

Literature Review: The Credit-Enhancing Functions of Downpayment and Downpayment Substitutes

Final Report

U.S. Department of Housing and Urban Development

April 2017



PD&R



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Preface

A cash downpayment serves the important functions of limiting lender loss in the event of default and demonstrating borrower commitment, capacity, and creditworthiness. A cash downpayment, however, represents a significant barrier for many low- and moderate-income households and first-time homebuyers. In many instances, the barrier of saving for a downpayment is a greater challenge than having adequate income or credit history, particularly during a period of stagnant household incomes and rising rents, as we have experienced in recent years.

In a review of the literature, this study documents the multiple functions a cash downpayment plays. The study also identifies 11 alternatives to the cash downpayment and examines the extent to which each may individually address or replicate the functions of the cash downpayment. Although many alternatives to cash downpayment exist, the study found no substitutes to perfectly replicate all its credit-enhancing functions. Instead, the authors suggest using multiple complementary substitutes to achieve the desired level of credit enhancement.

The findings underscore the difficult balance between maintaining the critical functions of the cash downpayment while also extending homeownership to low- and moderate-income households through the introduction of substitutes to the cash downpayment. The balance between cash downpayments and substitutes will be particularly relevant as future housing demand will be driven by minority and younger households of low and moderate means. Ensuring sustainable access to homeownership for these groups will require development of financial and nonfinancial programs that meet qualitative and quantitative cash downpayment functions. Many important questions remain on the specifics, however. The hope is that this study will inform and motivate future work on substitutes for the cash downpayment and the effectiveness of such programs.

Abstract

Prospective homebuyers must meet lenders' requirement of a cash downpayment on the purchase of a home. A cash downpayment serves two main purposes: (1) it demonstrates that the borrower has the capacity to save and a commitment to home purchase and (2) provides lenders a buffer against losses in the event of borrower default. Cash downpayment, however, has also proven to be the most significant barrier to homeownership, especially for low- and moderate-income households and first-time homebuyers. Research shows that lack of accumulated wealth historically has posed a higher barrier to homeownership than having low income or a poor credit history. This literature review identifies the various credit-enhancing functions of downpayment and examines alternative instruments, products, and structures that could potentially replicate or satisfy some of the credit-enhancing functions of the cash downpayment. These tools could give underwriters additional strategies to mitigate the risk of lending to borrowers who lack sufficient downpayment. Although none of these substitutes replicates *all* functions of a cash downpayment, from demonstrating borrower preparedness to protecting lenders, we find that many of these substitutes can replicate *some* functions of cash downpayment, making them valuable credit enhancement tools for underwriters. Because different substitutes provide different types of credit enhancement, and to varying degrees of effectiveness, the ultimate takeaway from this review is that underwriters should avoid overreliance on any single substitute or a set of substitutes and, instead, mix-and-match complementary substitutes to achieve the desired level of credit enhancement.

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Introduction

Households that desire homeownership are generally required to accumulate enough liquid savings to satisfy a lender’s downpayment requirement. Downpayment provides lenders not only a cushion against credit losses but also serves as an underwriting measure of how prepared prospective borrowers are for homeownership. To be more specific, a cash downpayment¹ indicates both 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.

Downpayment also gives borrowers a stake in the property from the day of purchase (“skin in the game”), which in turn strengthens their commitment toward general upkeep of the home.

The ability to save for cash downpayment, however, has also proven to be the most critical barrier to homeownership, especially for low- and moderate-income households and first-time homebuyers. Research has shown that, historically, lack of wealth—which directly affects a household’s ability to save for downpayment—poses a higher barrier to homeownership than having low income relative to area house prices or having a poor credit history² (Barakova et al., 2003; Herbert and Tsen, 2007; Linneman and Wachter, 1989; Listokin et al., 2002; Quercia, McCarthy, and Wachter, 2003).

Prospective homebuyers traditionally have saved for downpayment by spending less (through reduced consumption) and saving more of their household incomes. Static household incomes and high rents³ make that more difficult today (Thompson, 2014). Our review of the literature indicates that several instruments, structures, and products (financial and nonfinancial) could replicate certain credit-enhancing functions of cash downpayment and could be used as substitutes to satisfy lender downpayment requirements.

At a high level, downpayment performs several key functions:

- **Demonstrates borrower commitment, capacity, and creditworthiness.** Presence of a downpayment means borrowers own a certain percentage of the property from the time of purchase. This ownership stake gives borrowers skin in the game and demonstrates a commitment to home purchase, which further motivates them to stay current on the mortgage and keep up with home maintenance. Literature implies that households that save for a downpayment are also more likely to save for other purposes, such as precautionary savings, home maintenance, and repairs. When such borrowers apply for a mortgage, they are essentially revealing their capacity and willingness to save not just for a downpayment, but also for other homeownership related expenses. By contrast, borrowers who do not make a downpayment or make a very small one may find it more difficult to demonstrate these virtues to lenders.

¹ We use “downpayment” and “cash downpayment” interchangeably to refer to downpayment funds derived from a households’ own savings.

² Recent studies show that today’s tight lending environment has also become a barrier to homeownership. (Goodman, Zhu, and George, 2015).

³ See Ellen Seidman, “Three trends that signal hard times for renters in 2015,” *Urban Wire* (blog), Urban Institute Nov 18, 2014, <http://www.urban.org/urban-wire/three-trends-signal-hard-times-renters-2015>.

- **Protects lenders from losses in the event of default.** Our literature review confirms the conventional wisdom that the higher the loan-to-value (LTV) ratio, the greater the likelihood of borrower default, other things being equal. Literature also shows that LTV is positively correlated to loss severity, which is a measure of the ultimate loss faced by lenders, after default has occurred. Downpayments essentially provide lenders an insurance buffer that absorbs losses, especially when house prices fall.

This report has two main sections, corresponding to these primary functions. In each section, we review the specific role and functions of the cash downpayment and then discuss potential substitutes that can replicate some of these functions. To be specific, we review the following 11 substitutes besides cash downpayment itself:

1. Borrower credit history.
2. Counseling.
3. Individual development accounts (IDAs).
4. Community land trusts (CLTs).
5. Borrower reserves.
6. Borrower income and residual income.
7. Short-term mortgage products.
8. Shared appreciation mortgages (SAMs).
9. Mortgage insurance—Federal Housing Administration (FHA) and private mortgage insurance (PMI).
10. Home price index futures.
11. Home equity insurance.

