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

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A Comparative Study of MHP's ONE Mortgage Program and FHA**

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This paper was originally presented at a national **Symposium on Housing Tenure and Financial Security**, hosted by the Harvard Joint Center for Housing Studies and Fannie Mae in March 2019. A decade after the start of the foreclosure crisis, the symposium examined the state of homeownership in America, focusing on the evolving relationship between tenure choice, financial security, and residential stability.

This paper was presented as part of Panel 1: "Homeownership and Wealth."

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Abstract

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

Introduction

Home prices in Massachusetts have reached an all-time high.¹ Accordingly, homeownership has grown more elusive for low- and moderate-income (LMI) borrowers. These borrowers, often low on savings, are increasingly reliant on specialized high loan to value (LTV) mortgage products that allow them to buy a home with a smaller down payment. Borrowers in Massachusetts have a large selection of options for high LTV mortgages, including products provided by the state's two Housing Finance Agencies (HFAs), Massachusetts Housing Partnership (MHP) and MassHousing Finance Agency (MassHousing). These products offer special benefits that drastically reduce borrower's mortgage costs. But despite the presence of these affordable alternatives, the largest proportion of LMI first-time homebuyers use Federal Housing Administration (FHA) loans (Campen, 2018).

FHA loans combine low down payments with reasonably-priced mortgage insurance, making them more accessible than many other high LTV loans.² They have facilitated millions of home purchases by LMI and minority borrowers. But researchers have increasingly noted that FHA loans are concentrated in LMI communities and among minority borrowers (Caplin et al., 2013; Immergluck, 2011). This concentration could carry significant risk, both for the FHA program overall and for individual borrowers (Lee and Tracy, 2018).

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

This analysis quantifies how ONE Mortgage loans and FHA loans differ in terms of overall household wealth creation. To do so, we use loan-level simulations to model the amount of wealth created by the ONE Mortgage and FHA loans and compare them on three dimensions: 1) equity

¹ S&P Dow Jones Indices LLC, S&P/Case-Shiller MA-Boston Home Price Index [BOXRSA], retrieved from FRED, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/series/BOXRSA>, February 14, 2019.

² "Why Choose HomeReady Mortgage." 2019. Accessed July 15, 2019. https://www.fanniemae.com/content/fact_sheet/why-choose-homeready-mortgage.pdf.

accumulation realized at the time of property sale; 2) savings on monthly mortgage payments; and 3) a net financial outcome metric that considers the borrower's overall wealth building.

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

This research raises important questions about Massachusetts LMI borrowers' heavy reliance on FHA loans. We find that borrowers who would have qualified for an MHP loan but instead borrowed an FHA loan missed out on significant benefits. Our simulations place the average overall savings at \$19,544 in the ONE Mortgage when compared to an FHA loan. We estimate that in 2017 alone, a maximum of about 1,500 FHA borrowers may have qualified for the ONE Mortgage, about 12.5% of all FHA borrowers in the state.

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

History of LMI Lending in Massachusetts

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

In 1989, the Federal Reserve Bank of Boston released a study chronicling a pattern of racial bias in Boston's mortgage lending over a five-year period from 1981-1985. The disparities in lending, the authors suggested, could not be explained by income, credit history, or other legitimate loan underwriting factors (Marantz, 1989). The Federal Reserve study laid bare systemic disparate treatment

in the mortgage market and resulted in a massive public outcry. In the wake of that report, a task force was created comprised of homeownership practitioners from MHP, the Massachusetts Bankers Association, the Commonwealth of Massachusetts, the City of Boston, and the Massachusetts Affordable Housing Alliance. This group's mission was to form a strategy that would counter the pervasive influence of racial bias in the state's mortgage market.³

The result of this effort was the introduction of two new affordable loan products: first, the SoftSecond Program (1991-2013) and then the ONE Mortgage Program (2014-present). These mortgage products were designed to address traditional barriers to homeownership and close the wealth gap by providing increased mortgage affordability to LMI and minority first-time homebuyers. The programs were housed within MHP, a quasi-public state housing finance agency founded in 1985 that works to increase the supply of affordable housing in Massachusetts. Since their introduction in 1991, more than 21,000 Massachusetts households have used one of these loans to purchase their first home. Two-thirds of ONE Mortgage loans in Boston and half of the loans statewide support purchases by households of color. The ONE Mortgage program accounts for about 1 percent of all home purchase loans to all borrowers in the State of Massachusetts, and 4 percent of annual home purchase lending to LMI borrowers (Campen, 2018; MHP Lending Overview 6/30/2016).

Meanwhile, national trends over the course of the 1990s and 2000s were characterized by the growth of mortgage lenders originating high cost loans in the subprime market. The subprime lending industry continued to deliver inferior loans in LMI and minority communities. The subprime lenders that spent the most money advertising in LMI communities tended to have higher interest rates than other lenders (Gurun and Matvos 2013). Unsurprisingly, an analysis of lending in seven metropolitan areas found black and Hispanic borrowers to be 105 and 78 percent more likely to receive high cost mortgages respectively (Bayer et al., 2017). Lenders also extracted higher closing costs, resulting in black borrowers spending about \$700 more on closing costs than white borrowers (Woodward and Hall, 2010).

