

All Eggs in One Basket? The Portfolio Composition of Low- and Moderate-Income Home Owners and Renters *

Ahmed Rachid El-Khattabi¹ and Roberto G. Quercia²

^{1,2}*Department of City and Regional Planning, University of North Carolina at Chapel Hill*

²*Center for Community Capital, University of North Carolina at Chapel Hill*

February 18, 2020

Abstract

Disproportionately investing in illiquid assets raises an “all eggs in one basket” concern because it may crowd out other forms of investment and reduce the likelihood of having a higher yielding, lower risk, diversified portfolio. In this paper, we examine this concern in the context of housing given the post-Great Recession debate regarding the desirability of promoting homeownership broadly. We compare portfolio compositions of low and moderate income (LMI) homeowners and renters over time and identify factors associated with portfolio differences. Our household-level panel data features detailed financial information before, during, and after the recent housing and economic crises. Contrary to expectations, we find that LMI homeowners tend to hold a more diversified portfolio than their renter counterparts. We also find that owners were significantly more likely than renters to acquire retirement accounts over the analysis period. The results suggest that the “all eggs in one basket” choice may be more complex than the ongoing debate would indicate.

*The authors thank Allison Freeman for her valuable insight and support.

Introduction

Holding financial assets is important for wealth building, withstanding material hardship, and for financing a secure retirement. In recent decades, investments in illiquid assets such as real estate, private equity, and infrastructure have become more common due to perceptions of higher expected returns (e.g. Chan and Faff, 2005). For instance, the share of illiquid assets held by pension funds, for example has risen from 5% in 1995 to 20% in 2011 (Ang, Papanikolaou and Westerfield, 2014). Disproportionately investing in illiquid assets, however, creates an “all eggs in one basket” concern because it may crowd out other forms of investment, thereby reducing the likelihood of having a higher yielding, lower risk, diversified portfolio. Furthermore, the illiquidity of the asset introduces additional risk due to transaction costs and search frictions. This potential concern is most applicable to low and moderate income (LMI) homebuyers given the limited financial means and wealth at their disposal.

In this paper we examine the “all eggs in one basket” concern in the context of owning a home—an illiquid asset. The key goal of our analysis is to assess the impact of homeownership on LMI households’ ability to build wealth. Specifically, we ask the following two questions: (1) How is LMI homeownership correlated with the magnitude of the wealth/debt accrued over time? (2) How is LMI homeownership correlated with the gain or loss of a particular asset or financial product in a household’s portfolio? Our findings suggest that, on average, LMI homeowners had more liquid assets throughout the sample period than their renter counterparts. In terms of portfolio composition, owners were significantly more likely than renters to acquire retirement accounts over the sample period; while owners who entered the study already in possession of retirement accounts were significantly more likely than similarly situated renters to retain those accounts. That is, owners have a more diversified portfolio than comparable renters.

The context of housing is important because of the large share of overall wealth that the illiquid home equity represents for LMI families (Bricker et al., 2017).¹ This fact exposes them to the volatile nature of home values (Wolff, 2012), and limits their ability to access this asset quickly in response to emergencies and other hardships. In particular, the susceptibility to the substantial financial risks associated with changes in home values underscores the importance of diversified portfolios (Bostic and Lee, 2008; Van Zandt and Rohe, 2011). The vulnerability of LMI households

¹In 2007, housing wealth represented 51.2% and 47.1% of total family wealth for families in the bottom two quintiles of the income distribution, respectively (Sabelhaus et al., 2012). From 2007 to 2010, house prices fell by 24%, median household wealth fell by 47% (Wolff, 2012).

is particularly important in light of the recent housing bubble burst, foreclosure crisis, and the subsequent “Great Recession” that resulted in widening inequalities (Wolff, 2012) and substantial declines in household wealth among LMI households in its aftermath (Sabelhaus et al., 2012; Pfeffer, Danziger and Schoeni, 2013; Wolff, 2017).² From a policy perspective, the “all in eggs in one basket” concern has contributed to increased uncertainty regarding the appropriate federal role in support of homeownership. The contention that investment in housing may not be appropriate for LMI households is easily explainable. Home purchase crowds out other forms of investment and reduces the likelihood of having a diversified portfolio (Cocco, 2005; Hu, 2005; Yao and Zhang, 2005). From this perspective, LMI households can better build wealth if renting and investing the saved cash flow (Rappaport, 2010; Beracha and Johnson, 2012). While there is growing support for this perspective, many scholars maintain that homeownership is an important factor in LMI households’ successful wealth building (Grinstein-Weiss et al., 2013; Shapiro, Meschede and Osoro, 2013). Little is known, however, about the portfolio composition of lower-income homeowners and renters and the factors associated with portfolio differences.

This paper contributes to the literature on LMI households by comparing portfolio compositions and overall wealth between a sample of LMI homeowners and a matched sample of renters during the 2003 to 2012 period using data from a unique panel study, the Community Advantage Panel Survey (CAPS). In particular, the dataset includes in-depth modules on participants’ wealth and assets in years before, during, and after the recent housing and financial crises, providing an opportunity to shed light on the role of homeownership as a potential buffer during turbulent economic times. Our findings inform the current debate regarding appropriate public role in supporting homeownership for low income, low wealth households.

The paper is structured as follows. First, we provide a review of the literature concerning the role of the home in the portfolios of LMI owners. Following this, we provide an overview of the data underpinning the analysis. We then present the analysis itself, including an explanation of and results from the two types of models used in the study: (1) a panel data model that captures overall changes in holdings of assets/debts during the sample period; and (2) a logit models to determine the likelihood of having a particular asset/debt in the portfolio. We conclude the paper with a discussion of the implications of our findings for affordable housing policy and identify additional areas for research.

²The average wealth of the poorest 40% declined from \$62,000 in 1983 (in 2010 dollars) to -\$10,600 in 2010 (Wolff, 2012).

Literature Review

From a theoretical perspective, demand for housing can be decomposed into two dimensions: consumption as well as investment. Like their renter counterpart, homeowners need a place to live (a roof over their head). This is reflected in the consumption dimension of housing. In addition, homeowners can benefit from the wealth creation that results from the appreciation of the underlying real estate and the forced savings resulting from the periodic repayment of mortgage debt. Homeowners also benefit from the preferential tax considerations such as the non-taxation of imputed rent and the deductibility of mortgage interest and property tax payments. Though renters forsake benefits of homeownership, they would be free to allocate investments to create an efficient blend of a “market” portfolio. Household tenure decisions, i.e. the decision to live in owner-occupied housing, is driven by differences in investment value and the consumption value for housing, with households choosing to live in owner-occupied housing as long as investment value exceeds consumption value (Henderson and Ioannides, 1983).³ Empirically, however, Ioannides and Rosenthal (1994) find that the principal residence of most owner-occupiers is determined by their consumption demand for housing, not their investment demand. This finding suggests that these households may be over-invested in housing and have inefficient portfolios as the expected return of their portfolio would increase with a marginal decrease in their housing investments. Brueckner (1997) argues that this inefficiency should not be taken as an indication that consumers are irrational or careless in their financial decisions, but the result of “rational balancing of the consumption benefits and portfolio distortion associated with housing investment” (p.176).

