Journal of Housing Economics 39 (2018) 17–24

Contents lists available at ScienceDirect

Journal of Housing Economics

journal homepage: www.elsevier.com/locate/jhec

How to prevent mortgage default without skin in the game: Evidence from an integrated homeownership support nonprofit☆

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ARTICLE INFO

Keywords:
Homeownership
Mortgage performance
Down payment assistance

JEL classification:
G21: banks
Depository institutions
Micro finance institutions
Mortgages
R3: Production and firm
Housing markets

ABSTRACT

We test the assumption that borrowers need sufficient "skin in the game", or a large down payment, to perform well on their mortgages. To do so, we estimate the effects of a homeownership support organization's attempt to help low- and moderate- income households purchase homes through a range of integrated services, including the provision of a second mortgage that allows for a low down payment with no mortgage insurance. Using client-level data from the homeownership support organization, Homewise, and controlling for income and other demographics, we first show that the organization's clients successfully avoid the savings barrier to home purchase – a barrier which impedes many low-income households from obtaining a mortgage. We then combine Homewise administrative data with CoreLogic and Home Mortgage Disclosure Act (HMDA) data to compare the post-purchase behavior of participating households to those of similar households using a propensity score matching technique. Results indicate that Homewise's clients perform better on their loans than other similar borrowers in their region. For every 100 home purchasers, clients purchasing homes through Homewise have 6.3 fewer 30 day delinquencies in the first two years of their mortgage than a matched comparison group of purchasers, 2.3 fewer 60 day delinquencies, 1.8 fewer 90 day delinquencies, and 1.1 fewer 180 day delinquencies. These results show that with the correct combination of homeownership support services, low- and moderate-income households can sustain a mortgage with a low-down payment.

1. Introduction

An amortizing mortgage is the most important savings vehicle most low- and moderate-income Americans will own. Even after the foreclosure crisis, housing represented the largest source of net worth for most Americans (Herbert and Belsky, 2008; Rappaport, 2010), and given current interest rates and tax policy, it is often less expensive to purchase a home than to rent (Kolko, 2014). As a result of these factors, home equity represents nearly half of nonannuitized (i.e., non-Social Security and nondefined benefit pension) net worth for all households upon retirement (Poterba et al., 2013) and, of course, an even larger share for owner-occupants. For those in the bottom quintile of the income distribution, home equity represents 60 percent of total net worth, even though only 27 percent of these households are homeowners (Soto, 2010).

Beyond financial gains, evidence has also shown that homeownership provides benefits for both homeowners and for their communities. For instance, owner-occupied properties are better maintained than other properties (Galster, 1987; Harding et al., 2007), homeowners invest more in social capital than non-homeowners (Green and White 1997; Haurin et al., 2002), and children growing up in owner-occupied dwellings have higher high school graduation rates and cognitive test scores than those who do not (Green and White, 1997; Haurin et al., 2002). Coulson and Li (2013) find that transitioning a home from rental to ownership in a typical neighborhood would create about $1,327 per year in externality value to surrounding properties. Although other recent studies have indicated that the benefits of homeownership may be more related to selection and other factors than a true causal effect (Mohanty and Raut, 2009; Holupka and Newman, 2012; Barker and Miller, 2009, Engelhardt et al., 2010), increasing the rates of homeownership remains a goal for many policymakers and practitioners.

However, barriers to home purchase exist for low- and moderate-income households that make it difficult or even impossible for them to become homeowners. To purchase a home, a household must have

☆ Thank you to the individuals at the Homewise for providing the primary data for this study. Thank you also to Will Monson for data cleaning and analysis on an earlier version of this work, Brian Stacy for review, and the Housing Finance Policy Center at the Urban Institute (and Wei Li in particular) for merging CoreLogic data with HMDA data and allowing us to use it in this study.

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https://doi.org/10.1016/j.jhe.2017.12.004
Received 15 June 2017; Received in revised form 28 November 2017; Accepted 19 December 2017
Available online 22 December 2017

adequate savings, low levels of debt, good creditworthiness, and a steady source of income. A rich literature exists exploring these barriers, with most finding that savings poses the greatest barrier to homeownership, followed by low creditworthiness and income constraints (Barakova et al., 2003; Calem et al., 2010; Haurin et al., 1996,1997; Herbert and Tsen, 2007; Linneman and Wachter, 1989; Listokin et al., 2002; Quercia et al., 2003; Rosenthal, 2002). However, less is known about how to remove these barriers and how households fare once the barriers are removed.

In this paper, we examine the effects of a homeownership support nonprofit in New Mexico's attempt to help low- and moderate- income households purchase homes through a range of services, including the provision of a second mortgage that allows for a low down payment with no mortgage insurance. We examine whether this lowdown payment option, combined with other services provided by the nonprofit, called Homewise, allows prospective home purchasers to purchase a home even if they have a traditional barrier to home purchase (lack of savings, high debt, low creditworthiness, or too little income). We also examine the effect that the program has on the loan performance of purchasing households.