When the crisis arrived, the deepest distress fell on LMI and minority homeowners. Even in the years prior to the crisis, Black households were 68.2 percent more likely than their white counterparts to transition back to renting at the conclusion of their homeownership experience (Sharp and Hall 2014). The crisis magnified that effect. Foreclosure rates for Black borrowers spiked to levels over three times

³ For a full history of the ONE Mortgage and SoftSecond programs, see Ziegler et al. (2017).

that of white borrowers, while Hispanic homeowners saw foreclosure rates over four times greater than white households (Garriga et al., 2017).

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

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

Affordable Loan Options in Massachusetts and Their Features

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

Table A: Program Term Sheet Comparison (Single Family/Condo Guidelines Shown)

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

MHP's Subsidized Mortgage Programs

SoftSecond Loan Program (1991-2013)

The SoftSecond Loan Program was targeted at first-time homebuyers under 100 percent AMI. It offered a 30-year fixed interest rate with a minimum three percent down payment. Although the loans could be offered up to 97 percent LTV, they were originated without mortgage insurance (MI). The loans

avoided MI using a unique loan structure that combined public reserves with private financing. SoftSecond loans had a dual mortgage structure consisting of a 77 percent first mortgage and a twenty percent second mortgage, both offered by the participating lender. While the first loan was a conventional loan with a 30 year amortization schedule, the second loan was interest only for the first 11 years. MHP covered lenders' risk on the second mortgage by setting aside a percentage of the loan in a dedicated loan loss reserve fund. The average loan loss reserve (LLR) amount in the SoftSecond Program was \$1,979 per loan.

Participating lenders also provided affordability assistance by agreeing to offer these loans at a discounted interest rate without charging any points. The SoftSecond Program was offered to borrowers at a discounted interest rate capped a 30 basis point discount from the weekly Freddie Mac Primary Mortgage Market Survey interest rate.

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

Table B: Sample SoftSecond Loan Program Subsidy Schedule

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

Year	1st Mortgage Payment (a)	2nd Mortgage Payment (b)	2nd Mortgage Subsidy Amount (c)	Total Payment (a + b + c)
1 - 5	\$1,286.63	\$233.33	-\$123.94	\$1,396.03
6	\$1,286.63	\$233.33	-\$99.15	\$1,420.82
7	\$1,286.63	\$233.33	-\$74.36	\$1,445.61
8	\$1,286.63	\$233.33	-\$49.82	\$1,470.15
9	\$1,286.63	\$233.33	-\$24.91	\$1,495.06
10	\$1,286.63	\$233.33	\$0.00	\$1,519.97
11 - 30	\$1,286.63	\$424.19 ⁴	\$0.00	\$1,710.82

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

ONE Mortgage Loan Program (2013-Present)

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

Thus, in 2013 MHP redesigned and rebranded the SoftSecond Loan Program as the ONE Mortgage Program. Many aspects of the ONE Mortgage were left unchanged from the earlier

⁴ In year 11, the second mortgage payment increases as the loan transitions from interest-only to fully-amortizing.

SoftSecond model. ONE Mortgages are 30-year fixed rate mortgage with a minimum three percent down payment. Like SoftSecond, ONE uses a publicly funded loan loss reserve to offer borrowers a no-PMI benefit and is offered to the borrower at the same 30 basis point discount as the SoftSecond program. It adopted a new structure that incorporated a 97 percent fully amortizing first mortgage.

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

Table C: Sample ONE Mortgage Program Subsidy Schedule

Purchase Price: \$350,000

Down Payment: \$10,500 (3%)

Mortgage Amount: \$339,500 (97%)

Interest Rate: 4.00%

Full Value Subsidy Amount: \$6,369

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

FHA Insured Loans

Since 1934, FHA insured mortgage loans have been one of the federal government’s premier products for increasing access to homeownership. The FHA uses federally-backed insurance to facilitate private-sector mortgage lending. FHA has the broadest borrower eligibility guidelines of the various government-backed loan options. Unlike the SoftSecond and ONE Mortgage Programs, FHA loans do not

have a set maximum income, maximum asset limit, or minimum credit score. This makes it an attractive option for borrowers from a range of income classes and levels of financial health. Also unlike the SoftSecond and ONE Mortgage Program, FHA requires a three-and-a-half percent down payment and mortgage insurance. FHA insurance premiums are applied in the form of an initial payment, the upfront mortgage insurance premium (upfront MIP), and an ongoing “annual” payment. FHA insurance can be used to cover a variety of loan terms. In this paper any reference to FHA loans is to the 30 year fixed rate variety.

MassHousing Mortgages

Unlike most states, Massachusetts has two HFAs, both offering income-restricted mortgage options. MHP offers the ONE Mortgage while its larger counterpart, MassHousing, offers a suite of income-restricted mortgage options. The two organizations take very different approaches to their loan products, reflecting two fundamentally different approaches to the mortgage market. MassHousing is a wholesale lender and its lending is integrated into the secondary market. Their loans are originated by partner lenders, which include banks, credit unions, and licensed mortgage lenders. The loans are then serviced by MassHousing and sold to GSEs on the secondary market.⁵ In contrast, SoftSecond and ONE Mortgage loans are held in portfolio by the originating partner lender.