Given concerns of over-investments in housing as an asset, the role of LMI homeownership in households’ financial portfolios is a matter of much policy debate. This section briefly reviews the mixed empirical evidence on how investments in housing impact household wealth, with a focus on studies that explore the role of homeownership in generating wealth among LMI households.

On the one hand, several researchers argue that homeownership crowds out other investments. These researchers find that housing generally represents a disproportionate fraction of a homeowners’ portfolio. For example, Cocco (2005) finds that for younger and poorer households, investment in housing reduces the money available for investment in stocks, thereby “reducing the benefits of equity market participation.” Hu (2005)’s simulation analysis of investors’ optimal deci-

³The investment value cannot be less than the consumptive value as this would reflect that partial ownership in the home. Though this may be true for certain arrangements (e.g. time-shares, cooperatives), it is not the norm and therefore beyond the scope of this paper.

sions determines that “homeownership crowds out stock market participation.” Similarly, Yao and Zhang (2005) find that investment in a home substitutes for investment in stocks.

On the other hand, a wide body of literature finds that homeownership can help LMI households generate wealth. Grinstein-Weiss et al. (2013) find that homeownership plays an important role in the wealth of LMI households. In their analysis of CAPS panel data, the authors find that homeowners see greater increases in net worth, assets, and non-housing net worth than renters do; they further find that duration of tenure (i.e. sustained homeownership) positively impacts not only total net worth but also non-housing wealth. Using data from the Panel Study of Income Dynamics (PSID), Herbert, McCue and Sanchez-Moyano (2013) find that homeownership among LMI households is consistently associated with increases of roughly \$9,000 to \$10,000 in wealth for each year of ownership. They find both a substantial wealth gain through appreciation in home prices and an increase in savings when individuals make the move from renting to owning. Shapiro, Meschede and Osoro (2013) argue that homeownership is so important to wealth creation that the difference in years of homeownership “accounts for 27% of the difference in relative wealth growth between white and African-American families, the largest portion of the growing [racial] wealth gap.” Beracha, Skiba and Johnson (2017) explore the potential benefits of homeownership in the context of overall household portfolio performance (as opposed to the direct financial benefits of homeownership in isolation) and conclude that “while renting is superior to ownership in isolation, homeownership as a part of the household portfolio often improves wealth creation on a risk-adjusted basis.”

Furthermore, a few studies hint at a possible connection between homeownership and broader asset accumulation. For instance, previous work has found that renters generally hold fewer assets than homeowners (Caner and Wolff, 2004; McKernan and Sherraden, 2008); evidence which suggests that homeownership may be “associated with the ownership of a wide range of financial assets” (Haveman and Wolff, 2004). Additionally, Grinstein-Weiss, Key and Carrillo (2015) finds that though a larger proportion of homeowners lost net worth during the recession, renters were more likely than owners to lose at least 25% of their net worth. Focusing just on LMI households’ portfolios, Freeman and Desmarais (2011)’s descriptive analysis of CAPS panel data reveals no evidence that homeownership crowds out other forms of investment; these authors conclude that affordable home lending therefore “acts as a strong forced-savings tool” for LMI households and that there is “very little evidence that either alternative investments and/or savings are reduced as a result of equity accumulation.”

The timing of investment, however, can be especially important as LMI households are likely to have few liquid assets more sensitive to longer periods of unfavorable market conditions (Belsky and Duda, 2002). Supporting this finding, Rappaport (2010) finds that homeowners with ten-year occupancies beginning during the 1970s and 1990s unambiguously built more wealth. On the other hand, renting and investing unambiguously built more wealth for occupancies that began during the 1980s. In their nuanced analysis of the effect of home equity and mortgage debt on household portfolios, Chetty, Sándor and Szeidl (2017) echo these findings and present mixed findings on the home’s role in the portfolio. These authors conclude that “exogenous increases in mortgage debt induce substantial reductions in the share of liquid wealth held in stocks, while exogenous increases in home equity wealth raise stock ownership.”

Researchers have also emphasized the importance of mortgage type in supporting homeownership that can lead to wealth creation through the forced savings resulting from the periodic repayment of the mortgage debt, the appreciation of the underlying real estate, and through preferential tax considerations. As the financial crisis painfully showed, subprime mortgages did not lead to wealth creation but to wealth losses for many homeowners. These subprime products included hybrid adjustable rate mortgages, interest only mortgages, and option adjustable rate mortgages among others. Subprime products were underwritten without regard to a borrower’s ability to repay often requiring refinancing and the payment of additional fees, something that reduced the ability to accumulate wealth in the form of home equity. In contrast, homeowners who relied on properly underwritten, 30-year fixed rate mortgages as those originated under the auspices of the Community Reinvestment Act were better able to build wealth and to navigate the financial crisis (e.g. Quercia, Freeman and Ratcliffe, 2011).

Data

The data used in our analysis come from the Community Advantage Panel Survey (CAPS). CAPS is a longitudinal survey of low- and moderate-income (LMI) homeowners and renters in the United States. The data concern the Community Advantage Program (CAP), a collaborative secondary mortgage market program, developed between Self-Help, Fannie Mae, and the Ford Foundation. Under CAP, Self-Help purchased existing community reinvestment home loans from originating

banks and sold them to Fannie Mae; Self-Help used a \$50 million grant from the Ford Foundation to retain any associated risk for a set period of time.⁴

Over time, the CAP portfolio grew to include 46,000 30-year, fixed-rate loans, all of which were originated between 1999 and 2003. The loans in the CAP portfolio meet at least one of three criteria: borrower households had annual incomes that were 80% or less of area median income; borrowers were members of racial/ethnic minority groups; or borrowers had household income of 115% or less of area median income and lived in a high-minority Census tract. CAP borrowers' financial profiles would have made it difficult for them to get affordable credit from mainstream lenders: 90% of CAP's homeowners had loan-to-value ratios in excess of 90% and/or had a debt-to-income ratio greater than 38% and/or had a credit score of 640 or less. Careful underwriting, market interest rates, and the long-term, fixed nature of these loans have enabled sustainable homeownership for a group of homeowners who might otherwise have resorted to subprime products.⁵

From 2003 to 2014, a subset of CAP homeowners was interviewed annually on a broad range of topics, such as savings, assets, debt, mortgage refinance, home maintenance, neighborhood amenities, etc. A panel of renters, matched to this subset of CAP homeowners by income and location, was added to CAPS in 2004 in order to allow researchers to parse out the effects of affordable homeownership. The data for the current analysis comes from 2005, 2008, and 2012, three years in which the CAPS questionnaire included an in-depth module on participants' financial lives, including their assets, debts, and the composition of their financial portfolios.