Using client-level data from Homewise and controlling for the demographic characteristics of the clients, we first estimate the impact that each barrier (debt, savings, creditworthiness, and income) has on the likelihood that an individual or household will purchase a home. We then merge Homewise administrative data with a separately matched data set of CoreLogic proprietary mortgage data and Home Mortgage Disclosure Act (HMDA) data to examine what effect the program has on the post-purchase behavior of buyers compared other similar households using a propensity score matching technique. This unique matched data was developed by the Urban Institute to combine the rich borrower demographic information from HMDA with borrowers' credit profile and loan performance information from CoreLogic's proprietary mortgage database.

Results indicate that Homewise's clients successfully avoid the savings barrier to home purchase, but that debt, creditworthiness, and income remain significant barriers. And although prior studies show that mortgages associated with down payment assistance exhibit significantly higher rates of default (Kelly, 2008; GAO, 2005; IFE, 2014; Lee and Steele, 2007), our results show that Homewise's clients actually perform better on their loans than similar borrowers. For every 100 home purchasers, clients purchasing homes through this program have 6.3 fewer 30 day delinquencies in the first two years of their mortgage than a matched comparison group, 2.3 fewer 60 day delinquencies, 1.8 fewer 90 day delinquencies, and 1.1 fewer 180 day delinquencies.

Although it is unclear whether these results are due to the selection of nonprofit clients into home purchase by the program or the direct effects of the program itself—both of which are valuable functions for Homewise to perform—these results challenge the assumption that low income individuals need to be able to provide a large down payment to sustain a home purchase. Some households can actually perform better on their loans than purchasers with larger down payments, given the correct support, structure, preparation, and selection.

2. The Homewise model

The home-buying assistance nonprofit that our data comes from, Homewise, is a vertically integrated organization, which means that they work with individuals through the entire home buying process from initial inquiry through final financing or refinancing. Homewise offers in-house counseling, homebuyer education, real estate development, real estate sales, mortgage origination, and loan servicing, as well as an in-house incentivized savings program. Each function is aligned in sequence, with early steps intended to build the foundation for customers' long term financial security. However, clients need not participate in every step; they can access some components of the model and not the others. For example, clients are not required to use one of Homewise's realtors or purchase a home developed by Homewise to access financing through the organization. However, all clients are required to participate in financial counseling and anyone who purchases a home is required to take homebuyer education.

In addition to providing financing for low- and moderate-income households to purchase their homes, Homewise works to improve potential buyers' knowledge, creditworthiness, and savings through classes and counseling. New customers work individually with program staff to assess their current levels of savings, income, debt, and creditworthiness, and select the house that will fit their needs yet will be financially feasible. As clients work to improve their finances, they continue to meet with their counselor to discuss their progress. These meetings are augmented by classes hosted by Homewise to teach aspiring homeowners the basics of buying and financing a home. Once the client is financially ready to buy, Homewise has realtors to help find and purchase a home. These realtors are not paid on commission and therefore do not have an incentive to encourage buyers to purchase a home when they are not ready or a home that is too expensive for them to afford.

To finance the purchase of a home, Homewise issues two mortgages – the first is for the first 80% of the home value and the second is for 18%. The first mortgage is resold on the secondary market to raise capital for additional clients, and Homewise holds on to the riskier second mortgage so that the client pays only a 2% down payment while still eliminating the need for mortgage insurance.[1] Homewise services both loans so that they can monitor loan performance on both loans and intervene early if there is a problem. Using this low down payment, in combination with counseling and incentivized savings programs, Homewise attempts to remove the savings barrier for the client and keep the monthly cost of owning a home at a reasonable level through removing the monthly mortgage insurance costs.

3. Previous research on homeownership support and mortgages with low down payments

Renter households that desire homeownership are generally required by mortgage lenders to accumulate enough liquid savings to satisfy loan down payment requirements. Down payments provide lenders not only a cushion against default, but also serve as an underwriting measure of how prepared prospective borrowers are for homeownership. More specifically, cash down payments serve as an indicator of borrower capacity to repay a loan as agreed and to carry out essential functions of homeownership, such as saving for expected maintenance and unexpected repairs. Down payments also give borrowers a stake in the property from the day of purchase ("skin in the game"), which in turn strengthens their commitment towards general upkeep of the home.