MassHousing products are limited to borrowers below 135 percent AMI, with some products (such as the MassHousing 100 product) targeted at borrowers under 100 percent AMI. MassHousing’s income guidelines are calculated in accordance with the Fannie Mae Selling Guide. In contrast, MHP compliance is based on an estimate of the entire household’s income, including non-borrowers, which means that a borrower who is over 100 percent AMI by MHP’s definition might still qualify for a MassHousing product limited to 100 percent AMI.⁶

Massachusetts’s large number of variously overlapping HFA mortgage products does raise interesting questions about how borrowers decide among those products. MassHousing offers a suite of purchase loan products (five as of the writing of this paper), including an FHA option. These products are designed for various income brackets and financing scenarios. Because the large number of variously overlapping HFA products would introduce a large degree of complexity, we will limit our analysis to a

⁵ See *MassHousing Agency Backgrounder* for more detail about MassHousing’s wholesale lending model

⁶ See *MassHousing General Underwriting Guide* for a full overview of MassHousing’s underwriting parameters

comparison between ONE Mortgage Loans and FHA loans. Of note, it is important to clarify that one cannot distinguish if an FHA loan was originated through an HFA or by another private institution.

Prior Evaluations of Mortgage Subsidization

The ONE Mortgage is a combination of a three types of public subsidy: 1) monthly payment reduction in the forms of an interest rate discount and interest rate subsidy; 2) a low down payment; and 3) no mortgage insurance. Because borrowers receive all those benefits together, it is difficult to tease out the effects of the individual subsidies.

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

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

The Effect of Interest Rate Discounts and Subsidies

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

reduction in monthly payments was found to reduce the probability of re-defaulting by 0.23 percentage point, and a 1 percent reduction in interest rate reduced the probability of re-default by 0.17 percentage point (Schmeiser and Gross, 2015).

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

The Effect of Low Down Payment Requirements

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

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

The Effect of Subsidizing Mortgage Insurance

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

Data and Methodology

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

Filtering the Data Set

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

In order to take advantage of the extra data associated with MHP subsidized property sales, we first limited the dataset to subsidized loans that had already experienced a sale event. Our database contained a sales price for each of these loans which we used to

determine the borrower's actual amount of equity accumulation. Note that selecting only loans that received subsidy means that all loans in our subset also meet the subsidy criteria, which require the borrower's household income to be below 80 percent AMI and their Housing-to-Income ratio to be above 28 percent. Because only a few ONE Mortgage borrowers meeting our filters have sold their properties to date, this dataset exclusively contains SoftSecond loans.

Next, we filtered out any multifamily (2 or 3 unit) properties, which are not directly comparable with the single family and condominium units that composed the bulk of our subset. And finally, we excluded properties with any form of affordability deed restriction. Affordability deed restrictions in Massachusetts allow LMI borrowers to purchase properties at below-market prices but require that the

Loan Subset Criteria

- Loan closed between 1/1/2004 and 5/31/2013
- The subject property has been sold as of August 2018
- The subject property is a condominium or single family home
- The subject property does not have any deed restriction limiting the price appreciation of the property
- Loan received MHP interest subsidy and meets the following subsidy award criteria:
 - Household Income below 80% AMI
 - Unsubsidized Housing to Income ratio is greater than 28%

borrower also sell their property at a below-market price. This creates an artificial limit on the amount of appreciation the homebuyer can experience, meaning they are not comparable with unrestricted market units. Our database did not capture deed restrictions and certain other loan characteristics until 2004, so all loans prior to this cutoff have been excluded.

Constructing Our Comparisons

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

- 1) A set of real SoftSecond loans drawn from MHP’s loan database.
- 2) A set of simulated ONE Mortgage loans. Each loan in this set is based on a loan in the SoftSecond data set. For each loan we hold constant the total loan amount, the interest rate, and the full value subsidy amount. The monthly payments are recalculated to reflect the differences in amortization between the two-mortgage structure of the SoftSecond Program and the ONE Mortgage Program. We also alter the subsidy payment schedule to reflect the new shorter schedule of the ONE Mortgage Program.⁷
- 3) A set of simulated FHA loans. Like the simulated ONE Mortgage loans, each simulated FHA loan is based on a loan from the SoftSecond set. For the FHA loans we keep only the loan amounts constant. We modify the interest rate to match FHA’s historical average at the time of origination. Upfront PMI payments are included in the loan amount, which is a common practice in FHA loans. In addition, these loans are assumed to have mortgage insurance until reaching 78 percent LTV, a common feature of FHA loans prior to June 2013.

Comparison Metrics

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

⁷ ONE Mortgage subsidy schedule calculation (where “Full Value Subsidy” is the total amount of subsidy funds to be disbursed):

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

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

Equity accumulation in this paper is a measure of the total proceeds to the borrower when they sell their property. It is measured by subtracting the principal balance remaining on the loan at the time of sale from the sale price of the home. In the case of ONE Mortgage and SoftSecond loans, the subsidy repayment is also subtracted⁸:

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

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

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

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

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

⁸ In practice, MHP does grant borrowers partial subsidy forgiveness if their property has had little appreciation. MHP's Subsidy Note allows borrowers to repay the lesser of either: a) the amount of subsidy they received or b) 20 percent of net appreciation. For simplicity, we assume that all borrowers repay the amount of subsidy they've received.