In this study, we focus solely on the outcomes of consistent owners, i.e. those who received a CAP loan and kept it throughout the sample period, relative to consistent renters, i.e. those who started out as and remained renters. We do not include households that switched from owning to renting (and vice versa) during the study period, as the timing of these households' decisions to select out of or into treatment makes it difficult to study wealth creation, which is long-term in nature. We further restricted our sample to those households that provided a full set of answers to the wealth module questions in all three years of interest: our total sample consists of 1,265 households, 724 of whom own their homes and 541 of whom rent.

⁴These are loans for which banks would receive credit for complying with the Community Reinvestment Act.

⁵For example, at the peak of the mortgage lending crisis (2009Q4), CAP's serious delinquency rate was 9.61%, lower than that of prime adjustable-rate mortgages (18.13%), subprime fixed-rate mortgages (22.06%), and subprime adjustable-rate mortgages (42.07%). For point of comparison, in the same quarter, the serious delinquency rate of prime fixed-rate mortgages was 4.99%

Table 1: Binary Outcome Variables for Logit Model

Financial Asset	
Bank Account & CD's	Binary variable indicating possession of a bank account or certificates of deposit
Investment Account	Binary variable indicating possession of an investment account
Retirement Account	Binary variable indicating possession of a retirement account
Cash Value Life Insurance	Binary variable indicating possession of cash value life insurance
Financial Debt	
Credit Card Debt	Binary variable indicating outstanding credit card debt
Vehicle Debt	Binary variable indicating outstanding vehicle debt
Student Loans	Binary variable indicating outstanding student loans

Outcomes of Interest

Between 2005 and 2012, CAPS households either accrued or lost certain types of assets or debts. To examine the overall wealth accrued over the sample period, we use two alternative measures.

First, we create a measure of total wealth, measured as total assets minus total debts. Since home equity is usually the largest component of wealth for LMI households (Quercia, Freeman and Ratcliffe, 2011), this measure may be dominated by home equity. We therefore also use non-housing wealth as an alternative way to measure wealth. This measure is defined the same as the previous measure with the exclusion of home equity. This measure is important as it also captures aspects of the crowding out debate. If LMI households are over-investing in home equity, we would expect homeownership to have a negative effect on non-housing wealth.

Second, we create binary indicators of the relevant financial assets to capture differences in portfolio composition. Consistent with the literature on wealth, we study the impacts on the following debt and asset categories shown in Table 1.

Demographic Controls

Consistent with other studies, we control for key characteristics of the head-of household, such as race, age, gender, presence of minors in the household, marital status, employment status, education, and region (Pfeffer, Danziger and Schoeni, 2013; Grinstein-Weiss et al., 2014). Controls for race and gender are important because they are highly associated with the types of assets and debts held by households (Graham et al., 2002; Ogden, Ogden and Schau, 2004; Cong and Hanna, 2007) including significant gaps in homeownership (Sedo and Kossoudji, 2004; Hanna, Wang and

Yuh, 2010; Quercia, Freeman and Ratcliffe, 2011; Fonseca et al., 2012).⁶ Table 2 defines these controls.

Table 2: Control Variables

Variable	Definition
Age	Decade of life (i.e. 20's, 30's, 40's, 50's, and over 60). 20-30 age group used as reference category.
Minors in Household	Indicator for whether household ever had a minor in their care.
Employment Status	Indicator for unemployment. Separate variables for head of household and spouse.
Gender	Male or female
Race	(1) White (2) Black (3) Hispanic (4) or all other. White used as the reference category.
Education	Education level measured as a binary measure for college education.
Education Change	Binary variables capturing whether or not head of household moved from one level of educational achievement to another.
Marital Status	(1) Never married male (2) Never married female (3) Currently married or partnered (4) Currently separated
Regions	(1) South (2) West (3) Midwest and (4) Northeast. South used as the reference category.

Note: Unless otherwise specified, information is for head of household.

Selection into CAP Homeownership

A naïve comparison of CAP owner and renter outcomes would simply attribute the difference in outcomes between the two groups to the effect of homeownership. This approach would ignore any initial differences in the starting points of each group and therefore would potentially over-state the impact of homeownership. To correct for any systematic differences among the CAP owner and renter populations due to the issue of selection, we pre-matched owners and renters using coarsened exact matching (CEM), effectively comparing outcomes between otherwise identical pairs of owner and renter households (Iacus, King and Porro, 2012). This procedure allows us to isolate and study the effect of homeownership by accounting for inherent differences between the two groups using pre-treatment information.

The goal of any matching technique used for causal inference is to reduce the difference, or imbalance, between the empirical distributions of pre-treatment confounders treated and control observations (Stuart, 2010). The prevailing assumption at the core of these procedures is that the treatment effect bias will be eliminated conditional on observables once observations that have

⁶For instance, approximately 7 of 10 white families own their home. In contrast, only 4 of 10 families among either African Americans or Latinos are homeowners (e.g. Quercia, Freeman and Ratcliffe, 2011).

no close matches on pre-treatment covariates in both the treated and control groups are pruned (Iacus, King and Porro, 2012). The CEM procedure works by placing observations into bins based on how similar they are to other observations after each variable is first coarsened. For example, observations with the same values for all coarsened variables are then placed into the same bin. In further analyses, control units within each bin are weighted to match the number of treated observations in that bin. Bins that do not include at least one treated and one control unit are weighted at zero and therefore not included in the analysis. A measure of imbalance is then calculated using differences between the multivariate histogram of the treated group and the multivariate histogram of the control group (Iacus, King and Porro, 2011). Perfect balance results in a measure of 0, while perfect imbalance results in a measure of 1.

To perform the matching, we use key financial characteristics captured by the CAPS survey that would explain respondents' choice of getting a CAP loan. The survey includes questions on financial upbringing as well as the respondents' understanding of finance, characteristics that are typically unobservable. With the inclusion of these variables, the matching process will therefore be more effective in eliminating bias than traditional matching on observable techniques. Renters and owners are matched by their non-housing wealth in 2005, their region of origin, as well as their financial upbringing and current financial state reported in 2005. We present details on the matching procedure in Appendix A.

Summary Statistics

Prior to matching, renter households are quite different on average from owner households. For example, a larger share of owner households had children, identified as White, and were younger. A smaller share of the renter population have a vehicle, a bank account, a credit card, cash value life insurance, and student loans. In addition, the mean difference for every variable is highly statistically significant prior to matching. Pre-weighted summary statistics for are provided in Appendix B.