However, the ability to save for a cash down payment has also proven to be the most critical barrier to homeownership, especially for low- and moderate-income households and first-time homebuyers. Research shows that historically, lack of wealth poses a higher barrier to home ownership than having low income relative to area house prices, or having a poor credit history (Barakova et al., 2003; Calem et al., 2010; Haurin et al., 1996, 1997; Herbert and Tsen, 2007; Linneman and Wachter, 1989; Listokin et al., 2002; Quercia et al., 2003; Rosenthal, 2002). Static incomes and high rents make saving for a down payment even more difficult today (Thompson, 2014, Seidman, 2014). Traditional ways for prospective homebuyers to save for a down

[1] Conventional loans with an LTV of more than 80 percent often require the borrower to purchase private mortgage insurance (PMI). This monthly PMI premium is added to the mortgage payment until the borrower has accumulated enough equity in the home that the lender no longer considers them high risk (when the LTV reaches 78 percent). FHA backed loans require an upfront mortgage insurance premium (UFMIP) of 1.75 percent of the base loan amount and a monthly insurance premium (MIP) which varies based on the amortization term and the LTV ratio.

payment include spending less (through reduced consumption) and saving more of their household incomes. Down payment assistance programs can also be a useful asset for households who desire homeownership but lack sufficient down payment funds to achieve it. Common sources of down payment assistance, in addition to gifts from family and relatives, include grants from government agencies or nonprofits, or seller-funded down payment assistance. Underwriters often permit prospective homeowners to obtain funds from third-party sources to pay for a down payment. GAO (2005) studies the risk of Federal Housing Administration (FHA)-insured loans with down payment assistance and shows that over 55 percent of FHA-insured loans in 2005 had some form of down payment assistance.

Saving for a down payment demonstrates that a borrower is willing and able to save and budget. Although down payment assistance programs can ease the down payment burden for borrowers, mortgages associated with down payment assistance, especially those that do not require any down payment from the borrower, have been shown to exhibit significantly higher rates of default. Kelly (2008) shows that borrowers who make down payments using their own savings are significantly less likely to default than borrowers whose down payments come from relatives, government agencies, or nonprofits. Kelly further observes that borrowers with seller-funded down payments, especially those who made no out of pocket contribution, have the highest default rates. GAO (2005) finds that FHA-insured mortgages with seller-funded down payment assistance have the highest delinquency rates and FHA mortgages with no down payment assistance have the lowest. IFE (2014) studies the sources of down payment assistance since 2002 and finds that loans with any form of down payment assistance performed worse across all origination years than loans receiving no down payment assistance. In a related study, Lee and Steele (2007) shows that baby boomers who borrow money for down payments may be considered risk takers and their borrowing behaviors may reflect a lack of financial preparedness.

Other studies show that down payment assistance might also reduce the motivation for saving. Collins (2015) and Carter and Barrett (2006) show that assistance can make borrowers less likely to save for down payments because of the possibility of getting cash from other resources. Similarly, Engelhardt and Mayer (1995) find that households receiving down payment gifts adjust their down payment savings accordingly. Specifically, households receiving a gift reduce their savings rate by up to 7 percentage points relative to households that do not receive any gifts. In addition, GAO (2005) and Kelly (2008) both find that seller-funded down payment assistance programs lead to increases in the selling price of homes relative to comparable homes that are sold without down payment assistance. Finally, Kelly (2008) shows that down payment assistance programs that require some amount of investment from the borrower may be most successful at producing sustainable homeowners.

3.1. Second liens

While second lien piggyback loans – which were widely used as a cheaper substitute for private mortgage insurance (PMI) during the housing bubble – provide some benefit to both borrowers and lenders, they also come with higher risks than loans without second liens. These loans typically combine a fixed-rate first mortgage with a closed-end second lien or home equity line of credit (HELOC) originated simultaneously to purchase a home or refinance an existing mortgage. The first mortgage is sized to meet loan-limit and/or Loan-To-Value ratio (LTV) requirements for sale in the secondary mortgage market, while the simultaneous second lien enables the borrower to make a smaller down payment and avoid mortgage insurance.

Calhoun (2005) finds that piggyback loans enable borrowers to own a home without having to pay a large down payment or the more expensive private mortgage insurance (PMI) premiums. Meanwhile, lenders earn additional origination fees on the second mortgages as profits at the expense of PMI. Calhoun cautioned, however, that piggyback loans – especially floating-rate second liens – are also risky for both borrowers and lenders because the higher rate reset frequency and higher lifetime rate cap offer minimal protection against interest rate and payment shocks.

Bernstein (2008) studied the impact of increased use of second liens and decreased use of PMI in the run up to the housing bubble and found that the use of multiple liens grew substantially between 2001 and 2007 with a corresponding decrease in the use of PMI. A comparison of single-lien and multiple-lien households also found that single-lien households tend to be slightly stronger financially than households with multiple liens. The study also found that the absence of PMI can increase loss severity for lenders because the proceeds from foreclosure can often be less than the outstanding mortgage balance and other foreclosure costs insured by lenders. A key conclusion was that restrictions on the use of piggyback loans that seek to avoid PMI could reduce future mortgage market problems.