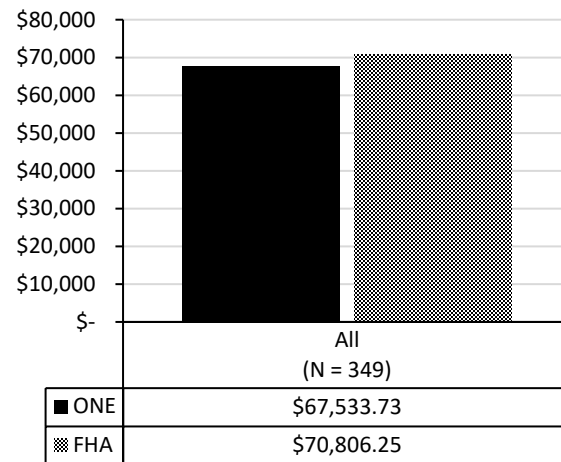
Results

Equity Accumulation

In general, FHA loans offered borrowers slightly higher equity accumulation than ONE Mortgage. As seen in Figure 1, on average ONE Mortgage borrowers accumulated \$67,534 in equity accumulation compared to \$70,806 for FHA borrowers. Figure 2 shows loan level differences. The median loan built 4.4 percent less equity as a ONE loan than it did as an FHA. Approximately 84 percent of the loans modeled would have had higher equity accumulation under an FHA loan than a ONE Mortgage loan. Based on a two-tailed, two-sample t-test, using a

Figure 1

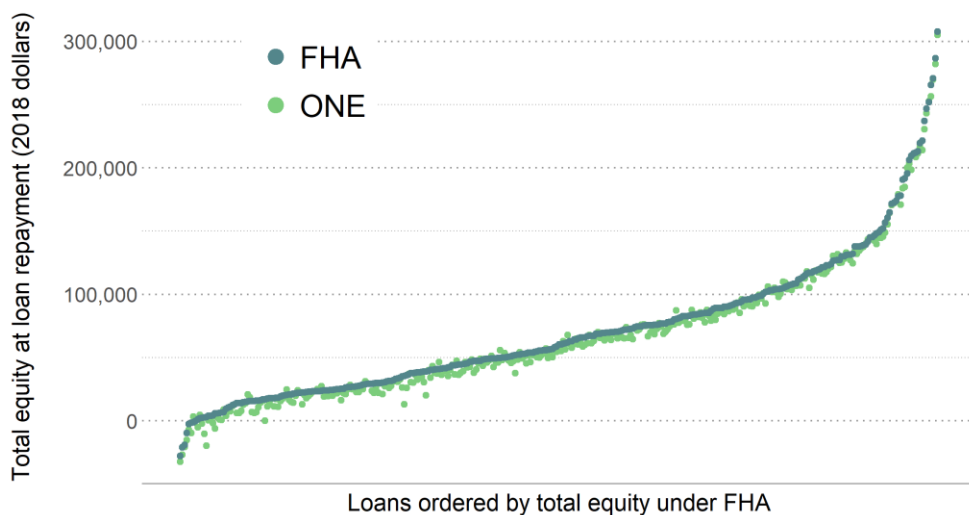
Average Equity Built



95% confidence level as the threshold, the difference in the means of the two groups is not statistically significant.

Figure 2

Total equity at loan repayment - ONE v. FHA (all equity in 2018 dollars)



Though not statistically significant, the fact that FHA builds equity slightly faster than ONE is surprising, given that ONE Mortgages feature a discounted interest rate (ONE Mortgage interest rates

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

Monthly Payments

While FHA might result in higher equity realized at repayment, the ONE Program compared very favorably to an equivalent FHA loan in terms of the borrower’s total monthly payments over the life of the loan. As Figure 3 shows, loans modeled as FHA mortgages had payments about 33 percent higher than when modeled as ONE mortgages. Not only did the overall averages favor the ONE Mortgage Program over FHA, but every single loan in the data set would have lower total payments under ONE than under a comparable FHA mortgage.

The distribution of total payments (Figure 4) shows the stark difference between the products.

Figure 3

Average of Total Payments Over the Life of the Loan

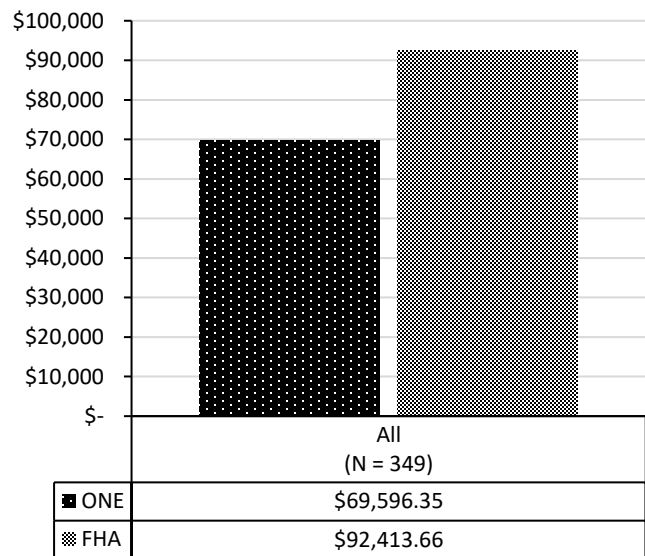
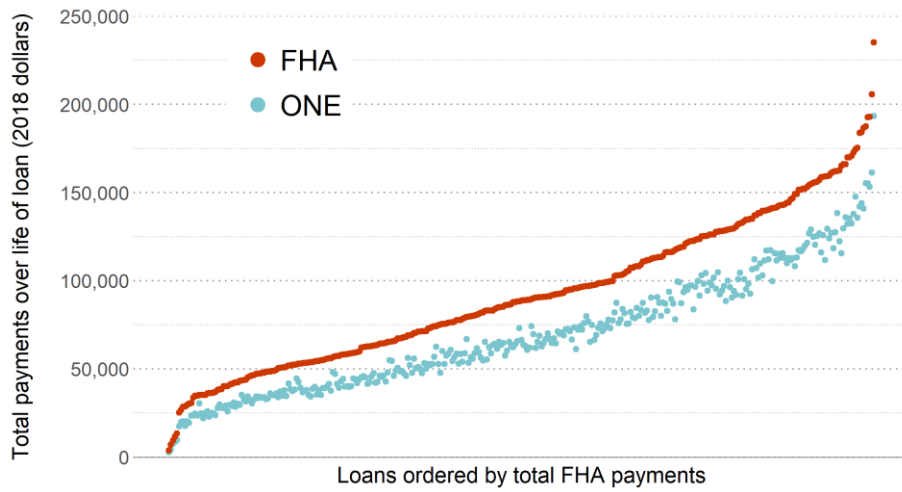


