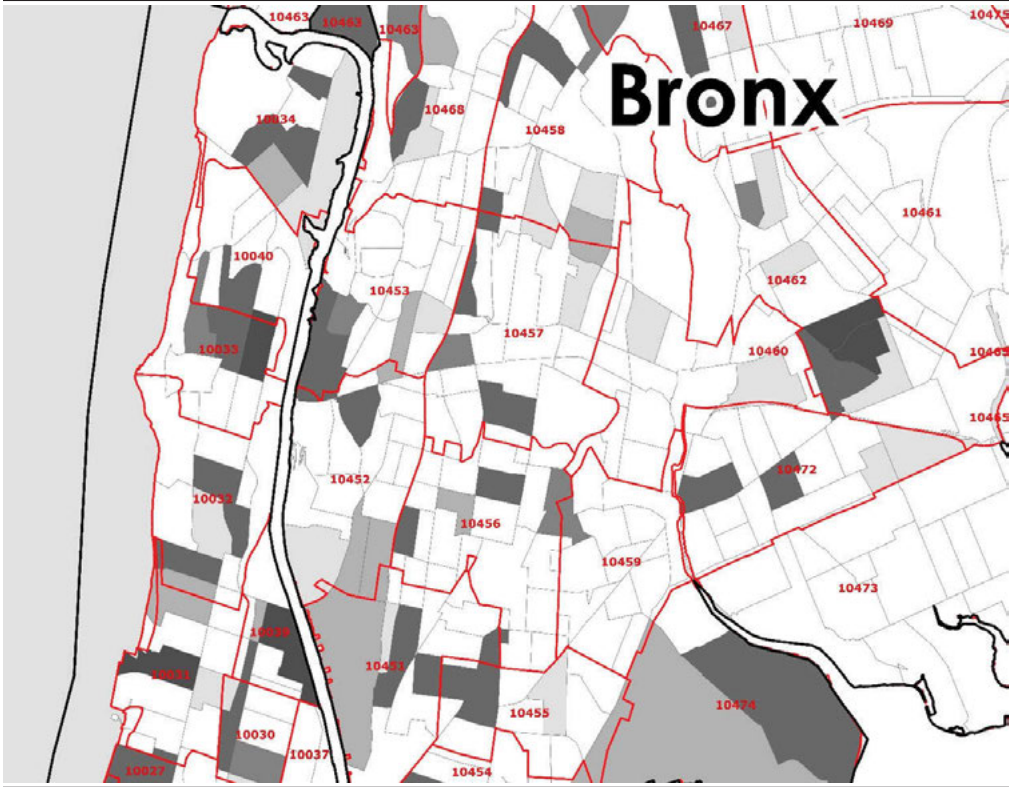


Exhibit 12 shows a frequency distribution of differences between the actual counts and estimates for each of the 2,164 tracts across the New York City area. The distribution shows to have a high kurtosis normal distribution, which means the differences for most tracts are not that wide.⁹ In this aspect the histogram indicates that there is little bias in the estimate errors because the differences are distributed in similar way as to be expected under a random process.

The three middle bars at the average of the histogram make up 40 percent (866) of all tracts, to which the difference is between the actual number of calls and estimated number of calls is -1.29 and 2.54. The largest group of census tracts is within approximately 2.5 estimated to actual calls, a relatively small difference. The remaining 28 percent of tracts within the first standard deviation extends the difference range from -8.18 to 8.54, that is, about eight calls below or above the actual number of rat calls for service.

Beyond the first standard deviation, the range extends from about 9 to 58 calls, indicating that some tracts are very different between the actual and estimated number.

⁹ Having a high kurtosis is an ideal characteristic of a difference distribution because it indicates that most of the differences are not large and are similar to the average.