After matching, the balance is significantly improved. Table 3 below shows the post-weighted summary statistics. After applying the Coarsened Exact Matching procedure, the differences between the treatment and control groups on all observable characteristics are statistically insignificant at the 95% confidence level, indicating that the weighting procedure is reasonably effective in addressing the issue of selection bias.

Table 3: Household Summary Statistics 2005: Weight Adjusted

	Renters		Owners		Difference	
	Mean	Std Error	Mean	Std Error	Beta	Std Error
Age	43.59	13.32	42.28	12.84	1.31	1.74
Minor in Household (%)	0.17	0.47	0.16	0.46	0.01	0.06
Unemployed (%)	0.07	0.26	0.03	0.17	0.04	0.03
White (%)	0.59	0.49	0.61	0.49	-0.02	0.06
Black (%)	0.26	0.44	0.26	0.44	0	0.06
Hispanic (%)	0.11	0.31	0.09	0.28	0.02	0.04
Other (%)	0.04	0.2	0.04	0.2	0	0.03
College (%)	0.14	0.35	0.19	0.39	-0.05	0.05
Never Married Male (%)	0.04	0.2	0.11	0.32	-0.07	0.03
Never Married Female (%)	0.19	0.4	0.22	0.42	-0.03	0.05
Separated (%)	0.31	0.46	0.3	0.46	0.01	0.06
Non-Housing Net Worth (\$)	9360.64	35064.08	22833.58	75176.08	-13472.9	7167.99
Number of Households	<i>N=142</i>		<i>N=202</i>			

Empirical Estimation

The key goal of our analysis is to assess the impact of homeownership on LMI households' ability to build wealth. Specifically, we ask the following two questions: (1) How is LMI homeownership correlated with the magnitude of the wealth/debt accrued over the sample period? (2) How is LMI homeownership correlated with the gain or loss of a particular asset or financial product in a household's portfolio?

To answer our first question (overall differences in wealth and debt), we estimate a correlated random effects (CRE) model that fully takes advantage of the time series component of the data. We use CRE to overcome the shortcomings of traditional panel data models, notably fixed and random effects estimators. Fixed effect estimation methods eliminate any time invariant unobservable heterogenous effects that may be correlated with the covariates which would therefore cause omitted variable bias. This then implies that the time invariant characteristics of main concern in this study, such as race and tenure, would be differenced out of the estimation. Random effect estimation, on the other hand, allows for the estimation of time invariant variables. The random effects model also allows for heterogeneity across individuals but at the expense of assuming that unobserved heterogeneity is not correlated with observables. In other words, the random effects model does not control for any omitted variable bias.

The correlated random effects (CRE) model makes use of the Mundlak-Chamberlain device, proposed by Mundlak (1978) and Chamberlain (1984).⁷ By doing so, the model considers household unobserved time-constant heterogeneity (an advantage of fixed effects models) while allowing for the effects of time-invariant independent variables to be measured (an advantage of random effects models). In so doing, the CRE model unifies both the fixed and random effects estimation approaches. This approach is estimated using the model represented in (refeq:specification1):

$$\log(y_{it}) = \beta_0 + \beta_1 T_i + \beta_2 x_{it} + \pi \bar{x}_{it} + \beta_3 c_i + \nu_i + \epsilon_{it} \quad (1)$$

where ν_i are household level fixed effects, x_{it} is a vector that represents household level time-variant characteristics, \bar{x}_i represents the time averaged vector for time variant characteristics, c_i is a vector that represents time-invariant household level characteristics, and ϵ_{it} is household specific error term. The variable T_i is an indicator term for being a CAP homeowner owner. This term represents the contribution of being a CAP homeowner to the outcome of interest. We also control for region fixed effects as well as year fixed effects in the models in order to capture regional and time differences over the sample period.

We use this model to examine the percent change in the dollar amount on overall measures of wealth by using a log-level setup (log of dependent variable regressed on the level of independent variables). The results suggest that CAP owners were able to accumulate more wealth than their renter counterparts. As shown in Table 4, on average CAP owners increased their non-housing wealth by 126.7% and their total wealth by 238.6%, more than their renter counterparts. We provide a full table of results in Appendix C.

Table 4: Correlated Random Effects Model Results for CAP homeowners

	Non-Housing Net Wealth	Total Net Wealth
CAP homeowners	1.267*** (0.207)	2.386*** (0.197)

Notes: This table presents results for the percent change wealth associated with CAP homeownership.

Our second question examines the probability of having/holding each asset or debt in 2012 (accounting for baseline status). We do so by estimating logit models to determine the likelihood of having a particular asset or debt over the sample period conditional on having the asset/debt in

⁷The Mundlak-Chamberlain device consists of including time averaged variables of all time variant explanatory variables in the model.

Table 5: Likelihood of Asset/Debt Acquisition

	CVLI	Bank Accnt	Investment Accnt	Retirement Accnt	Other Real Estate	Vehicle Debt	Student Loans	Credit Card Debt
CAP homeowners	0.950 (0.428)	0.594 (0.890)	2.217 (1.198)	3.764** (2.081)	1.646 (1.100)	1.642 (0.638)	1.387 (0.688)	4.996*** (2.951)

Notes: This table presents odds ratios for log likelihood of CAP homeowners to acquire assets/debts for households who do not own the asset/debt in 2005.)

2005. These models allow us to identify the characteristics associated with gaining (or still having) assets/debts relative to 2005.

We model the change in the outcomes of interest as a function of changes known to influence wealth, such as gains in education or trigger events (divorce, unemployment). The basic modeling approach to measure the likelihood of change is given by (2):

$$1(a_{i,2012}|a_{i,2005}) = \beta_0 + \beta_1 T_i + \beta_2 \Delta x_i + \epsilon_i \quad (2)$$

where a represents holdings of a particular asset/debt for household i in 2012 conditional on their holdings in 2005. The vector x_i represents household characteristics, and ϵ_i is household specific error term.

The advantage of this model is that it both identifies and provides estimates of change observed (relative to 2005) in the holdings of specific assets and debts. This approach is not a panel data model, however, and therefore does not take full advantage of the information for the years between 2005 and 2012.

As shown in Table 5, CAP ownership seems to have had a positive impact on households' ability to engage in asset building. In examining the likelihood of having the financial assets of interest in 2012 conditional on not having them in 2005, we find that CAP owners were more likely to acquire investment accounts, retirement accounts, and other real estate, though the effect is only statistically significant for retirement accounts. Notably, the odds of CAP homeowners acquiring investment accounts and retirement accounts are 2.217 and 3.764 times greater, respectively, than the odds of renters acquiring these assets. CAP ownership not only correlated to the acquisition of assets, but also the acquisition of liabilities. Moreover, CAP owners are approximately 5 times more likely to have acquired credit card debt over the study period than their renter counterparts.