Figure 4

Total payments over life of loan - ONE v. FHA
(all payments in 2018 dollars)

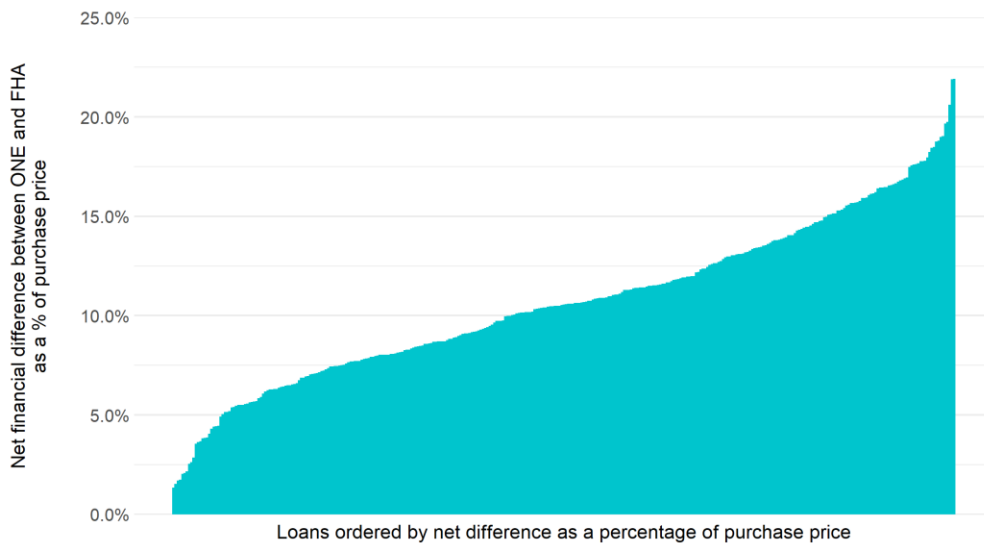


Net Financial Outcome

In terms of net financial outcome, every loan in our subset performed better as a hypothetical ONE Mortgage compared to a hypothetical FHA loan. Figure 5 below shows the relative net cost or gain as a percentage of purchase price over the life of the loan (amount of equity gained less the cumulative monthly payment). On average, this estimated net financial difference was the equivalent of 10.7 percent of the original purchase price.

Figure 5

Net difference in financial outcome (as a percentage of original purchase price) when ONE Mortgage is modeled against FHA



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

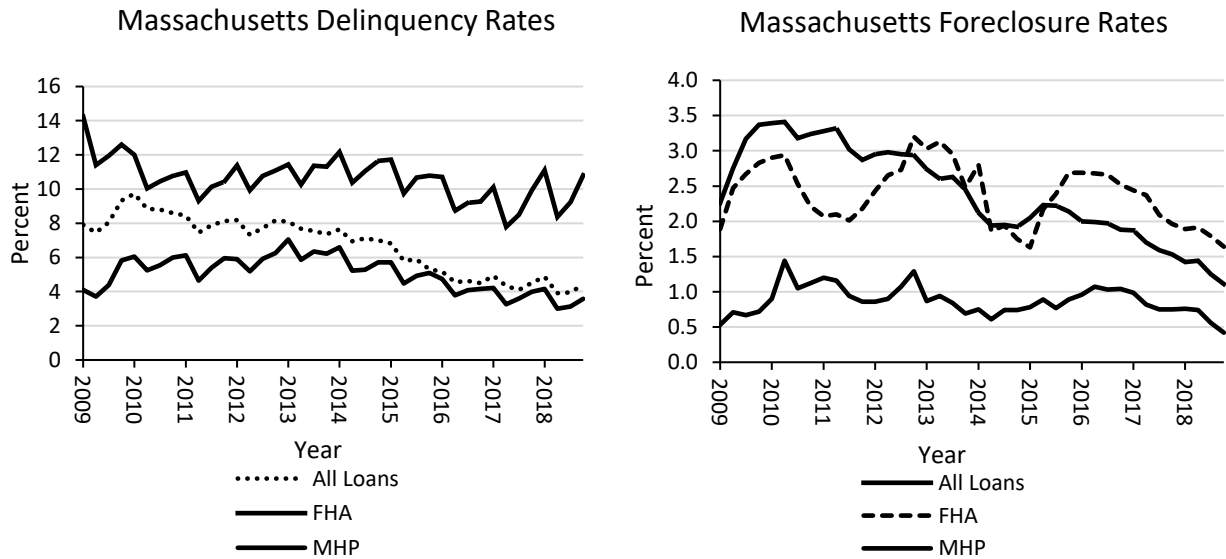
Table D: Descriptive Statistics
(N = 349)

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

Delinquency

MHP Loans have lower delinquency and foreclosure rates than both FHA loans and the average loan originated in the state (Figure 6).⁹