We note that there is no *clear* mapping between these substitutes and the downpayment functions they fulfill. Some substitutes can satisfy more than one downpayment function. For example, homeownership counseling can help borrowers understand the financial and nonfinancial responsibilities of homeownership, and thus strengthen their commitment to stay in the home. Counseling, however, can also reduce loss to lenders by helping borrowers choose the right size and type of mortgage, reducing the likelihood of default or by curing mortgages already in default. Although we have mapped these substitutes to specific downpayment functions for the purposes of this report, this mapping represents somewhat of a rough approximation. This mapping can also be used as a guide to quickly grasp the high-level structure of this report (appendix A).

In addition, the current state of the literature does not allow for an effective comparison of the degree of credit enhancement provided by any one substitute with that provided by cash downpayment. The literature generally quantifies the effectiveness of substitutes either in terms of probability of default or loss severity without necessarily specifying the typical downpayment level for each substitute. Many substitutes are also nonstandard products, suffer from data availability issues, or operate on a small scale, limiting the volume of available literature. All these factors make it very difficult, if not impossible, to relate the effectiveness of each substitute in satisfying a downpayment function, to a specific downpayment level. What is possible based on existing literature, instead, is to deduce the link between the substitutes and the downpayment functions they satisfy, discuss their effectiveness in demonstrating borrower capacity and lender protection, and highlight their pros and cons.

A key takeaway from our review is that adequate cash downpayment is the single most effective mechanism for mitigating borrower credit risk; however, many of the previous substitutes could also be effective, to varying degrees, in replicating certain functions of downpayment, although no single substitute can replicate all functions. Some substitutes also suffer from operational, implementation, data availability, or other impediments that have limited the attainment of their full potential.

Each substitute discussed in this report, individually, ultimately is unlikely to offer an adequate degree of credit enhancement. We recommend underwriters use a mix-and-match approach that combines complementary substitutes to achieve a level of loss protection that is commensurate with the underlying risk.

Note: Although a key policy question is beyond the scope of this review, we must add that that question concerning the relationship between downpayment and the probability of default is the incremental risk of default that lenders, insurers, guarantors, and investors would be willing to accept in exchange for originating low downpayment mortgages. The principal issue here is that of facilitating the expansion of homeownership opportunity and choice while maintaining adequate loss protection. Although the question of how to strike the right balance between these two objectives is beyond the scope of this report, it is nevertheless closely related and deserves careful consideration, especially considering that future housing demand will almost certainly be driven mostly by minority and younger households,⁴ who tend to be less wealthy than White or baby boom households, and thus, are more likely to be downpayment constrained.

⁴ Goodman, Pendall, and Zhu (2015) projects that of the 11.6 million new households created between 2010 and 2020, 8.9 million (or 77 percent) will be non-White. Similarly, between 2020 and 2030, 9.1 million, or 88 percent of the 10.4 million new households created, will be minority.

The Role of Downpayment in Demonstrating Borrower Commitment, Capacity, and Creditworthiness

Borrower creditworthiness is a function of several different attributes that collectively determine the likelihood that a borrower will repay a loan as agreed. In the case of home mortgages, downpayments are considered to be an important determinant of borrower creditworthiness. In fact, the current segmentation of the mortgage market is also based largely on downpayment requirements. Borrowers who tend to save more for downpayment are generally self-selected into mortgages backed by the two government-sponsored enterprises (GSEs), Fannie Mae and Freddie Mac, or get privately owned mortgages that remain on bank balance sheets. Borrowers who have fewer funds for downpayment generally opt for mortgages insured by the FHA because of its lower downpayment requirement.⁵

A downpayment generally indicates that the borrower has taken specific steps to prepare for homeownership. Downpayment can also demonstrate that the borrower understands the financial and nonfinancial responsibilities of homeownership and is willing to fulfill them. In general, the presence of downpayment indicates that a borrower has:

- The capacity and the willingness to repay the mortgage.
- The capacity and willingness to pay for expected home maintenance and save for unexpected repairs.
- A strong commitment to homeownership and a specific property.
- Skin in the game.

These four functions of downpayments are also critical factors that underwriters consider before deciding whether to lend to a borrower. The most effective and well-known instrument for borrowers to demonstrate these attributes traditionally has been a cash downpayment; however, other instruments, structures, and products—some financial and some nonfinancial—could enable borrowers who lack a cash downpayment to demonstrate some of these functions.

In this section, we review the literature to examine the effectiveness of downpayment substitutes in satisfactorily addressing the respective functions of a cash downpayment. Our review shows that several substitutes provide varying degrees of credit enhancement and potentially offer additional means for lenders to lend to low downpayment borrowers, without necessarily increasing exposure to risk. Our review also indicates that there are impediments to increasing the scale, appeal and availability of some of these substitutes. In this section, we review the literature surrounding the first eight substitutes listed in the introduction: borrower credit history, counseling, IDAs, CLTs, borrower reserves, borrower income and residual income, short-term mortgage products, and SAMs.

⁵ Loans purchased by the GSEs, otherwise known as conventional loans, typically require a 20 percent downpayment; GSE-backed loans with less than 20 percent downpayment require PMI. In comparison, FHA-insured loans require a downpayment of as low as 3.5 percent, but borrowers have to pay a mortgage insurance premium. The Department of Veterans Affairs also offers a low-downpayment mortgage program that allows up to 100 percent LTV financing in exchange for a funding fee, which is typically 2.15 percent of the loan amount. In addition to the downpayment, borrowers must also pay closing costs associated with the acquisition of property and placing the mortgage.

Capacity and Willingness To Repay the Mortgage

Keynes (1936) and Browning and Lusardi (1996) listed nine important motivations for individuals to save:

- Build up reserves against unforeseen contingencies.
- Save for anticipated future needs.
- Enjoy interest and appreciation of savings.
- Enjoy a gradually increasing expenditure and an improving standard of life
- Carry out business projects.
- Bequeath a fortune.
- Satisfy pure miserliness.
- Enjoy a sense of independence and the power to do things.
- Accumulate deposits to buy houses or other durables (downpayment motive).

The last item on this list comes from the desire to own a home. Therefore, households that desire homeownership may be *self-motivated* to save for downpayment for a home purchase (Lee and Steele, 2007). This is especially true for first-time homebuyers—the American dream of owning a home gives them an incentive to save for a cash downpayment. For households that are unable to save for a sufficient downpayment but desire homeownership, substitutes could help to satisfy the need to demonstrate the capacity and the willingness to repay.

Cash Downpayment

Economists have shown that many of the previous savings motives are “complementary” and can be present at the same time (Browning and Lusardi, 1996; Harris et al., 2002). A household’s overall capacity to save and pay is also based on savings patterns, financial literacy, and behavioral commitment (Harris et al., 2002; Karlan et al., 2014; Lusardi and Mitchell, 2007). This suggests a certain degree of correlation and predictability when it comes to saving; that is, a household that is saving for a cash downpayment for a home purchase could also have a greater willingness to build financial reserves for other purposes, such as home maintenance and repair. In other words, cash downpayment protects lenders not only by acting as a buffer against falling house prices but also by signaling that the borrower may be a habitual saver, which can directly enhance the capacity to repay.