Turning now to households the retention of assets and debts, CAP owners were generally more likely than their renter counterparts to retain assets in 2012. As shown in Table 6, the odds of

Table 6: Likelihood of Asset/Debt Retention

	CVLI	Bank Accnt	Investment Accnt	Retirement Accnt	Vehicle Debt	Student Loans	Credit Card Debt
CAP	0.843	3.488	1.810	3.006**	1.348	0.0967*	2.882**
homeowners	(0.987)	(3.120)	(2.097)	(1.468)	(0.693)	(0.133)	(1.500)

Notes: This table presents odds ratios for the likelihood of CAP homeowners to retain assets/debts for households who own the asset/debt in 2005.)

retaining a retirement accounts are three times higher for CAP owners compared to renters. With respect to categories of debt, CAP owners are 90.33% less likely to still have student loans,⁸ but 2.88 times more likely to still have credit card debt.⁹ We provide full tables of results for Table 5 and Table 6 in Appendix C.

Discussion and Conclusion

In this study, we explored two questions related to the overall wealth and the portfolio composition of LMI owners and renters. First, we find that, on average, being a CAP owner is correlated with an increase in non-housing wealth and total wealth by 126.7% and 238.6% (respectively) more than their renter counterparts. This suggests that community reinvestment programs such as the Community Advantage Program (CAP) can help promote wealth creation through the support of sustainable homeownership to low-income households. The findings are consistent with prior work showing the importance of relying on 30-year, fixed rate products that are carefully underwritten to ensure borrowers' ability to repay. This careful approach to affordable homeownership seems to have enabled a group of lower-income homeowners to remain in their homes and to reap the financial benefits that might attend homeownership.

Second, we find that being a homeowner is positively correlated with the likelihood of acquiring and retaining financial products that promote wealth building. Specifically, we find that owners were significantly more likely to acquire retirement accounts over the time frame relative to their renter counterparts. While the odds of acquiring an investment account was also higher for CAP owners relative to their renter counterparts, the effect was not statistically significant. We

⁸Odds ratios can be equivalently expressed as percentage deviations from 1; subtracting the odds ratio (0.0967) from 1 and multiplying by 100.

⁹For instance, this result can be equivalently expressed as CAP owners being 188% more likely than renters to retain credit card debt.

also found that CAP owners were significantly more likely than their renter counterparts to have acquired credit card debt.

Importantly, our analysis finds that homeowners and renters who started the study period with similar assets were not equally likely to retain those assets over time: the odds of retaining their retirement accounts are three times greater for CAP owners relative to CAP renters. With respect to categories of debt, CAP owners who had student loans at the start of the study period were more likely than renters to pay off these loans over the study period; however, the owners with credit card debt were more likely than similarly situated renters to retain credit card debt throughout the study period.

Finally, our analysis provides an additional insight into the relationship between portfolio composition and homeownership. We find a significant correlation between being a homeowner and retaining one's retirement account over the study period. There may be reasons for this and the other owner-renter differences that were not captured in the study. For instance, LMI renters may have been more likely to lose their job (and associated benefits such as retirement) during the Great Recession or they may have taken jobs without benefits while changing jobs. While we cannot know the exact reasons behind these differences, it is noteworthy that during a period of economic tumult, being a homeowner was associated with a greater likelihood of retaining retirement and other forms of wealth building assets.

What do our findings imply for the “all eggs in one basket” concern? Our finding that CAP owners were significantly more likely than their renter counterparts to gain retirement and investment accounts over the study period suggests that LMI homeownership do not displace other investments. For some households in our sample, it might even had a positive effect on their acquisition. From this perspective, the results suggest that the “all eggs in one basket” choice may be more complex than the ongoing debate would indicate.

This study raises the importance of additional questions that need to be addressed by future work. For instance, more understanding is needed to disentangle the importance of the consumption and investment aspects of housing for LMI households. Is the investment aspect of housing greater than the consumption aspect for low income, low wealth homebuyers? Similarly, why is it that despite what portfolio theory would suggest, comparable renters do not save or invest as expected?

Though our findings do not provide a definitive answer to the “all eggs in one basket” concern, they do suggest that entry into affordable homeownership when done right can help promote the acquisition of both housing wealth and other forms of wealth-creating assets. They also suggest

that concerns notwithstanding, comparable renters do not seem to save and invest as expected. Until the behavior of renters is better understood, it may be better to continue to promote LMI homeownership in a responsible manner.

Appendices

Appendix A Coarsened Exact Matching Procedure

The matching procedure is undertaken to ensure that the population of CAP owners can be directly compared to the population of renters. The variables used for matching were taken from the 2005 survey to ensure similarity at the start of the program. The variables chosen to match CAP owners and renters represent factors that likely played a significant role in the decision to get a CAP loan. Two key variables are included in the matching process likely to be correlated with unobservable household characteristics. First, a measure of financial upbringing is included. Specifically, respondents are asked whether their parents had a checking or savings account at a bank when you were growing up. Second, respondents are asked questions and evaluated on how informed respondent they are about finance. These variables have been found to be related to the types of investment that households are likely to make (Gaudecker, 2014). In addition to these variables, US Census region is used to proxy for culture and institutional factors. This variable would also capture difference in regional price levels and account for the fact that there is a positive correlation between the sale price of a household's current house and the purchase price of the next house, even when the house is in a different region (Sinai and Souleles, 2013). Other variables used for the match include employment status, race, age, relative non-housing wealth and income, presence of minors.

The CEM procedure works by placing observations into bins based on how similar they are to other observations after each variable is first coarsened. For example, observations with the same values for all coarsened variables are then placed into the same bin. In further analyses, control units within each bin are weighted to equal the number of treated observations in that bin. Bins without at least one treated and one control unit are thereby weighted at zero and not included in the analysis. The measure of imbalance is then calculated as the difference between the multivariate histogram of the treated group and the multivariate histogram of the control group (Iacus, King and Porro, 2011). Perfect balance results in a measure of 0, while perfect imbalance results in a measure of 1.