Research also shows that presence of second liens, especially second liens that are originated at the same time as the first mortgage, can significantly increase the probability of borrower default. Leventis (2014) shows that second liens can increase the risk of default in two ways. First, by taking out a second lien, borrowers reduce their net equity position, which as discussed earlier, increases the risk of default. Secondly, supporting the debt—i.e., making payments on second liens—places an extra ongoing financial burden on households. Elul et al. (2010) produce estimates of the impact of second liens on first-lien performance and find that the propensity of borrowers to default in a given quarter is about one quarter of a percentage point greater for borrowers with a second lien than those without one. Lee et al. (2012) compare the performance of second lien mortgages originated at the same time as the first lien to those originated later and find that contemporaneous second liens – presumably because they are used to bypass PMI – defaulted at significantly higher rates during the bubble years. LaCour-Little et al. (2011) also examined the use of simultaneous close second liens over the course of the housing bubble and subsequent mortgage market collapse from 2001 to 2008. They find that the higher share of piggyback originations is related to higher foreclosure and default rates in subsequent years, and that this relation is strongest for non-owner occupied properties and limited to the use of subprime piggybacks, rather than a more general phenomenon.

Homewise lowers the amount clients must invest up front and pay on a monthly basis. This is different from the common second liens during the housing bubble,on which much of this prior literature was focused. Homewise requires clients to put down only two percent on their homes and then provides a second mortgage (for 18 percent of the purchase price) with conventional interest rates and terms. The combination of the Homewise second mortgage and low down payment enables clients to avoid paying for private mortgage insurance (or FHA mortgage-insurance premiums) on their first mortgage (for 80 percent of the purchase price), which results in considerable monthly savings. This is different from other piggyback loans that can carry a substantially higher interest rate than the first mortgage, and can erode the comparative monthly savings. In addition, traditional piggyback loans usually required an 80-10-10 split rather than the 80-18-2 split (which Homewise provides), and they often required the purchaser to pay closing costs on both loans, meaning that they had to pay double for things like origination fees and any other fees the lender charged.

3.2. Homeownership counseling

Since its inception, pre-purchase mortgage counseling has been credited with a number of positive outcomes, including more responsible mortgage shopping and selection, improved home maintenance, lower default rates, and even neighborhood stabilization. Avila et al. (2013) study of 38,000 mortgages originated through Freddie Mac's affordable lending program between 2000 and 2008 finds

that counseling reduces the delinquency rate of first-time home buyers by 29 percent, that counseling's effectiveness is largely insensitive to its method of delivery, and that its effectiveness was greatest in the boom/crisis years of 2005 through 2008. Similarly, Mayer and Temkin (2013), in their analysis of the NeighborWorks program, find that counseling participants are one-third less likely to become 90 + days delinquent relative to their peers. Importantly, their findings are robust after a number of statistical controls designed to reduce the effect of unobserved differences between homeowners who participate in counseling and those who elect not to participate. Wei et al. (2016) extend that study by examining NeighborWorks mortgage loans originated between 2010 and 2012, when the housing market struggled to recover and mortgage credit became increasingly tight. They find that the positive impact of NeighborWorks housing counseling services on mortgage performance was sustained in a tight-credit, low-default housing market: clients receiving pre-purchase education and counseling services from NeighborWorks are 16 percent less likely to become 90 + days delinquent. Finally, Agarwal et al. (2010) finds that homeownership counseling not only reduces delinquency, but also is most effective with borrowers with low incomes, low FICO (credit) scores, or both.

These findings are further validated by a randomized experiment conducted by the Federal Reserve Bank of Philadelphia (Smith et al., 2014). Under this program, first-time homebuyers who receive one-on-one counseling have significantly better loan performance than first-time homebuyers who receive only a two-hour pre-purchase workshop and no other services. Similarly, a randomized controlled trial of financial coaching, a method similar to financial counseling but a bit more client driven in nature, finds that coaching can help to break down some of the barriers to home purchase, including high debt, low savings, and low creditworthiness (Theodos et. al, 2015).

Since all home purchasers in the Homewise program undergo counseling, we cannot directly explore whether it is counseling that leads to the positive performance findings. However, homeownership counseling, combined with the other services that Homewise provides including the second liens, may be one of the factors that leads to the positive mortgage performance of their clients.

4. Analysis and findings

The analysis and findings are split into two main sections. In the first, we use only administrative data from Homewise to estimate the impact that various barriers to homeownership have on the likelihood of home purchase. In the second, we combine these administrative data with data from Corelogic and HMDA to compare loan performance for Homewise clients to a matched comparison of homeowners.