Exhibit 12

Frequency Distribution of Actual Versus Estimated Rat Calls for Service, Census Tracts

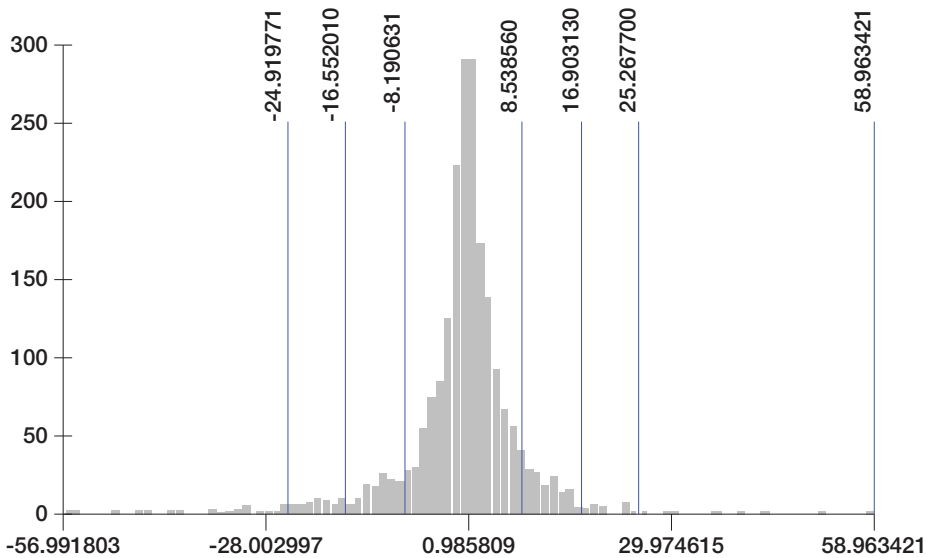
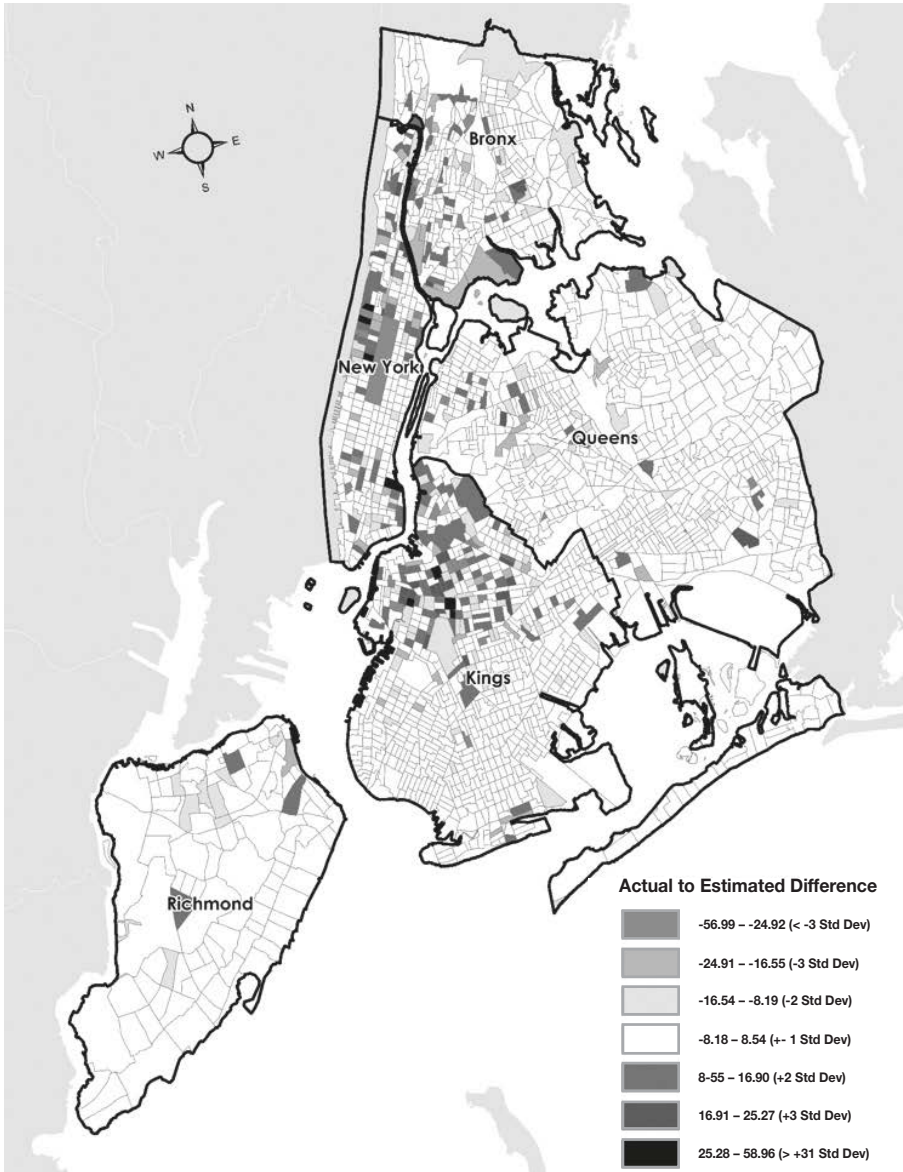