Appendix Table A1: Univariate Imbalance

Variable	L1	Mean	Min	25%	50%	75%	Max
Income Greater than 50K	3.1e-17	6.2e-17	0	0	0	0	0
Above Average Non-Housing Wealth	2.4e-16	2.5e-16	0	0	0	0	0
Age 30-39	2.9e-16	2.5e-16	0	0	0	0	0
Age 40-49	4.4e-16	3.3e-16	0	0	0	0	0
Age 50-59	3.3e-16	2.2e-16	0	0	0	0	0
Separated	3.9e-16	2.2e-16	0	0	0	0	0
Black	3.3e-16	2.2e-16	0	0	0	0	0
Presence of Minors	1.4e-16	1.9e-16	0	0	0	0	0
College Education	1.1e-16	1.1e-16	0	0	0	0	0
Financial Understanding	6.2e-16	2.4e-15	0	0	0	0	0
Parents had Bank Accounts	2.5e-16	6.7e-16	0	0	0	0	0
Region	1.3e-16	1.8e-15	0	0	0	0	0

Note: Multivariate L1 distance: 5.48×10^{-16}

Survey questions related to financial background

- Parents had Bank Accounts: “Did your parents have a checking or savings account at a bank when you were growing up?”
- Financial Understanding: measure of how informed respondent feels about finance

Appendix B Statistics prior to matching

As shown in Appendix Table Appendix Table B1, renter households were quite different on average from owner households prior to matching. For example, a larger share of owner households had children, identified as White, and were younger. A smaller share of the renter population had a vehicle, a bank account, a credit card, cash value life insurance, and student loans.

Appendix Table B1: Household Summary Statistics 2005: Unadjusted

	Renters		Owners		Difference	
	Mean	Std Error	Mean	Std Error	Beta	T-Statistic
Age	44.87	12.67	37.41	10.58	7.33***	(10.92)
Minors in Household (%)	0.09	0.36	0.98	1.11	-0.89***	(-19.46)
Unemployed (%)	0.06	0.24	0.02	0.13	0.05***	(4.15)
White (%)	0.45	0.50	0.62	0.49	-0.17***	(-6.05)
Black (%)	0.40	0.49	0.19	0.39	0.21***	(8.11)
Hispanic (%)	0.12	0.32	0.15	0.36	-0.04*	(-2.05)
Other race(%)	0.04	0.20	0.04	0.20	0.00	(0.01)
College (%)	0.17	0.38	0.31	0.46	-0.14***	(-6.10)
Never Married Male (%)	0.06	0.23	0.06	0.23	-0.00	(-0.02)
Never Married Female (%)	0.21	0.41	0.15	0.35	0.07***	(3.32)
Separated (%)	0.32	0.47	0.19	0.39	0.13***	(5.13)
Non-Housing Net Worth (\$)	7728.82	40774.63	33544.76	84857.24	-25131.86***	(-6.95)
Number of Households	<i>N=724</i>		<i>N=541</i>			

Appendix C Correlated Random Effects Regression Output

Appendix Table C2: Change in Wealth

	Non-Housing Net Wealth	Total Net Wealth
CAP homeowners	1.267*** (0.207)	2.386*** (0.197)
Ages 30-39	-0.169 (0.238)	-0.433** (0.213)
Ages 40-49	0.0335 (0.467)	-0.260 (0.408)
Ages 50-59	0.331 (0.571)	-0.0300 (0.495)
Ages 60 and over	0.404 (0.685)	-0.0562 (0.594)
Currently married	0.718*** (0.254)	0.451* (0.245)
Separated	-0.482 (0.389)	-0.475 (0.371)
Never married female	-0.336 (0.473)	-0.303 (0.440)
Never married male	-0.355 (0.481)	-0.231 (0.517)
Ever had minor	-0.226 (0.202)	-0.0454 (0.186)
No college	-0.00412 (0.293)	0.0413 (0.246)
Unemployed	-0.439 (0.329)	-0.480 (0.342)
Spouse unemployed	-0.257 (0.345)	0.107 (0.316)
Black	-0.390* (0.234)	-0.180 (0.230)
Hispanic	-0.0644 (0.362)	0.307 (0.347)
Race other	-0.983 (1.281)	-1.024 (1.116)
Move region	0.494 (0.783)	0.637 (1.425)
Constant	10.31*** (1.982)	11.22*** (2.192)
Observations	712	785
Number of households	305	316

Appendix D Probability of Acquiring and Losing Asset and Debts

Appendix Table D3: Probability of Asset/Debt Acquisition

	CVLI	Bank Accnt	Investment Accnt	Retirement Accnt	Other Real Estate
CAP homeowners	0.950 (0.428)	0.594 (0.890)	2.217 (1.198)	3.764** (2.081)	1.646 (1.100)
Age 20s to 30s	1.916 (1.647)		3.697* (2.706)	1.257 (0.889)	0.657 (0.752)
Age 30s to 40s	2.293 (1.743)		0.800 (0.694)	3.272 (2.507)	2.936 (2.566)
Age 40s to 50s	1.545 (0.876)	115.7 (400.5)	0.418 (0.560)	0.607 (0.514)	0.714 (0.643)
Age 50s to 60s	0.934 (0.702)	65.04*** (91.72)	2.430 (2.136)	0.0841** (0.0814)	1.348 (0.951)
Became separated	1.612 (1.191)	1.877 (2.703)	0.544 (0.447)	0.133** (0.122)	0.690 (0.624)
Got married	0.167** (0.135)	0.0429** (0.0665)	4.480* (3.476)	19.01*** (13.84)	2.375 (1.950)
Never married female	0.388 (0.266)		2.841 (2.115)	3.343 (2.966)	0.766 (0.761)
Never married male	0.281 (0.309)	0.0639 (0.128)	4.962 (5.448)		
Ever had minor	0.273** (0.142)	0.0241** (0.0456)	1.097 (0.674)	1.669 (0.863)	0.585 (0.364)
High school to college	0.490 (0.407)		2.629 (2.917)	0.0506** (0.0638)	0.698 (0.756)
College to graduate	1.538 (1.882)		4.084 (5.207)	0.197 (0.308)	3.872 (4.997)
Ever unemployed	1.001 (0.408)	0.690 (0.647)	0.327 (0.259)	1.608 (0.775)	0.169 (0.183)
Spouse ever unemployed	0.577 (0.427)	6.069 (8.389)	0.794 (0.615)	3.245 (2.568)	0.611 (0.543)
Black	3.588** (1.905)	3.244 (4.434)	0.504 (0.377)	0.464 (0.305)	0.813 (0.566)
Hispanic	1.517 (1.264)		0.237 (0.224)	0.104* (0.138)	1.185 (1.470)
Other race	2.078 (1.769)			0.863 (0.789)	1.932 (2.067)
Move region	0.191 (0.234)			8.339** (8.298)	
Constant	0.250** (0.145)	4.348 (5.037)	0.0288*** (0.0259)	0.0816*** (0.0536)	0.0703*** (0.0324)
Observations	296	23	272	202	298

Appendix Table D3: Probability of Asset/Debt Acquisition (*continued*)