4.1. Barriers to homeownership for Homewise clients

Using administrative data from Homewise, we first estimate the impact that four of the main barriers to homeownership have on the likelihood of home purchase – inadequate savings, high levels of debt, poor creditworthiness, and lack of a steady source of income. Because Homewise offers all services from inquiry to post-purchase, their data provide a rich panel of information on people attempting to purchase a home, from detailed financial and demographic characteristics over time to information on the loan and home purchase, should they make it to that stage. The data also include information on both clients who made it to home purchase and those who did not, which allows us to examine individuals who were interested in purchasing a home but did not. The data cover all clients that entered their program between 2009 and 2014 and who are no longer active clients (we do not include active clients who may eventually make it to home purchase).

Basic descriptive statistics for key variables are displayed in Table 1.

We define a deficiency in savings, debt, or creditworthiness based on Homewise's definitions: a creditworthiness deficiency is defined as a credit score of less than 640, a savings deficiency is defined as less than $5000 in savings, and, a debt deficiency is defined as a debt level of more than 10% of initial income. Homewise does not define a strict income deficiency cutoff, so we instead include income as a continuous variable rather than as a dummy variable.

Table 1
Descriptive statistics for Homewise clients.
Sources: Authors' calculations based on Homewise's CHIP HomeKeeper administrative data (2009–2014).

	Obs.	Mean	SD	Min	Max
Bought a home	3565	29%	46%	0	1
Initial credit score	3289	676	86	301	825
Initial savings	3536	$13,382	$51,382	0	$1316,329
Initial total debt	3538	$30,068	$54,579	0	$857,879
Initial income	3541	$46,441	$29,673	0	$635,830
Age	3525	38	13	18	87
Female	3565	55%	50%	0	1
Black	3536	1%	11%	0	1
Asian	3536	1%	11%	0	1
Other race	3536	4%	20%	0	1
Hispanic	3565	58%	49%	0	1

* Number of observations varies due to missing values for certain variables

Table 2 shows the success rates of clients based on their mix of deficiencies at intake into the program. Of the clients who entered the program with a financial deficiency in either savings, debt, or credit, those with a savings deficiency alone are the most likely to make it to home purchase, followed by those with debt alone, and then savings and debt deficiencies combined. Those with a savings, debt, and creditworthiness deficiency are the least likely to purchase a home, followed by those with a savings and creditworthiness deficiency, then a creditworthiness deficiency alone. Of the three barriers alone, low creditworthiness is the hardest to overcome, followed by debt and savings. This indicates that Homewise may be successful at removing the savings barrier for their clients.

To estimate the impact that each of these four barriers to homeownership has on clients in our sample and to examine whether Homewise is successful at helping its clients to bypass any of these barriers, we estimate the probability that a client will purchase a home given their initial savings, debt, credit score, and income using a maximum likelihood probit model.

We begin with the underlying latent variable model for the likelihood that someone will purchase a home as follows:

$$y_i^* = \beta_0 + \beta_1 Sav_i + \beta_2 Debt_i + \beta_3 Credit_i + \beta_4 Income_i + \theta \mathbf{x}_i + e_i$$

where Sav_i is individual i's amount of savings at the time of inquiry into the program, $Debt_i$ is his or her debt level at the time of inquiry, $Credit_i$ is his or her credit score at the time of inquiry, $Income_i$ is his or her income level at the time of inquiry, $\mathbf{x}_i$ is a vector of control variables, and e_i is an error term that is approximately normally distributed with a mean of

Table 2
Success rates by mix of deficiencies at intake.[a]
Sources: Authors' calculations based on Homewise's CHIP HomeKeeper administrative data (2009–2014).

Mix of deficiencies at intake	% That became buyer ready	% That bought a home through the program
Savings	61%	43%
Debt	73%	48%
Credit	38%	30%
Savings, debt	40%	29%
Savings, credit	17%	14%
Debt, credit	31%	20%
Savings, debt, credit	9%	8%
No deficiency	85%	54%

[a] Table includes only those clients who were not buyer ready at intake

Table 3
Probability of purchasing a home given initial characteristics.
Sources: Authors' calculations based on Homewise's CHIP HomeKeeper administrative data (2009–2014).

	(1)	(2)	(3)
Credit Score (tens)	0.017***	0.017***	0.018***
	(0.001)	(0.001)	(0.001)
Income (tens of thousands)	0.015***	0.010**	0.015***
	(0.003)	(0.003)	(0.003)
Savings (tens of thousands)	0.000		0.002
	(0.002)		(0.002)
Debt (tens of thousands)	−0.010***		−0.010***
	(0.002)		(0.002)
Savings Minus Debt (tens of thousands)		0.004**	
		(0.001)	
Age			−0.004***
			(0.001)
Female			−0.019
			(0.015)
Black			−0.055
			(0.068)
Asian			−0.008
			(0.067)
Other Race			−0.055
			(0.041)
Hispanic			−0.017
			(0.016)
Household Size			−0.009
			(0.006)
Pseudo R-squared	0.108	0.104	0.120
Observations	3616	3616	3560

Marginal effects; Robust standard errors in parentheses clustered at the individual level; Sample is clients who entered the program between 2009 and 2014
*** p < 0.01, ** p < 0.05, * p < 0.1

zero and a standard deviation of 1. We also estimate a model where the savings and debt variables are combined into one wealth variable to examine whether these two variables in concert affect the likelihood of purchasing a home.