Figure 6

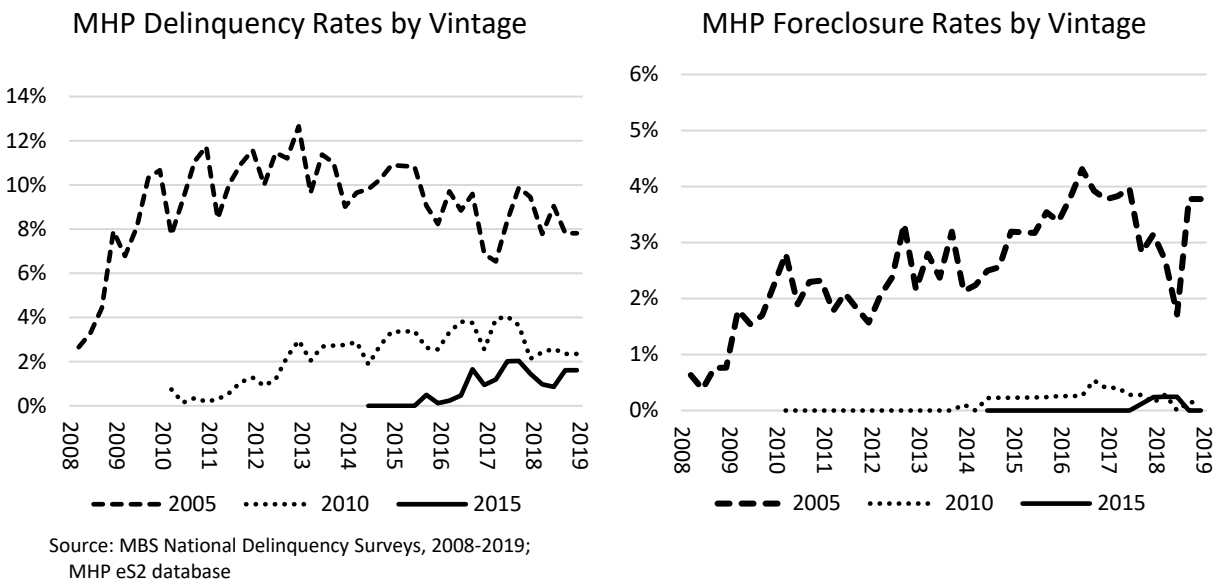


Source: MBS National Delinquency Surveys, 2009-2019;
MHP eS2 database

⁹ MHP's delinquency rates are a measure of all currently delinquent loans (>30 days delinquent, but not reported as in foreclosure) divided by the number of active loans. Our foreclosure rate reports the percentage of loans that MHP lenders, who service the loans, report as being in the process of foreclosure.

The ONE Mortgage program was introduced in 2014 and is still relatively new. It has only existed during times of economic expansion and its performance has not been tested in a crisis. Figure 7 shows MHP delinquency rates over time for 3 selected vintages (2005, 2010, and 2015). The 2005 and 2010 vintages include only SoftSecond loans, while the 2015 vintage contains only ONE Mortgage loans. The stark contrast between the 2005 and 2010 delinquency data shows the unpredictable effect a recession can have on a seemingly low-delinquency HFA product. Given the ONE Mortgage program’s general similarity to the SoftSecond Program, we expect that performance would be generally comparable with the SoftSecond Program’s.

Figure 7



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

How Many FHA Borrowers Could Have Qualified for the ONE Mortgage?

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

Table E: Availability of MHP Borrower Qualifications in Publicly Available Datasets

	MHP Borrower Qualifications								Upper bound: FHA Loans that could have been ONE (Annual)	Upper bound: FHA Loans that could have been ONE (Annual)
	First-time Homebuyer?	Household Income (Including Non Borrowers)	Qualifying Income	Credit Score	Borrower Assets	Loan Size	HTI	DTI		
Ginnie Mae MBS	✓		✓			✓			1,516	\$382MM
HMDA				✓		✓		✓	1,555	\$382MM

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

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

Discussion

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

Historically, homeownership has been the single biggest driver of household wealth in the United States. As Goodman & Mayer (2018) note, although homeownership generally offers households superior wealth building when compared to renting, the advantage of owning a home is highly dependent on assumptions about home price appreciation and the relative costs of homeownership and renting. The terms of the mortgage and the types of subsidization used play a major role in evaluating the overall benefit of homeownership.

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

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

The MHP subsidy mortgage can be seen as a deferred amortization mechanism that transfers funds from the proceeds of the borrower's eventual home sale to a buy-down of their monthly payments. It is disbursed to the borrower on a monthly basis over the course of the first seven years

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

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

Throughout the programs' histories, both SoftSecond and ONE Mortgage have had lower delinquency and foreclosure rates than the average Massachusetts mortgage loan. These loan performance figures benefit both borrowers and originating lenders. While borrowers have safer, more sustainable loans, lenders can produce more loans because of their relatively strong performance. Most of our focus has been on affordability and wealth building, however, the sustainability of homeownership is another important factor to consider when crafting housing policy at all levels. In addition to the losses foreclosures entail for the borrower, a single foreclosure is associated with an average loss to the loan holder of over \$58,000. Foreclosures also cost cities and neighborhoods, to the tune of \$27,000 and \$10,000 respectively (Immergluck and Smith, 2006).

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

borrower was better off in terms of net financial outcome when modeled as a ONE Mortgage rather than an FHA loan.