There is also simultaneity between planning for home purchase and wealth accumulation (Moriizumi, 2003). Haurin et al. (1996b) showed that the probability of becoming a homeowner is an important determinant of wealth. That is, when households save money for home purchase, they tend to save not only for a downpayment but also for future homeownership-related expenses, such as monthly mortgage payments, insurance premiums, or home maintenance. The propensity to save provides an indirect, but valuable, benefit to lenders in the form of additional credit enhancement and capacity to repay.

Studies also show that financial knowledge is an important factor driving households to save. Lusardi and Mitchell (2007) showed that lack of financial knowledge may lead households to underestimate the need to set aside resources for savings. This finding implies that when households save for downpayment, they are indirectly demonstrating a certain degree of financial knowledge and planning ability that could enhance their capacity and the willingness to repay. Collins (2015) showed that such households are also more likely to save for unexpected future costs in the form of precautionary savings.

The size of a downpayment can also act as a signaling device that indicates how risky a given borrower is. This could in turn provide lenders a critical tool for assessing borrower capacity and willingness to repay the loan. Harrison et al. (2004) showed that the relationship between LTV and the probability of default is contingent upon the cost of default to the borrower.⁶ Brueckner (2000) also acknowledged the signaling role of LTV ratios in discerning borrower creditworthiness. This literature suggests that lenders could use the LTV, which is a reflection of cash downpayment, to assess borrower creditworthiness and their capacity to repay the mortgage.

Karlan et al (2014) however cautioned that factors such as lack of knowledge and behavioral biases can impede individual efforts to save. This study further explored the role of “commitment devices”⁷ in enforcing a regimen that motivates individuals to save. Saving for downpayments or monthly mortgage payments can be viewed as commitment device that motivates households desirous of homeownership to set aside funds periodically. Hayashi (1985) further demonstrated that high-savings households also tend to be less dependent on borrowing.

Substitute: Borrower Credit History

Borrower credit history is generally considered to be a good indicator of how borrowers will manage their debts. Credit scores, which are generated using borrower credit history, are specifically designed to gauge borrowers’ inclination to fulfill their loan commitments (Agarwal et al., 2010). This substitute could be especially beneficial for borrowers who lack enough downpayment funds, but have in the past demonstrated sound financial responsibility and debt repayment capacity.

Credit scores historically have offered a standardized statistical assessment of borrower creditworthiness and risk profile; however, credit scoring is also getting increasingly sophisticated in its ability to score consumers. Both FICO and Vantage, the two major credit-scoring firms, recently announced plans to use improved credit scoring and segmentation techniques to score millions of previously unscorable consumers and improve the accuracy of existing credit scores (VantageScore, 2013).⁸ These new scoring models would rely on additional information traditionally not found in borrower credit files, such as rental and utility bill payment history (Andriotis, 2015; Kaul, 2015). Although it is too early to evaluate the effectiveness of these new initiatives, should they prove successful, many borrowers who are considered non- or less-creditworthy today could be able to demonstrate better creditworthiness in the future.

Compared with downpayment, however, credit scores can have some disadvantages. Fitch Ratings warned that credit scores can be limited by the accuracy of data contained in consumers’

⁶ Specifically, Harrison et al. (2004) showed that when the cost of default (to the borrower) is high (for example, because of high moving costs or household disruption and so on), risky borrowers will self-select into lower LTV loans to reduce the probability of facing a costly default; safe borrowers, on the other hand, will self-select into higher LTV loans to signal enhanced creditworthiness.

⁷ A commitment device is an arrangement that an individual enters into to help fulfill a plan for future behavior that would otherwise be difficult because of intrapersonal conflict stemming from, for example, a lack of self-control. See Bryan, Karlan, and Nelson (2010).

⁸ See also FICO (2015).

credit files (Pendley et al., 2007). Inaccurate, incomplete, or conflicting information and the use of “credit improvement schemes” can artificially inflate credit scores and mask the true underwriting risk posed by borrowers.

Substitute: Borrower Income and Residual Income

The amount and stability of income is one key determinant of a borrower’s capacity to repay (Freddie Mac, 2011b). The relationship between monthly income and the capacity to repay can be demonstrated by two channels. First, a sufficient monthly income provides borrowers with the funds necessary to continue making monthly mortgage payments. Second, income is also positively correlated to asset accumulation, suggesting that higher incomes lead to higher savings and that households with higher levels of income tend to have higher lifetime savings ratios (Carroll, 1998; Chang, 1994; Harris et al., 2002). Higher savings or assets indicate that a borrower will have the necessary financial means to continue paying the mortgage, even if the income flow is suddenly disrupted (Freddie Mac, 2011b). This offers lenders an additional degree of credit enhancement and comfort in lieu of downpayment while enabling households that lack sufficient downpayment, but otherwise have sufficient incomes and savings, to demonstrate the capacity to repay.

Similarly, residual income, which is derived from household income, can also signal the capacity to pay. Residual income represents the amount a household has left every month after setting aside major monthly expenses such as housing, taxes, and other debt payments. In other words, residual income is the money left for ongoing household expenses such as groceries, gas and so on. According to Marglin (1974), apart from the decision to save for home purchase, most household savings are the income left over after meeting consumption needs; that is, they do not emanate from a deliberate decision to save. To the extent a borrower has sufficient residual income to repay the mortgage, such assets could potentially be relied upon by lenders as both an indication of a borrower’s conscious inclination to save and as a measure of borrower capacity to repay, in lieu of cash downpayment.

A residual income test is also an important component of Department of Veterans Affairs’ (VA) mortgage underwriting guidelines. This test measures whether a borrower will have enough money left after paying mortgage and related expenses each month to meet unanticipated expenses, thus making it more difficult for borrowers who lack sufficient excess income to meet unanticipated expenses to qualify for a VA mortgage. In fact, research shows that VA loans have a much reduced rate of default. Goodman et al. (2014) showed that VA loans, on average, have lower default rates compared with FHA loans. The paper evaluated several theories for VA’s superior performance, such as a strong military culture and discipline, VA’s statutory requirement to service its borrowers through “direct contact,” and VA’s risk-sharing arrangement with lenders, but eventually concluded that the residual income test could be the “critical differentiating factor” for VA’s superior performance relative to FHA’s. On the flip side though, VA is the only major mortgage program that traditionally has relied on residual income tests during underwriting. Although the FHA has recently begun permitting the use of residual income tests, this program is currently restricted to borrowers with very high debt-to-income (DTI) ratios. Some private lenders have also begun using residual income tests for loans that do not qualify under the Consumer Financial Protection Bureau’s (CFPB’s) Qualified Mortgage (QM) rule and for high-cost QMs that lack the QM safe harbor.