We cannot observe the likelihood of home purchase directly, but rather we observe a binary variable for whether the individual actually purchases a home:

$$y_i = \begin{cases} 1 \text{ if } & y_i^* > 0 \\ 0 & y_i^* \leq 0 \end{cases}$$

We run the model both with and without demographic control variables such as age, gender, race, ethnicity, and household size as a sensitivity check.

Results indicate that Homewise's clients successfully avoid the savings barrier to home purchase but creditworthiness, income, and debt remain significant barriers (Table 3). Results are robust to the inclusion or exclusion of control variables.[2] Results for three versions of the model can be seen in Table 3. The first model includes savings and debt measured separately. The second combines them into one wealth variable (savings minus debt). The third includes them separately but adds in other control variables (age, gender, race, and ethnicity). The effects shown are the marginal effects for each variable with errors clustered at the individual level.

Results show that if an applicant's credit score is 10 points higher than another's, they are 1.7% - 1.8% more likely to purchase a home through the program, holding all other variables constant. If an applicant's income is $10,000 higher, his or her probability of purchasing a home through the program is 1.0 to 1.5% higher. And if an applicant's debt level is $10,000 higher, he or she has a 1.0% lower likelihood of purchasing a home through the program. Savings, however, is not a statistically significant predictor of home purchase, indicating that the savings barrier is not a binding constraint for Homewise's clients. Savings minus debt, however, is a significant predictor, but the effect is very small: if an individual's net savings increases by $10,000, he or she has only a 0.4% greater likelihood of purchasing a home through the program.

4.2. Loan performance for Homewise clients compared to a matched comparison

To examine whether Homewise clients' loan performance differs from those of other similar home purchasers, we construct a comparison group of borrowers who have similar characteristics to Homewise clients and purchased homes in the same metropolitan statistical area as Homewise purchasers during the same time period. To do so, we draw data from a Home Mortgage Disclosure Act–CoreLogic (HMDA-CL) matched dataset, which covers the majority of the mortgage loan market. This dataset combines rich borrower demographic and income data from HMDA with mortgage origination and performance information from CoreLogic's proprietary loan-level data.

HMDA data are considered a near "universe" of mortgage loans because federal law requires that almost all mortgage originations, except for originations by some small lenders, be reported in HMDA. HMDA data contain most mortgage loans and include information on race or ethnicity and gender of the borrower and coborrower; income; year of origination; loan amount; loan purpose (purchase, refinance, or home improvement); and census tract of the property. HMDA data also contain information on whether the unit is owner occupied and whether the loan is a government loan or a conventional loan.

However, HMDA data do not include any credit risk–related information such as the LTV ratio of the property or the borrower's credit score (FICO). Nor do HMDA data include any information on loan performance. To get this information, we merge the HMDA data with CoreLogic data. CoreLogic covers the overwhelming majority of the mortgages we examined, because it contains both loans contributed by a large number of servicers and all mortgage loans contained in private label securitizations. The CoreLogic data contain extensive information on the loan, property, and some borrower characteristics at the time of origination, as well as monthly updates on loan performance subsequent to origination. However, the data do not contain information on income or borrower's demographic information like race/ethnicity, which are available in HDMA data. By supplementing the HMDA data with proprietary loan-level data from CoreLogic, we can see all these data points and, thereby, obtain a more complete picture of the borrower at origination and observe the actual performance of the loan.

The procedure used to match the two databases is described in Li et al. (2014). In short, we match the two datasets by their origination year; loan amount; loan purpose (purchase or refinance); occupancy; lien; loan type (FHA, VA, or conventional); and geography.[3] To expand the size of the matched database beyond unique matches, we assigned weights to each matched HMDA-CoreLogic loan pair, to reflect how close the match is, and supplemented information in either database with information from the other using this weight.

To match the clients from Homewise's dataset with those from the HMDA-CL data so that we can exclude them from the control group, we use the following matching rules. We regard two loans as a match if they are in the same zip code, have identical loan terms, have credit score within 30 points of each other, have original LTV ratio within 5% of each other, have a loan amount at origination within $1000 of each other, are within two months of each other for loan origination date, and have an interest rate difference of less than 0.5%. Including these

[2] Results are also robust to the exclusion of debt (which we ran since it is correlated with credit), and to age in brackets rather than as a continuous variable and with household type instead of size. Other demographics such as education level were too highly missing to include in the model.

[3] HMDA data is at the ZIP Code Tabulation Areas (ZCTA) level, which was matched to the zip code level Corelogic data by Li et al. (2014).