Yet HMDA data reveals that FHA lending accounts for 29 percent of LMI home purchase lending in the state compared to the ONE Mortgage's 4 percent (Campen, 2018; MHP Lending Overview 6/30/2016). In the post-crisis era, FHA emerged as the next-best option for lenders who could no longer offer high cost loans. This was consistent with its original intent as the loan program of last resort (Immergluck, 2011). So, why are Massachusetts borrowers using a more expensive last resort option when a more affordable State-sponsored option is available?

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

The volume of ONE Mortgage lending is also limited by the program's built-in constraints on pricing. Participating lenders must offer the product at a 30 basis point discount from the Freddie Mac Primary Mortgage Market Survey. The ONE Mortgage program's equitable lending mission conceptually includes contributions from lenders alongside the public subsidy. The interest discount represents the lender's main contribution (alongside the sales and loan servicing functions). The interest rate discount ensures ONE Mortgage borrowers always receive a "better than the market" interest rate. However, it also means that the program's lending volumes are constrained by participating lenders' willingness to originate a loan with a discounted interest rate. In addition, the loans must be held in portfolio (with the exception of a relatively small quantity of loans sold between participating lenders). This means lenders need to adjust their lending volume to suit their appetite for the loans' built in interest rate risk over the anticipated life of the loan.

If there are large numbers of LMI and minority borrowers who would qualify for the ONE Mortgage program but are instead sold FHA mortgages, our analysis suggests it could constitute a problematic dynamic, not unlike similar patterns leading up to the crisis. This would be in line with concerns raised in Immergluck (2011). By showing that a categorically superior loan product is available

to LMI borrowers in Massachusetts, our analysis lays a groundwork for future research about FHA loan sales, which would enable more concrete conclusions about disparate lending of FHA loans.

Conclusion

Since the financial crisis, mortgage lending in LMI and minority communities nationwide has been dominated by FHA lending. FHA loans have emerged to fill the void left by the collapse of the high cost mortgage loan market, as licensed mortgage lenders operating in LMI communities have transitioned from a business model revolving around the sale of high cost mortgages to one revolving around FHA loan sales. Given that history, researchers have asked to what extent the current FHA market is an improvement on the high cost mortgages of the past and to what extent it is a continuation of the problematic trends of pre-crisis high cost lending.

Our work addresses this question, taking advantage of a peculiar feature of the Massachusetts mortgage market: that a large number of FHA borrowers seemingly could qualify for a widely available alternative, the ONE Mortgage. If the ONE Mortgage results in superior financial outcomes for borrowers, the fact that low income homebuyers in Massachusetts depend on FHA loans would be suggestive of disparate outcomes for these borrowers.

Our analysis finds strong evidence that the ONE Mortgage is indeed a better option than FHA. In fact, every single loan we examined had better financial outcomes for the borrower when modeled as a ONE Mortgage than as an FHA loan. Although a borrower's optimal mortgage choice depends on their preferences for monthly savings, equity appreciation, and other factors, the ONE Mortgage provides a combination of subsidies that establishes it as a more affordable loan product from the borrower's perspective. ONE Mortgage borrowers may sacrifice a relatively small amount of equity when compared to a FHA borrowers, but the monthly savings are overwhelming. Lower monthly payments are extremely beneficial to LMI borrowers, who can use the extra money for unexpected expenses and staving off delinquency or foreclosure. As a result, the net financial outcomes were much better for our modeled ONE Mortgage loans than they were for FHA loans.

Conclusively addressing the question of whether FHA lending has a disparate impact will require better quantifying how many borrowers actually would have qualified for both programs. Although the research in this paper proposed an approximated upper bound of this number, more research is needed to produce a more accurate estimate. A promising pathway for subsequent research would be to use a proprietary dataset to study the quantities and demographics of borrowers who would qualify for both

programs. Establishing the scale of this group would enable more conclusive findings about disparate treatment and outcomes in FHA lending.

The ONE Mortgage's unique fusion of public subsidy with private loans has created a sustainable model that provides stable housing costs and long-term wealth building opportunities. Although LMI first-time homebuyers are often limited in their selection of home loans, there are stark differences between their options. When compared with FHA loans, the benefits of the ONE Mortgage Program are clear.