Relying on income or residual income to determine borrower willingness and capacity to repay must be done with care, however, paying particular attention to documentation requirements. Fitch Ratings warned that lenders need to exercise a greater degree of caution when making the tradeoff between cash downpayment and income (Pendley et al., 2007). Fitch Ratings specifically singled out the risk of misrepresentations and fraud arising from inflated levels of “stated-income,” which can make borrowers appear less risky than they really are (as happened during the recent housing bubble). In the current lending environment, though, virtually all income is fully documented, currently making this less of a risk.

Substitute: Individual Development Accounts

According to the Corporation for Enterprise Development,⁹ IDAs are—

...special savings accounts that match the deposits of low- and moderate-income people. For every dollar saved in an IDA, savers receive a corresponding match that serves as both a reward and an incentive to further the saving habit. Savers agree to complete financial education classes and use savings for an asset-building purpose—typically for postsecondary education or job training, home purchase, or to capitalize a small business. In addition to earning match dollars, savers learn about budgeting, saving, and receive additional training before purchasing an asset. (CFED, 2016)

Because of their role in motivating households to save for a specific purpose, such as purchasing a home, IDAs can be an indicator of a borrower’s capacity and willingness to save. Borrowers who further complete IDA programs by successfully achieving their savings target can additionally demonstrate the capacity to save and repay, potentially making IDAs a very good substitute for downpayment’s role in demonstrating the capacity and willingness to repay.

Han, Grinstein-Weiss, and Sherraden (2007) conducted a study of the Tulsa, Oklahoma IDA program to examine whether participation in IDAs had a positive effect on overall asset growth, beyond the savings accumulated in the IDA. Results of this study showed that IDA participants had higher levels of real and total assets than non-IDA participants. The authors further indicated that higher levels of real and total assets for IDA participants could be attributed to IDAs’ focus on long-term asset accumulation, such as homeownership, education, or starting a business—all of which tend to be vehicles for long-term wealth creation and sustained improvement in household financial condition.

Similarly, Loibl and Bird (2009) concluded that IDA participants who successfully graduated from programs had higher annual household incomes, were more likely to be employed full time, and were more likely to own an investment account, than participants who had dropped out before program completion. More importantly, this study showed that IDA graduates had significantly higher postprogram financial assets than dropouts did.

⁹ See CFED. 2016. “Frequently Asked Questions About Individual Development Accounts (IDAs).” http://cfed.org/programs/idas/ida_faq_article/.

Even though participation in IDAs leads to increased savings and asset accumulation, which can directly augment borrower willingness and capacity to repay, IDAs have failed to reach meaningful scale for a variety of reasons. The Aspen Institute (2003) found that IDAs are highly resource-intensive and costly to administer due to the “high-touch” nature of providing support, service, counseling, and financial education to low-income communities. Weber and Smith (2001) further pointed out that IDA programs frequently require homes financed using IDAs to be located within a certain neighborhood. This restriction means that people who cannot find a house in an IDA neighborhood, or want to move out, are in effect shut out of the program, thereby limiting its potential. The authors however noted that as IDAs become popular, it may be possible to transfer funds from one IDA program to another. Adams (2005) evaluated 13 IDA programs across the nation and concluded that IDAs are also difficult to roll out, in part because they involve introducing low-income households to the idea of saving. Last, the availability of nonprofit matching funds is constrained by the availability of subsidies.

Substitute: Borrower Reserves

Reserves are extra savings borrowers need to show lenders at the time of origination, in addition to downpayment funds and closing costs. Reserves can be used as a substitute for downpayment in the context of demonstrating the capacity to repay similar to the way in which borrower savings (discussed earlier) can be used for the same purpose. The purpose of reserves is to demonstrate that borrowers have enough money left after closing to make the first few mortgage payments. Reserve requirements are typically expressed in number of mortgage payments, for example, at closing a lender may require cash reserves equivalent to two monthly payments to ensure borrowers have enough funds to make initial mortgage payments. Therefore, reserves, by definition, demonstrate that borrowers have the capacity to make mortgage payments. When borrowers have reserves, they are less likely to miss their mortgage payments (Cornett, 2015). Moreover, as discussed later in the Borrower Reserves section, reserves can also protect lenders against the probability of default.

We want to stress that there is relatively very little literature on reserves as there is almost no publicly available data. With no data to quantify the benefits of reserves, it is very hard for researchers to evaluate its effectiveness. This has also limited our ability to comprehensively evaluate this substitute of a downpayment. Freddie Mac, Fannie Mae, and Ginnie Mae all provide loan-level data showing LTV, DTI ratio, and credit score at origination, but provide no indication of reserves. We would encourage the release of this data, as reserves are potentially a very good downpayment substitute, but data to analyze their effectiveness are sorely lacking.

Capacity and Willingness To Pay for Maintenance and Unexpected Repairs

Cash Downpayment

Even though conventional wisdom suggests that cash downpayment gives borrowers the incentive to ensure upkeep of their property through regular maintenance and ongoing repair, empirical literature proving this relationship is almost nonexistent. Most existing literature on this topic compares homeowner commitment to maintenance with that of renters and overwhelmingly agrees that homeowners tend to be more committed to home maintenance than renters.

Housing constitutes the vast majority of assets for most households when measured as a share of total household assets (Li and Yang, 2010). Homeownership also has intrinsic value for households and the communities in which they live (Megbolugbe and Linneman, 1993). Because downpayment gives homeowners a stake in the home's well-being, homeowners tend to maintain their properties better than renters (Li and Yang, 2010). Coulson (2002) also showed that owner-occupants maintain their dwellings better than renters. Galster (1983) found that more money is spent on maintaining owner-occupied housing than on maintaining rental properties. Glaeser and Sacerdote (2000) further showed that apartment dwellers are 25 percent less likely to garden than people who live in single-family homes. Megbolugbe and Linneman (1993) showed that homeowners engage in home improvement projects to customize dwellings to their tastes and tend to maintain homes better than landlords. Li and Yang (2010) further outlined several factors that could explain why homeowners might be more engaged. These include better civic engagement, less likelihood of moving, and the opportunity to reap profits when the house is sold. A general positive implication from this literature is that stronger homeowner willingness to perform home maintenance relative to renters can more effectively preserve, sustain, or even increase the market value (and therefore homeowner equity) of owner-occupied homes.