Table 4
Delinquency rates for Homewise clients and other borrowers in the MSA.
Sources: Authors' calculations based on Homewise's CHIP HomeKeeper administrative data (2009–2014), HMDA data, and Corelogic data.

Means	Homewise purchasers	Unmatched comparison group	Statistical difference
2 Year delinquency rate			
30 Day			
No.	16	1399	***
%	1.69%	6.50%	***
60 Day			
No.	5	398	***
%	0.53%	2.12%	***
90 Day			
No.	1	253	***
%	0.11%	1.35%	***
180 Day			
No.	0	108	***
%	0.00%	0.62%	***
Observations	**949**	**13,298**	

*** p < 0.01, ** p < 0.05, * p < 0.1

conditions gives us a high degree of confidence that the match is correct. We also restrict the sample of comparison loans to ones that are purchase money, first-lien, and owner-occupant loans, since all Homewise loans have these characteristics as well.

Descriptively, clients who received assistance performed on their loans better than the pool of comparison loans in its metropolitan statistical area even though they had lower average FICO scores and median income, as shown in Table 4. Among the loans from Homewise clients, only 1.69 percent were ever 30 days late in the first two years of the loan, 0.53 percent were ever 60 days late in the first two years, 0.11 percent were ever 90 days late in the first two years, and none were ever 180 days late in the first two years. The comparison mortgages had two-year delinquency rates of 6.50 percent for 30 day delinquencies, 2.12 percent for 60 day delinquencies, 1.35 percent for 90 day delinquencies, and 0.62 percent for 180 day delinquencies.

Not only do Homewise purchasers have lower default rates on average than other purchasers in the area, they also have lower credit scores and median incomes than the other purchasers – characteristics that are usually associated with higher default rates. To correct for these differences and compare Homewise purchasers to a similar comparison group, we estimate the average treatment on the treated of the program using propensity score matching drawing from all of non-Homewise first-lien, owner-occupant, purchase money loans originated between 2009 and 2014 in Homewise's MSA. The propensity score for each client is defined as the conditional probability of receiving homeownership assistance through Homewise given pre-treatment characteristics (gender, ethnicity, FICO score, origination year, combined loan-to-value ratio (CLTV), and income):

$$p(X) \equiv \Pr(T = 1|X) = E(T|X)$$

where $T = \{0,1\}$ is the indicator of whether the person received assistance from Homewise and X is a vector of pretreatment characteristics (Rosenbaum and Rubin, 1983). If the exposure to Homewise's services is random given X, then it is also random within $p(X)$.

We then use this estimated propensity score to match individuals in the treatment group (Homewise purchasers) to those in the comparison group (outside purchasers) with a similar likelihood of selecting to participate in the program. To do so, we use a nearest neighbor matching with replacement approach, where an individual in the control group can be matched to more than one individual in the treatment group. The statistic of interest is then the difference in the average outcomes between the Homewise purchasers and the matched comparison group. To test whether this difference is statistically different from zero, we estimate standard errors using the expression derived in Abadie and Imbens (2006) .[4]

Table 5 shows the demographics and financial characteristics of Homewise clients and the comparison group both before and after being matched based on propensity score. Before being matched, Homewise clients had lower credit scores, were more likely to be female, less likely to be Asian, more likely to be Hispanic, and had lower median incomes. After being matched, most of these statistical differences disappear, with only credit score and number of females still slightly significant. Even with propensity score matching, Homewise clients still have lower credit scores than the comparison group, indicating that our results are a likely lower bound on the true effect of the program since lower credit scores are associated with a higher likelihood of default.

When we estimate the difference in delinquency rates using propensity score matching to control for some of the differences between Homewise clients and other purchasers in the MSA (gender, ethnicity, FICO score, year, combined LTV, and income), we find that Homewise clients have, on average, 0.063 fewer two-year 30 day delinquencies than similar borrowers in the region. This means that for every 100 borrowers, Homewise clients have 6.3 fewer incidences of having at least one two-year, 30-day delinquency (Table 6). For 60 day delinquencies within the first two years, nonprofit clients have 0.023 fewer incidences of having at least one delinquency, or for every 100 borrowers, this is equivalent to 2.3 fewer incidences of two-year, 60-day delinquency. For 90 day delinquencies in the first two years, nonprofit clients have 0.018 fewer incidences of at least one delinquency, or 1.8 fewer per 100 purchasers, and for 180 day delinquencies, nonprofit clients have 0.011 fewer incidences, or 1.1 per 100 borrowers. These results are robust to other forms of specification, such as ordinary least squares and Poisson without matching. The propensity score matching estimates are the most conservative of the alternative forms of specification.