	Vehicle Debt	Student Loans	Credit Card Debt
CAP homeowners	1.642 (0.638)	1.387 (0.688)	4.996*** (2.951)
Age 20s to 30s	1.659 (1.067)	3.379 (2.536)	0.390 (0.337)
Age 30s to 40s	0.377 (0.260)	0.952 (0.946)	0.971 (0.887)
Age 40s to 50s	0.728 (0.358)	1.071 (0.808)	0.237* (0.195)
Age 50s to 60s	0.764 (0.466)	1.883 (1.543)	0.561 (0.394)
Became separated	0.409* (0.221)	0.706 (0.579)	0.263 (0.241)
Got married	4.880*** (2.624)	2.915 (2.143)	17.36*** (17.39)
Never married female	3.692** (2.413)	2.093 (1.684)	14.11*** (10.50)
Never married male	3.740 (3.375)	0.630 (0.623)	9.060** (8.981)
Ever had minor	1.489 (0.611)	0.557 (0.328)	1.141 (0.600)
High school to college	3.114* (2.097)	3.576* (2.690)	0.610 (0.738)
College to graduate	10.75* (13.83)	6.417** (5.876)	
Ever unemployed	1.882 (0.734)	3.233** (1.717)	0.385 (0.233)
Spouse ever unemployed	1.293 (1.001)	2.775 (1.810)	0.284 (0.232)
Black	0.768 (0.353)	1.060 (0.640)	0.349 (0.228)
Hispanic	0.131** (0.118)	0.226 (0.243)	0.918 (0.824)
Other race	1.362 (1.107)		2.387 (2.213)
Move region	0.550 (0.539)		42.66** (67.61)
Constant	0.135*** (0.0600)	0.0222*** (0.0162)	0.135*** (0.0849)
Observations	211	265	146

Appendix Table D4: Probability of Asset/Debt Retention

VARIABLES	CVLI	Bank Accnt	Investment Accnt	Retirement Accnt
CAP homeowners	0.843 (0.987)	3.488 (3.120)	1.810 (2.097)	3.006** (1.468)
Age 20s to 30s	20.02 (48.51)	1.201 (1.056)	2.851 (3.878)	2.269 (1.646)
Age 30s to 40s	1.315 (3.503)		33.16*** (42.14)	2.000 (1.578)
Age 40s to 50s	1.025 (1.917)	0.181* (0.163)	0.157 (0.312)	2.503 (1.865)
Age 50s to 60s	2.582 (4.109)	0.566 (0.580)	2.669 (4.032)	1.356 (1.030)
Became separated	0.207 (0.330)	1.421 (1.443)	15.59 (26.47)	1.925 (1.542)
Got married	0.206 (0.489)	0.656 (0.796)	0.0462** (0.0635)	1.782 (1.242)
Never married female	0.515 (0.731)		0.0506** (0.0713)	3.107* (2.042)
Never married male			0.0502 (0.0924)	18.42*** (17.75)
Ever had minor	0.465 (0.614)	0.107*** (0.0889)	1.432 (1.490)	0.820 (0.431)
High school to college	0.821 (1.107)		45.53*** (46.60)	1.317 (0.996)
College to graduate			0.143 (0.269)	1.590 (1.532)
Ever unemployed	0.469 (0.537)	0.326 (0.274)	1.318 (1.434)	0.0861*** (0.0517)
Spouse ever unemployed		2.871 (3.989)	0.310 (0.354)	0.691 (0.541)
Black	14.91* (21.76)	0.273* (0.201)	0.141 (0.188)	0.381* (0.205)
Hispanic		0.283 (0.366)		0.443 (0.372)
Other race			1.888 (3.544)	0.228 (0.294)
Move region		0.00420*** (0.00610)	0.227 (0.361)	
Constant	0.742 (0.779)	288.2*** (329.9)	0.385 (0.639)	0.531 (0.377)
Observations	39	195	55	134

Appendix Table D4: Probability of Asset/Debt Retention (*continued*)

VARIABLES	Vehicle Debt	Student Loans	Credit Card Debt
CAP homeowners	1.348 (0.693)	0.0967* (0.133)	2.882** (1.500)
Age 20s to 30s	1.266 (0.833)	8.377 (14.95)	1.207 (0.865)
Age 30s to 40s	0.884 (0.599)	81.03** (170.9)	1.183 (0.905)
Age 40s to 50s	0.727 (0.516)	1.650 (2.486)	0.580 (0.371)
Age 50s to 60s	0.301 (0.242)	35.15 (84.63)	0.413 (0.264)
Became separated	1.496 (0.992)	0.00692* (0.0207)	0.788 (0.525)
Got married	1.226 (0.726)	8.088 (16.26)	1.370 (0.830)
Never married female	0.119** (0.120)	0.0861 (0.142)	1.761 (1.449)
Never married male	0.0794* (0.121)		
Ever had minor	1.461 (0.691)	0.842 (0.819)	0.240*** (0.102)
High school to college	1.782 (1.056)	19.90* (32.91)	0.834 (0.605)
College to graduate	1.491 (1.441)	2.579 (4.219)	
Ever unemployed	0.661 (0.336)	1.194 (1.301)	0.677 (0.329)
Spouse ever unemployed	0.881 (0.494)	12.15 (22.49)	0.904 (0.667)
Black	1.171 (0.689)	9.648 (14.46)	0.807 (0.560)
Hispanic	0.260** (0.173)	49.96 (155.5)	0.787 (0.578)
Other race		7.190 (14.53)	0.336 (0.395)
Move region		41.65 (133.7)	0.823 (1.431)
Constant	1.059 (0.734)	0.699 (1.004)	4.985*** (2.759)
Observations	125	65	183

References

- Ang, Andrew, Dimitris Papanikolaou, and Mark M Westerfield.** 2014. "Portfolio choice with illiquid assets." *Management Science*, 60(11): 2737–2761.
- Belsky, Eric S, and Mark Duda.** 2002. "Asset appreciation, timing of purchases and sales, and returns to low-income homeownership." *Low-income homeownership: Examining the unexamined goal*, 208–238.
- Beracha, Eli, Alexandre Skiba, and Ken H Johnson.** 2017. "Housing ownership decision making in the framework of household portfolio choice." *Journal of Real Estate Research*, 39(2): 263–287.
- Beracha, Eli, and Ken H Johnson.** 2012. "Lessons from over 30 years of buy versus rent decisions: is the American dream always wise?" *Real Estate Economics*, 40(2): 217–247.
- Bostic, Raphael W, and Kwan Ok Lee.** 2008. "Mortgages, risk, and homeownership among low-and moderate-income families." *American Economic Review*, 98(2): 310–14.
- Bricker, Jesse, Lisa J Dettling, Alice Henriques, Joanne W Hsu, Lindsay Jacobs, Kevin B Moore, Sarah Pack, John Sabelhaus, Jeffrey Thompson, and Richard A Windle.** 2017. "Changes in US family finances from 2013 to 2016: Evidence from the Survey of Consumer Finances." *Fed. Res. Bull.*, 103: 1.
- Brueckner, Jan K.** 1997. "Consumption and investment motives and the portfolio choices of homeowners." *The Journal of Real Estate Finance and Economics*, 15(2): 159–180.
- Caner, Asena, and Edward N Wolff.** 2004. "Asset poverty in the United States, 1984–99: Evidence from the panel study of income dynamics." *Review of income and Wealth*, 50(4): 493–518.
- Chamberlain, Gary.** 1984. "Panel data", in (Z. Griliches and M. Intriligator, eds.) *Handbook of Econometrics*."
- Chan, Howard W, and Robert W Faff.** 2005. "Asset pricing and the illiquidity premium." *Financial Review*, 40(4): 429–458.
- Chetty, Raj, László Sándor, and Adam Szeidl.** 2017. "The effect of housing on portfolio choice." *The Journal of Finance*, 72(3): 1171–1212.