Paying a downpayment also renders the borrower as a claimant of the house and creates skin in the game from the day of home purchase. This further motivates homeowners to maintain the house and save for unexpected costs. Melzer (2012) showed that negative equity homeowners cut back substantially on home maintenance, because debt overhang reduces incentive to invest in the property. Because these borrowers have a higher likelihood of default, they are reluctant to spend on home maintenance out of fear that any value created by home maintenance will eventually flow to the lender. Borrowers who have a lower likelihood of default or have a meaningful positive equity position conversely are more likely to take care of their homes in order to maintain market value. Because a higher cash downpayment increases the likelihood that a borrower will maintain positive equity position when house prices fall and further because of Melzer's results establishing the connection between home equity and the willingness to maintain, one can logically infer that cash downpayment can positively influence the willingness for home maintenance.

Lack of literature establishing the empirical relationship between cash downpayment and home maintenance, however, makes it difficult to identify the degree to which cash downpayment might influence borrower capacity or the willingness for home maintenance. Although Melzer's findings certainly help us connect the dots, empirical research that closely studies this relationship remains to be undertaken.

Substitute: Borrower Income and Residual Income

As discussed in the Borrower Income and Residual Income section, higher household income generally leads to higher household savings and accumulated assets, which in turn lends households the financial capacity to repay mortgages. The same income and savings, however, could also be used to perform ongoing home maintenance and build a financial cushion for unexpected repairs. In other words, borrower income could be viewed as a substitute for downpayment's function of demonstrating the capacity to perform home maintenance and repair. Similarly, the VA's residual income tests discussed in the Borrower Income and Residual Income section can be a very effective measure of overall borrower financial capacity, which can further augment the capacity to maintain the home.

Literature suggests that there is a relationship between changes in household income and the ability to spend on home maintenance. Gyourko and Tracy (2006) found that homeowners adjust maintenance activities in accordance with fluctuations in transitory income. That is, when households face a transitory income decline, they postpone home maintenance. This delay generates savings that the household can use to maintain its consumption of nondurables. The paper uses American Housing Survey data and shows that home maintenance expenditures amount to nearly \$2,100 per year, and there is a statistically significant positive elasticity of maintenance expenditures to transitory income changes. In terms of actual dollars, the paper finds that deferred home maintenance offsets on average 1 to 7 cents for each dollar of transitory income loss.

Moreover, literature also suggests that there might be a limitation when relying on incomes and residual incomes to demonstrate the capacity to save for maintenance. Li and Yang (2010) suggested that capacity does not predestine accomplishment, because households that struggle to control spending often precommit themselves to spending habits that could be costly to break, ultimately preventing them from achieving their desired savings target. Thus, even with enough income or residual income, borrowers who lack self-control could still adjust consumption upward to a level high enough to reduce their accumulated savings and impair their capacity to save and pay for home maintenance and repair.

Substitute: Counseling

Homeownership counseling can be classified as two types—postpurchase and prepurchase. According to Collins and O'Rourke (2011: 17), prepurchase counseling is—

...delivered before individuals become homeowners, and as such focus[es] on assisting prospective homeowners to qualify for a mortgage, apply successfully and succeed as homeowners.

Postpurchase counseling, which is delivered after individuals become homeowners, can further be of two types: (1) financial counseling, which teaches new homeowners how to budget for maintenance, repairs, and upgrades, and also default and foreclosure counseling for borrowers facing financial difficulties; and (2) nonfinancial training, which focuses on physical maintenance of property through hands-on practice with simple repairs and maintenance (Hirad and Zorn, 2001).

Zandt and Rohe (2011) showed that counseling can help homeowners acquire the knowledge and skills to maintain the value of their homes. This indicates that counseled borrowers are more likely to understand the importance of performing home maintenance, which could then enhance the willingness to do so. This further suggests that counseling can be used as a substitute for downpayment's function of demonstrating borrower willingness to perform home maintenance.

Commitment to Homeownership

Homeownership is an integral part of the American dream (Megbolugbe and Linneman, 1993; Rossi 1980). The utility of homeownership comes from its value to homeowners. For some, this value comes from the accumulation of household equity, which creates a sense of social and financial security. For others, homeownership might offer the feeling of being part of a community of homeowners (Fannie Mae 1997; Megbolugbe and Linneman 1993). However one derives this value, it seems that households that value homeownership should be more committed to buying and keeping their homes than households who are unsure of the value proposition of owning.

Cash Downpayment

The capacity to save for downpayment is based on factors such as financial literacy, savings and consumption preferences, income, wealth, and the relative costs of owning versus renting. Households that make a downpayment at the time of purchase strongly demonstrate that they have taken particular steps toward homeownership, in turn signaling a commitment to homeownership (Moriizumi, 2003; Yoshikawa and Ohtake, 1989).

Empirical evidence shows that there is a strong correlation between a tenure transition plan—that is, planning for homeownership—and wealth accumulation (Haurin et al., 1996b; Krumm and Kelly, 1989; Moriizumi, 2003; Yoshikawa and Ohtake, 1989). When households decide to buy a home, they begin the process by saving for a downpayment. Therefore, saving for a downpayment is a *signal* that potential buyers are driven and committed to homeownership. There is also an endogenous relationship between savings and transition into homeownership (Krumm and Kelly, 1989). Further, the labor earnings of households usually increase before entering homeownership and significant wealth accumulation occurs during the year of purchasing of the home (Haurin et al., 1996b).

The size of downpayment can also be influenced by changes in house prices. When house prices increase, the amount of downpayment a borrower needs to pay also increases. Empirical studies of the effect of rising house prices on household saving behaviors, however, have produced slightly mixed results. Sheiner (1995) showed that house prices have a positive and significant effect on the accumulated net worth of young prospective homeowners. Using data from the 1984 Panel Study of Income, this study showed that for young renter households, living in cities with real house prices \$10,000 higher is associated with an increase in net worth of \$400 to \$1,800, controlling for both the household income and the per capita income of the city in which they live. Yoshikawa and Ohtake (1989) used household savings data from Japan and found that a rise in land prices increased the savings rate of renter households that were considering becoming homeowners and reduced the savings rate for households with no homeownership plans. To be specific, the implied savings elasticity with respect to land prices was 0.003 for households with a home purchase plan and negative 0.06 for those without one. The positive correlation between house prices and downpayment savings for prospective homeowners shown by these two studies highlights cash downpayment's role in demonstrating how committed a household is to homeownership.

Engelhardt (1994), however, reached a different conclusion when examining the effect of house prices on young renters' decision to save for home purchase. The paper found that higher house prices significantly reduced the likelihood of saving for a downpayment. To be specific, prospective first-time homebuyers were found to have \$300 less in accumulated assets for every \$1,000 increase in housing prices.