Bibliography

- "Agency Backgrounder." About MassHousing. Accessed July 15, 2019.
https://www.masshousing.com/portal/server.pt/community/about_masshousing/221/agency_backgrounder.
- Avery, Robert B., Neil Bhutta, Kenneth P. Brevoort, and Glenn B. Canner. "The 2009 HMDA data: The mortgage market during a time of low interest rates and economic distress." *Federal Reserve Bulletin*, December (2010).
- Bayer, Patrick, Fernando Ferreira, and Stephen L. Ross. "What drives racial and ethnic differences in high-cost mortgages? The role of high-risk lenders." *The Review of Financial Studies* 31, no. 1 (2017): 175-205.
- Bhutta, Neil, and Daniel Ringo. "The effect of interest rates on home buying: Evidence from a discontinuity in mortgage insurance premiums." *Available at SSRN 3085008* (2017).
- Bhutta, Neil, Steven Laufer, and Daniel R. Ringo. "Residential mortgage lending in 2016: Evidence from the Home Mortgage Disclosure Act data." *Fed. Res. Bull.* 103 (2017): 1.
- Board of Governors of the Federal Reserve Board. 2018. "Report on the Economic Well-Being of U.S. Households in 2017 ." Annual Report, Washington DC.
- Campbell, John Y., and Joao F. Cocco. "A model of mortgage default." *The Journal of Finance* 70, no. 4 (2015): 1495-1554.
- Campen, Jim. 2018. *Changing Patterns XXIV: Mortgage Lending to Traditionally Underseved Borrowers & Neighborhoods in Boston, Greater Boston and Massachusetts, 2016*. Annual Report, Somerville: Massachusetts Community and Banking Council.
- Caplin, Andrew, Anna Cororaton, and Joseph Tracy. "Is the FHA Creating Sustainable Homeownership?." *Real Estate Economics* 43, no. 4 (2015): 957-992.
- Garriga, Carlos, Lowell R. Ricketts, and Don E. Schlagenhauf. "The Homeownership Experience of Minorities During the Great Recession." *Review—Federal Reserve Bank of St. Louis* 99 (2017): 139-67.
- Genesove, David, and Christopher J. Mayer. *Equity and time to sale in the real estate market*. No. w4861. National Bureau of Economic Research, 1994.
- Goodman, Laurie S., and Christopher Mayer. "Homeownership and the American dream." *Journal of Economic Perspectives* 32, no. 1 (2018): 31-58.
- Goodman, Laurie, and Karan Kaul. "Sixty Years of Private Mortgage Insurance in the United States." *Urban Institute*, August (2017).
- Grinstein-Weiss, Michal, Clinton Key, Shenyang Guo, Yeong Hun Yeo, and Krista Holub. "Homeownership and wealth among low-and moderate-income households." *Housing Policy Debate* 23, no. 2 (2013): 259-279.
- Gurun, Umit G., Gregor Matvos, and Amit Seru. "Advertising expensive mortgages." *The Journal of Finance* 71, no. 5 (2016): 2371-2416.
- Immergluck, Dan, and Geoff Smith. "The external costs of foreclosure: The impact of single-family mortgage foreclosures on property values." *Housing Policy Debate* 17, no. 1 (2006): 57-79.

- Immergluck, Dan. "From minor to major player: the geography of FHA lending during the US mortgage crisis." *Journal of Urban Affairs* 33, no. 1 (2011): 1-20.
- Lam, Ken, Robert M. Dunsky, and Austin Kelly. "Impacts of down payment underwriting standards on loan performance—evidence from the GSEs and FHA portfolios." *Federal Housing Finance Agency Working Paper* (2013): 13-3.
- Lee, Donghoon, and Joseph Tracy. "Long-term outcomes of FHA first-time homebuyers." *Economic Policy Review* 24, no. 3 (2018).
- Lo, Stephanie H. "What is the Microelasticity of Mortgage Demand to Interest Rates?." (2017).
- Marantz, Steven. "Inequalities are cited in hub mortgages." *The Boston Globe* 1, no. 1 (1989).
- Martins, Nuno C., and Ernesto Villanueva. "The impact of mortgage interest-rate subsidies on household borrowing." *Journal of Public Economics* 90, no. 8-9 (2006): 1601-1623.
- Massachusetts Housing Partnership. 2016. *MHP Lending Overview 6/30/2016*. Quarterly Report, Boston: Massachusetts Housing Partnership.
- Massey, Douglas S., Jacob S. Rugh, Justin P. Steil, and Len Albright. "Riding the stagecoach to hell: a qualitative analysis of racial discrimination in mortgage lending." *City & community* 15, no. 2 (2016): 118-136.
- "MassHousing General Underwriting Guide." January 2, 2019.
https://www.masshousing.com/portal/server.pt/document/4645/masshousing_underwriting_g rid.
- Munnell, Alicia H., Geoffrey MB Tootell, Lynn E. Browne, and James McEneaney. "Mortgage lending in Boston: Interpreting HMDA data." *The American Economic Review* (1996): 25-53.
- National Delinquency Survey*. Report. Mortgage Bankers Association, 2008-2019.
- Quercia, Roberto G., George W. McCarthy, and Susan M. Wachter. "The impacts of affordable lending efforts on homeownership rates." *Journal of Housing Economics* 12, no. 1 (2003): 29-59.
- S&P Dow Jones Indices LLC, S&P/Case-Shiller MA-Boston Home Price Index [BOXRSA], retrieved from FRED, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/series/BOXRSA>, February 14, 2019.
- Schmeiser, Maximilian D., and Matthew B. Gross. "The determinants of subprime mortgage performance following a loan modification." *The Journal of Real Estate Finance and Economics* 52, no. 1 (2016): 1-27.
- Sharp, Gregory, and Matthew Hall. "Emerging forms of racial inequality in homeownership exit, 1968–2009." *Social Problems* 61, no. 3 (2014): 427-447.
- Stegman, Michael A., Allison Freeman, and Jong-Gyu Paik. "The portfolios and wealth of low-income homeowners and renters: findings from an evaluation of Self-Help Ventures Fund's Community Advantage Program." *Federal Reserve Bank of San Francisco, Working paper 2007 2* (2007).
- "Why Choose HomeReady Mortgage." 2019. Accessed July 15, 2019.
https://www.fanniemae.com/content/fact_sheet/why-choose-homeready-mortgage.pdf.
- Woodward, Susan E., and Robert E. Hall. "Diagnosing consumer confusion and sub-optimal shopping effort: Theory and mortgage-market evidence." *American Economic Review* 102, no. 7 (2012): 3249-76.

Ziegler, Clark L., Elliot Schmiedl, and Thomas Callahan. "ONE Mortgage: A Model of Success for Low-Income Homeownership." *BCJL & Soc. Just.* 37 (2017): 339.