- Cocco, Joao F.** 2005. "Portfolio choice in the presence of housing." *The Review of Financial Studies*, 18(2): 535–567.
- Cong, Wang, and Sherman D Hanna.** 2007. "The risk tolerance and stock ownership of business owning households." *Journal of Financial Counseling and Planning*, 18(2).
- Fonseca, Raquel, Kathleen J Mullen, Gema Zamarro, and Julie Zissimopoulos.** 2012. "What explains the gender gap in financial literacy? The role of household decision making." *Journal of Consumer Affairs*, 46(1): 90–106.
- Freeman, Allison, and Bruce Desmarais.** 2011. "Portfolio adjustment to home equity accumulation among CRA borrowers." *Journal of Housing Research*, 20(2): 141–160.
- Graham, Judy F, Edward J Stendardi, Joan K Myers, and Mark J Graham.** 2002. "Gender differences in investment strategies: an information processing perspective." *International journal of bank marketing*.
- Grinstein-Weiss, Michal, Clinton Key, and Shannon Carrillo.** 2015. "Homeownership, the great recession, and wealth: Evidence from the survey of consumer finances." *Housing Policy Debate*, 25(3): 419–445.
- Grinstein-Weiss, Michal, Clinton Key, Shenyang Guo, Yeong Hun Yeo, and Krista Holub.** 2013. "Homeownership and wealth among low-and moderate-income households." *Housing Policy Debate*, 23(2): 259–279.
- Grinstein-Weiss, Michal, Kim R Manturuk, Shenyang Guo, Pajarita Charles, and Clinton Key.** 2014. "The impact of homeownership on marriage and divorce: evidence from propensity score matching." *Social Work Research*, 38(2): 73–90.
- Hanna, Sherman D, Cong Wang, and Yoonkyung Yuh.** 2010. "Racial/ethnic differences in high return investment ownership: A decomposition analysis." *Journal of Financial Counseling and Planning*, 21(2): 44–59.
- Haveman, Robert, and Edward N Wolff.** 2004. "The concept and measurement of asset poverty: Levels, trends and composition for the US, 1983–2001." *The Journal of Economic Inequality*, 2(2): 145–169.

- Henderson, J Vernon, and Yannis M Ioannides.** 1983. "A model of housing tenure choice." *The American Economic Review*, 73(1): 98–113.
- Herbert, Christopher E, Daniel T McCue, and Rocio Sanchez-Moyano.** 2013. "Is homeownership still an effective means of building wealth for low-income and minority households?(Was it ever?)." *Homeownership Built to Last*.
- Hu, Xiaoqing.** 2005. "Portfolio choices for homeowners." *Journal of Urban Economics*, 58(1): 114–136.
- Iacus, Stefano M, Gary King, and Giuseppe Porro.** 2011. "Multivariate matching methods that are monotonic imbalance bounding." *Journal of the American Statistical Association*, 106(493): 345–361.
- Iacus, Stefano M, Gary King, and Giuseppe Porro.** 2012. "Causal inference without balance checking: Coarsened exact matching." *Political analysis*, 20(1): 1–24.
- Ioannides, Yannis M, and Stuart S Rosenthal.** 1994. "Estimating the consumption and investment demands for housing and their effect on housing tenure status." *The Review of Economics and Statistics*, 127–141.
- McKernan, Signe-Mary, and Michael Wayne Sherraden.** 2008. *Asset building and low-income families*. The Urban Insite.
- Mundlak, Yair.** 1978. "On the pooling of time series and cross section data." *Econometrica: journal of the Econometric Society*, 69–85.
- Ogden, Denise T, James R Ogden, and Hope Jensen Schau.** 2004. "Exploring the impact of culture and acculturation on consumer purchase decisions: Toward a microcultural perspective." *Academy of Marketing Science Review*, 3(1): 1–22.
- Pfeffer, Fabian T, Sheldon Danziger, and Robert F Schoeni.** 2013. "Wealth disparities before and after the Great Recession." *The ANNALS of the American Academy of Political and Social Science*, 650(1): 98–123.
- Quercia, Roberto G, Allison Freeman, and Janneke Ratcliffe.** 2011. *Regaining the dream: How to renew the promise of homeownership for America's working families*. Brookings Institution Press.

- Rappaport, Jordan.** 2010. “The effectiveness of homeownership in building household wealth.” *Economic Review-Federal Reserve Bank of Kansas City*, 35.
- Sabelhaus, John, Arthur B. Kennickell, Kevin B. Moore, and Jesse Bricker.** 2012. “Changes in US family finances from 2007 to 2010: Evidence from the Survey of Consumer Finances.” *Federal Reserve Bulletin*, 100(4): 1–80.
- Sedo, Stanley A, and Sherrie A Kossoudji.** 2004. “Rooms of One’s Own: Gender, Race and Home Ownership as Wealth Accumulation in the United States.”
- Shapiro, Thomas, Tatjana Meschede, and Sam Osoro.** 2013. “The roots of the widening racial wealth gap: Explaining the black-white economic divide.”
- Stuart, Elizabeth A.** 2010. “Matching methods for causal inference: A review and a look forward.” *Statistical science: a review journal of the Institute of Mathematical Statistics*, 25(1): 1–21.
- Van Zandt, Shannon, and William M Rohe.** 2011. “The sustainability of low-income homeownership: the incidence of unexpected costs and needed repairs among low-income home buyers.” *Housing Policy Debate*, 21(2): 317–341.
- Wolff, Edward N.** 2012. “The asset price meltdown and the wealth of the middle class.” National Bureau of Economic Research.
- Wolff, Edward N.** 2017. “Household Wealth Trends in the United States, 1962 to 2016: Has Middle Class Wealth Recovered?” National Bureau of Economic Research.
- Yao, Rui, and Harold H Zhang.** 2005. “Optimal consumption and portfolio choices with risky housing and borrowing constraints.” *The Review of Financial Studies*, 18(1): 197–239.