Substitute: Prepurchase Counseling

As discussed in the Counseling section, prepurchase counseling is designed to prepare families to recognize and understand the responsibilities of homeownership. Such counseling can deliver value in two ways. First, prepurchase counseling educates potential borrowers about the responsibilities of homeownership and prepares them to qualify for mortgages that they can afford and sustain (Hirad and Zorn, 2001). Second, borrowers who elect to participate in counseling programs voluntarily tend to be more serious about and signal a commitment to

homeownership. Agarwal et al. (2009) found that borrowers who attend counseling sessions voluntarily also exhibit lower default rates and acquire skills that are long lasting, signaling a heightened level of knowledge, understanding and responsibility, all three of which can have a major influence on borrower commitment toward homeownership. Therefore lenders could view counseling, especially voluntary counseling, as a signal from the borrower of a stronger commitment to homeownership and use it as a substitute in satisfaction of the commitment to homeownership function of downpayment.

Substitute: Individual Development Accounts

As discussed in the Individual Development Accounts section, IDAs are designed to motivate low-income households to save money for a specific cause, such as homeownership or higher education. Because IDAs require participants to contribute *out-of-pocket* funds to receive matching funds and to attend counseling, those who successfully graduate from a homeownership IDA program can be viewed as having demonstrated a commitment to homeownership.

Abt Associates Inc., a research firm, conducted an evaluation of the Tulsa, Oklahoma IDA program in 2004 and found a significant positive effect on homeownership for the treatment group compared with the control group (Mills et al., 2004). To be specific, 48 months after entering the study, the homeownership rate was 6.2 percentage points higher in the treatment group than in the control group. Herbert and Tsen (2007) similarly investigated the potential of downpayment assistance efforts and found liquid financial assets to be statistically significant predictors of homeownership. Although this study did not study IDAs specifically, it recommended IDAs as an additional policy approach to aid households' efforts to save for downpayment. Finally, both Loibl and Bird (2009) and Han, Grinstein-Weiss, and Sherraden (2007) concluded that IDA participants who had successfully graduated from programs generally had higher levels of household incomes and assets than IDA participants who had dropped out, indicating the success of IDAs in helping participants achieve financial goals.

A later evaluation of the Tulsa IDA program, however, arrived at a somewhat mixed conclusion. Grinstein-Weiss et al. (2011) found a greater relative increase in homeownership rate for IDA participants in the near term. Over a longer-term 10-year horizon, however, the study found a statistically insignificant difference in homeownership between the treatment and control groups. This study concluded that the Tulsa IDA program accelerated the onset of homeownership but was not a statistically significant factor in increasing homeownership during the 10-year study period.

A higher homeownership rate for IDA participants, even if only in the short term, clearly points to the success of IDA programs in enabling families to become responsible homeowners—an outcome that is impossible to achieve without commitment to homeownership. As we discuss later, research shows that IDA participants also demonstrate remarkably strong mortgage performance through extremely low default and foreclosure rates—indirectly, but strongly, suggesting that IDA participants are highly committed to homeownership. Perhaps it is useful to view IDAs as a single product that combines two proven features of sound underwriting discussed earlier—cash downpayment (through household IDA contributions) and counseling. The nonprofit match further acts as incentive for IDA homeowners to stay committed. Despite these benefits, as previously discussed in the section Individual Development Accounts, IDAs face many impediments that have prevented this product from reaching a meaningful scale.

Substitute: Community Land Trusts

The community land trust model is yet another vehicle—similar in some respects to the IDA—that could enable potential buyers to demonstrate commitment to homeownership. A CLT is typically a nonprofit organization that owns land and sells improvements (without transferring ownership of the underlying land) to homeowners via long-term lease arrangements. Separating ownership of land from ownership of the structure means very limited, if any, land appreciation is passed on to future homeowners, thereby preserving home affordability for low- to moderate-income households. CLT homes also have resale price restrictions that limit the selling price, and hence the return selling CLT homeowners can earn on their equity investment, once again helping to keep homes affordable to future homeowners. Finally, CLTs rely heavily on counseling and conservative underwriting practices to avoid risky products and also rely on ongoing engagement with homeowners to ensure early detection and remediation of borrower financial troubles.

These features have allowed for the CLT model to keep housing costs down and default rates low (Housing Assistance Council, 1993; Thaden and Rosenberg, 2010; Theodos et al., 2015). This implies that CLT homeowners—notwithstanding the fact that they tend to have lower incomes and limited means—can demonstrate a commitment to homeownership given the right tools, guidance, and support. Superior performance of CLTs comes in spite of the fact that CLT homeowners tend to have high loan-to-value ratios. A 2011 survey of 96 CLTs revealed a downpayment requirement of between 0 and 5 percent, with more than one-half of the CLTs reporting a requirement of less than 1 percent, strongly suggesting that the CLT model can be a very effective substitute for the downpayment’s role in demonstrating commitment to homeownership (Thaden, 2012). Like IDAs, CLTs combine several sound underwriting features (counseling, conservative underwriting, and ongoing engagement) into a single product; however, precisely which features of CLTs contribute to its strong performance, and to what extent, has not been measured thus far and is worthy of much more research.

Compared with a cash downpayment however, CLTs have two main disadvantages. First, as discussed previously, the resale price restrictions inherent in the CLT model limit the return CLT homeowners can earn on their investment, and therefore, can have a major negative impact on household wealth creation. Second, CLTs homes could be deemed undesirable, especially in geographies and societies where land ownership is an important part of culture (Weiss, 2005).

Skin in the Game

To have “skin in the game” means to incur a risk by investing in order to achieve a certain goal. At the time of home purchase, borrowers pay a certain percentage of the house price upfront in the form of a downpayment; that payment demonstrates that the borrower is also invested in the house alongside the lender. Any increases (or decreases) in the value of the house would lead to dollar for dollar increases (or decreases) in the borrower’s downpayment investment. In addition, as borrowers repay mortgages over time, their share of ownership increases and creates even more skin in the game (Li and Yang, 2010).

Cash Downpayment

A primary argument in favor of homeownership is that it is the best way for low- and moderate-income households to build wealth. Theodos, Stacy, and Monson (2015) stated that an amortizing mortgage represents the most important savings vehicle for most low- and moderate-income households. There are at least three ways by which a home purchase

facilitates wealth buildup. In deciding to purchase a home, households commit themselves to save money—initially for a cash downpayment, then again, every month for making mortgage payments. In addition, the home’s value may rise with price appreciation. Over time, rising homeowner equity increases homeowner wealth while also providing a return on their original investment (Mallach, 2011; Thaler and Benartzi, 2004). This wealth buildup in the form of rising home equity over time is ultimately a key driver of skin in the game and keeps borrowers’ interests aligned with those of lenders.