5. Conclusions

Results indicate that Homewise, a nonprofit homeownership support organization, helps its clients to successfully avoid the savings barrier to home purchase and that their clients perform better on their loans than other similar purchasers in their metropolitan statistical area even though they have lower incomes and credit scores at the time of origination. These results differ from much of the prior literature on mortgages with low down payments, which show that borrowers who do not provide a sufficient down payment are much more likely to default on their loans than those required to provide a large down payment themselves (Kelly, 2008; GAO, 2005; IFE, 2014; Leventis, 2014; Elul et al., 2010; Lee et al., 2012).

Our results likely differ for two reasons. First, the terms of the loans provided by Homewise are preferable to the terms of the piggyback loans that were common during the housing bubble, on which much of this prior literature was focused. Those loans usually required an 80-10-10 split rather than the 80-18-2 split (which Homewise provides), and they often required the purchaser to pay closing costs on both loans, meaning that they had to pay double for things like origination fees and any other fees the lender charged.

Second, Homewise provides much more than just a mortgage with a low-down payment, as was the focus of much of the prior research on the topic. Homewise also provides counseling, homebuyer education, real estate development, real estate sales, mortgage origination, and loan servicing, as well as an in-house incentivized savings program. The literature on homeownership counseling, which finds that homebuyers who receive counseling perform better on their loans than those who do

[4] Abadie and Imbens (2005) show that the bootstrap is not valid for matching estimators and therefore derive a consistent estimator for the large sample variance that does not require consistent nonparametric estimation of unknown functions in Abadie and Imbens (2006).

Table 5
Descriptive statistics for Homewise clients and comparison groups, and test of balancing of covariates.
Sources: Authors' calculations based on Homewise's CHIP HomeKeeper administrative data (2009–2014), HMDA data, and Corelogic data.

Means	Homewise purchasers	Unmatched comparison group	Statistical difference	Matched comparison group	Statistical difference
Credit Score	718	730	***	723	*
Female	54%	33%	***	58%	*
Black	1%	1%		1%	
Asian	2%	3%	*	2%	
Other Race	2%	2%		2%	
Hispanic	52%	30%	***	52%	
Household Median income	$43,381	$63,000	***	$	
Combined LTV	89%	90%		89%	
Observations	**949**	**13,298**		**896**	

Notes: Propensity score is estimated using a Probit model with a nearest neighbor matching with replacement approach; Probability of treatment a function of gender and ethnicity; Delinquency rate a function of FICO score, origination year, CLTV, and income. Sample is all loans in Homewise's MSA originated between 2009 and 2014; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 6
Loan performance of Homewise purchasers compared to other similar borrowers.[a]
Sources: Authors' calculations based on Homewise's CHIP HomeKeeper administrative data (2009–2014), HMDA data, and Corelogic data.*Notes:* Results shown are the average treatment on the treated using propensity score matching estimated using a Probit model with a nearest neighbor matching with replacement approach; Standard errors in parentheses estimated using the expression derived in Abadie and Imbens (2006); Probability of treatment a function of gender and ethnicity; Delinquency rate a function of FICO score, origination year, CLTV, and income. Sample is all loans in Homewise's MSA originated between 2009 and 2014; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

	Delinquencies in the first two years after origination			
	(1) 30 Day PSM	(2) 60 Day PSM	(3) 90 Day PSM	(4) 180 Day PSM
Nonprofit client	−0.063***	−0.023***	−0.018***	−0.011***
	(0.008)	(0.004)	(0.003)	(0.002)
Obs.	16,264	16,264	16,264	16,264

[a] Results are robust to a Poisson model without matching, and propensity score matching estimates are more conservative than the estimates derived from the Poisson without matching. Results are also robust to the exclusion of LTV, which allows HW purchasers to be matched to borrowers with a larger downpayment. Results are negative and sometimes significant when only CoreLogic data are used to define delinquencies (rather than CoreLogic and administrative data) but the number of treated mortgages is much lower since many of the nonprofit's mortgages do not show up in the CoreLogic data.

not (Hirad and Zorn, 2001; Avila et al., 2013; Mayer and Temkin, 2013; Wei et al., 2016; Smith et al., 2014), corroborate our findings.

These additional services likely serve two purposes: (1) they help the clients to become buyer ready, and (2) they help the client know when they are buyer ready, and perhaps more importantly, when they are not. Homewise is likely better at selecting households who are ready for home purchase than is a traditional bank, since they work with the household sometimes for a number of years prior to providing them with a mortgage. This combination of helping households to improve their finances and become buyer ready and helping clients to select when they are ready to purchase a home (and select a home that is appropriate for them) likely improves mortgage performance for their clients.

Future research should examine other programs that provide low down payment loans to determine whether the results are robust to other homeownership support agencies and models, and if possible do so in a randomized fashion. If it does hold that the savings barrier can be successfully avoided without threatening the loan performance of the recipients on a larger scale, such programs could be used to increase the number of sustainable homeowners and confer the benefits of homeownership without increasing the risk to society as a whole.

Funding

This work was supported in part by the Urban Institute's Fleishman Innovation Fund.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jhe.2017.12.004.

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