Exhibit 13 shows the geographic distribution of the difference across the NYC area. Unlike the histogram of actual counts vs estimate differences, the geographic distribution reveals a bias in the differences through the clustering of higher and lower differences. The clusters are largely in north Brooklyn and the Upper West Side in New York (Manhattan). This finding indicates that using addresses may not be the best for estimating calls for service in these areas, which for Brooklyn is quite sizeable. A scattered number of tracts with large differences can be seen in the Lower East in Manhattan, in east and south Bronx, and in west Queens.

It is unlikely that when crosswalking data that one will have the point data to check the accuracy of the estimate or there would not be a need to perform the crosswalk data processing. In identifying these discrepancies between actual and estimated counts for whatever the data, however, additional patterns of human activity may be identified. These patterns and trends may be further described through additional spatial analysis.

Exhibit 13

Geographic Distribution of Actual Versus Estimated Rat Calls for Service, Census Tracts



Summary

The HUD ZIP Code crosswalk files are one of the best available data sets for allocating address locations from ZIP Codes to other geographies or vice versa. Because the crosswalk files are updated quarterly, they are a timely data set that keeps pace with the frequent changes in ZIP Code

areas. The crosswalk files are also available from the first quarter of 2010 which means the most appropriate file can be applied to the data if it occurred within the timeframe. These data sets allow analysts, policy-drafters, and decisionmakers—to name a few—to integrate data that is aggregated at the ZIP Code level with existing data sets such as census data or the American Community Survey (ACS) and make the data more useful for analysis. The availability of previous quarters also allows for a relatively granular temporal analysis for changes across time.

It should be noted that there are considerations when crosswalking data to smaller geographies, particularly census tracts, however, because data on the resulting estimates are allocated as proportionally as to how the addresses are located between the ZIP Codes and the recipient geography. When using the files, there are a number of data components of which one needs to be mindful. With the exception of Congressional Districts crosswalk file, the crosswalk files are produced using the 2010 Census geographies and do not correspond to geographies that changed between censuses.¹⁰ This can cause confusion to those using the files. The crosswalk files are produced using ZIP Codes that have associated address counts; this does not include ZIP Codes that are only associated with postal office boxes. Still, even with these considerations, the crosswalk files are a popular and robust method to reapportion data from ZIP Codes to other administrative geographies, or vice versa, in the health, policy, finance, marketing, and other fields.

¹⁰ <https://www.census.gov/programs-surveys/geography/technical-documentation/county-changes.html>

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Symposium on the Hispanic Housing Experience

HUD's Office of Policy Development and Research invites submissions for a symposium in a future issue of Cityscape on topics that relate to the Hispanic Housing Experience in the United States. Topics might include (but are not limited to):

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Abstract submissions are due by July 1, 2020. If an abstract is accepted, the full manuscript is due by December 15, 2020. Submissions are subject to peer review and authors are required to address issues raised by the editors and/or reviewers by March 15, 2021. Please submit abstracts and direct questions to George Carter at George.R.Carter@hud.gov.

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