One assumption embedded in the home equity buildup argument, however, is that of sustained house price appreciation during the long run. When house prices are depreciating, repaying the mortgage may not necessarily lead to growing home equity or more skin in the game. Further, steep housing price declines can quickly push low downpayment mortgages into negative equity, which can eventually subdue borrowers’ commitment to staying in their homes and increase the likelihood of default, as it did during the recent crisis, especially when household circumstances are fundamentally altered with loss of income or a dramatic change in household goals and expectations. Using Freddie Mac loan level data, Goodman, Zhu, and George (2015) estimated that 13 percent of Freddie Mac’s originations in 2007—when house prices were near peak—experienced a credit event,¹⁰ compared with 2.3 percent for precrisis originations.

Borrowers who pay larger cash downpayments have larger buffers against house price declines. Such homeowners are more likely to remain in positive equity position even when house prices fall, giving them a continued positive stake in the investment and keeping them committed to either staying in the home or selling it to recoup remaining equity. Continued skin in the game means borrowers have something to lose by defaulting compared with borrowers who have very little or no skin in the game. Agarwal et al. (2014) empirically showed that borrowers who make higher downpayments are in a better position to weather economic downturns and other crises, and thus, are less likely to default.

Substitute: Short-Term Mortgage Products

The 30-year fixed-rate mortgage remains the most sought-after mortgage product for American homeowners. More than two-thirds of all purchase originations in the early 2000s were 30-year fixed-rate mortgages. This share dropped slightly during the housing bubble, as adjustable-rate mortgages became more popular; since the crisis, however, the 30-year fixed-rate mortgage has made up approximately 90 percent of all purchase originations.

As policymakers debate the future of the U.S. housing finance system, questions have also been raised about the future of the 30-year fixed-rate mortgage. Mortgages with shorter terms, such as 15 or 20 years, have the inherent advantage of faster principal amortization, meaning borrowers pay less in interest during the life of the loan compared with a 30-year mortgage. More importantly, because borrowers have fewer years to repay the mortgage, a short-term mortgage also enables borrowers to build equity faster, which in turn increases skin in the game faster than a 30-year product.

¹⁰ For the purposes of this study, a credit event was defined as a loan going 180 days delinquent or being liquidated through a deed-in-lieu, short sale, foreclosure sale, or REO before the 180-day delinquency point.

American Enterprise Institute, or AEI, (2014) proposed a new 15-year mortgage product—the Wealth Building Home Loan (WBHL)—as a way for borrowers to save interest expenses during the long term and build equity faster.¹¹ Developed jointly by AEI, the Neighborhood Assistance Corporation of America, and Bank of America, WBHL’s benefits include lower interest rates compared with a 30-year mortgage, ability to reduce the interest rate even more by using a buydown (paid for by a subsidy) and little or no downpayment. With a lower interest rate and shorter term, borrowers channel a higher share of the monthly payment toward principal repayment, allowing for faster equity buildup and increasing their skin in the game, and eventually, the prospect of owning their home debt free in just 15 years.

Short-term mortgage products, including the WBHL, have several shortcomings, however. Seidman, Zhu, and Goodman (2014) showed that monthly mortgage payments for a 15-year product may not be affordable to low-income borrowers. Further, the ability to use a buydown to reduce the interest rate would be constrained by the availability of subsidy funds. Even when subsidies are available, though, literature shows that buydowns financed using nonborrower funds can be problematic. Cotterman (1992) showed that seller-funded buydown subsidies were capitalized into higher home sale prices and that those mortgages defaulted at higher rates than nonbuydown mortgages. Walden (1992) showed that when borrowers pay for buydowns out of pocket, they are left with less cash for downpayment, which reduces their equity at the time of origination. Finally, a very high LTV ratio, as would be the case for WBHL mortgages, would offer very limited lender protection during the early years of the mortgage.

Substitute: Shared Appreciation Mortgages

Another model for supporting homeownership and encouraging skin in the game is shared appreciation mortgages. SAMs enable borrowers to purchase homes at subsidized prices. In exchange, borrowers agree to share a portion of the future house price appreciation or agree to other restrictions. The prospect of owning a subsidized home—even with restrictions—can create strong incentives for low-income households to own and stay in the home. Unlike cash downpayment, where skin in the game comes from personal borrower savings invested in the house, the skin in the game for SAMs comes from the *subsidy* borrowers receive at the time of home purchase. SAM homeowners who stay in their homes also benefit from rising equity over time, which creates even more skin in the game and a strong disincentive to default.

Three main types of SAMs are (1) general-use SAMs, (2) affordable SAMs, and (3) SAMs for underwater loan modifications. The first two types apply to new mortgages and are discussed briefly in the following paragraphs; the third is beyond the scope of this report.

General-use SAMs. Traditional SAMs were introduced in the late 1970s in response to high interest rates during that period. Lenders offered borrowers below-market interest rates in return

¹¹ The Neighborhood Assistance Corporation of America paired up with AEI to develop this program. Under the WBHL program, the money a borrower might otherwise have used for down payment would be used together with a subsidy from the lender to buy down the interest rate on a 15-year mortgage as a way to build equity faster. See “NACA, AEI and BOA Announce New Freedom Loan Program.” September 10, 2014, <http://forums.naca.com/?p=11242>.

for a stated share of home value appreciation at the end of the mortgage term. Demand for this product, however, has remained very low, partly owing to uncertainty related to tax treatment, but also owing to the availability of other financing alternatives like adjustable-rate mortgages, which offer affordability advantages without the complexity of or commitment to uncertain future costs. Interest-reduction SAMs lost further appeal once the 30-year fixed mortgage rate returned to more normalized levels.

Affordable SAMs. Affordable SAMs, also known as shared equity homeownership programs, are used by local government agencies or nonprofits to provide homeownership options to low- and middle-income households. These SAMs have mechanisms in place to preserve home affordability over time. “Affordable SAM” is a broad designation that includes the following types of programs, each with a different design:

- Deed restrictions, also called deed covenants, are restrictions written into the deed that convey a property and are binding for current and future owners (Abromowitz and White, 2006).
- Community land trusts, as discussed earlier, are nonprofit organizations committed to offering below-market price homeownership options with sale price restrictions (Davis, 2006).
- Limited equity cooperatives are typically multihousehold developments in which occupants purchase shares in the cooperative rather than the units outright. (Davis, 2006).

Theodos et al. (2015) detailed the findings of an evaluation of nine shared equity programs and found that many shared equity programs offer homeowners an *increasing* share of appreciation with time. In other words, the longer a household owns the home, the more equity—and hence skin in the game—they accumulate, even if house prices remain flat. For example, under one program covered by this study, homeowners receive 25 percent of house price appreciation through year 3, 50 percent from years 3 to 30, and 100 percent after 30 years of owning the house. The study specifically noted that the 50-50 split after year 3 offered by this program was designed to incentivize homeowners to stay in the home and was a particularly attractive feature.

A 2009 performance evaluation of a shared equity program in Burlington, Vermont found that the program was also an effective asset-building strategy for lower income households and that these buyers had lower foreclosure rates (Jacobus and Davis, 2010). In addition, households in this study were able to sustain homeownership during a long period of time compared with buyers of unrestricted market-rate homes. Temkin, Theodos, and Price (2013) studied seven shared equity programs and found that these programs enable homebuyers to earn returns that exceeded what they would have received had they invested in stocks or bonds, in addition to keeping the homes affordable to lower income homebuyers. Further, delinquency and foreclosure rates were very low under shared-equity programs. That said, shared-equity models may not work well in markets where homes are either depreciating in value or are not appreciating at a high enough rate.

A Note on Downpayment Assistance Programs

Downpayment assistance programs can be a useful source of funds for households who desire homeownership but lack downpayment savings. Underwriters often permit prospective homeowners to obtain funds from third-party sources to pay for a downpayment. The most common sources of downpayment assistance tend to be gifts from family and relatives, grants

from government agencies or nonprofits, and seller-funded downpayment assistance. GAO (2005) studied the risk of Federal Housing Administration-insured loans with downpayment assistance and showed that more than 55 percent of FHA-insured loans in 2005 had some form of downpayment assistance.

Although downpayment assistance programs can ease the cash downpayment burden for borrowers, literature suggests that mortgages associated with downpayment assistance can suffer from a serious lack of borrower skin in the game, which manifests itself in the form of poor performance for these mortgages. Using FHA single family purchase money loans endorsed between October 1999 and September 2002, Kelly (2008) showed that borrowers who make downpayments using their own savings are significantly less likely to default than borrowers whose downpayments come from relatives, government agencies, or nonprofits. Integrated Financial Engineering, Inc., or IFE, (2014b) studied the sources of downpayment assistance since 2002 and found that loans with any form of downpayment assistance performed worse across all origination years than loans receiving no downpayment assistance.

Other studies have shown that downpayment assistance might also reduce the motivation for saving. Collins (2015) and Carter and Barrett (2006) showed that availability of assistance could make borrowers less likely to save for downpayments because of the possibility of getting cash from other resources. Engelhardt, and Mayer (1995) similarly found that households receiving downpayment gifts adjust their downpayment savings accordingly. To be specific, households receiving a gift reduce their savings rate by up to 7 percentage points relative to households that do not receive gifts. In a related study, Lee and Steele (2007) showed that baby boomers who borrow money for downpayments may be considered risk takers and their borrowing behaviors may reflect a lack of financial preparedness.

While downpayment assistance programs are generally associated with higher rates of default or have other shortcomings, the literature also shows that seller-funded downpayment assistance programs in particular tend to have the worst performance characteristics. According to Kelly (2008), borrowers with seller-funded downpayments, especially those who made no out-of-pocket contribution to the downpayment, had the highest rates of default. GAO (2005) similarly found that FHA-insured mortgages with seller-funded downpayment assistance had the highest delinquency rates while FHA mortgages with no downpayment assistance had the lowest. Furthermore, both GAO (2005) and Kelly (2008) underscored that seller-funded downpayment assistance programs led to increases in the selling price of homes relative to comparable homes that were sold without any downpayment assistance. In an earlier, but related study, Cotterman (1992) found that seller provided subsidy requiring upfront funding in the form of a temporary buydown of initial mortgage payments led to capitalization of the subsidy into higher selling prices and higher rates of default. Cotterman (1992) also found that seller-subsidized buydowns could encourage borrowers to seek larger loans to take advantage of the additional affordability created by the temporarily lower interest rate. A key conclusion from this literature, also underscored by Kelly (2008), was that downpayment assistance programs that require some amount of investment from the borrower can create skin in the game and therefore may be more successful in producing sustainable homeowners.

The Role of Downpayment in Ensuring Lender Protection

The LTV ratio has long been a principal feature of underwriting and pricing guidelines for both primary and secondary market lending institutions and mortgage insurers. Because interest rates charged to borrowers reflect lenders' expectations of borrower risk, interest rates tend to be higher for loans with higher LTV ratios, all else being equal, because of the higher probability of default associated with high LTV mortgages; however, probability of default is not the only risk lenders face. When a mortgage defaults, lenders are also exposed to the risk that the net proceeds after foreclosure is completed will be less than the unpaid mortgage balance, requiring the lender to take a write down, or loss. Lenders are also interested in protecting themselves against this loss. Along with other underwriting requirements, cash downpayment plays an important role in protecting lenders against both the probability of default and loss once default has occurred.

The subject of mortgage default and loss severity has received intense attention from researchers, industry analysts, and policymakers, and the understanding of the importance of downpayment requirements in protecting lenders against both risks has continued to evolve over time. In this section, we first review the literature surrounding the role of downpayment in protecting lenders against the probability of borrower default. The literature overwhelmingly agrees that presence of downpayment reduces the risk of default for reasons discussed in the preceding sections. Next, we discuss the literature on protecting lenders against loss severity. Although a cash downpayment provides a potent buffer against losses, lenders can use other substitutes as well, which will be discussed in this subsection. Finally, in the last subsection, we will review the literature on downpayment substitutes that can offer protection against house price declines (that is, market risk).

Protecting Lenders Against the Probability of Default

Cash Downpayment

Early empirical findings. Early empirical studies revealed the importance of cash downpayment at origination in reducing the probability of default (Quercia and Stegman, 1992). Using a simple linear regression model based on aggregate FHA and VA loan data, Von Furstenberg (1969, 1970a, 1970b) was the first to document that the initial LTV was the most important predictor of default risk. Williams, Beranek, and Kenkel (1974) used LTV categories in their regression analysis and showed that borrowers with an initial LTV higher than 70 percent were significantly more likely to default than those with more equity at origination.

Negative equity. Early theoretical literature modeled borrowers' optimal choice over time. At each payment period through the life of the mortgage, borrowers face four choices: make the scheduled payment, delay payment, stop payment, or prepay the mortgage through refinancing or selling the property. Under this model, every payment cycle, borrowers rationally compare the benefits and costs associated with each choice and choose the one that maximizes their utility return. Jackson and Kasserman (1980) were among the first to use this borrower choice model, and they found evidence that borrowers will choose to default if the equity becomes negative. The authors also found support for this "negative equity" model over the "ability to pay" model, in which borrowers default when their income does not meet their payment obligation. Campbell and Dietrich (1983) extended Jackson and Kasserman's work and found that both initial and contemporaneous LTV ratios have significant positive impact on default decisions.

Foster and Van Order (1984) was among the first to study default decisions as put options that enable the borrower to sell the property to the lender for the outstanding mortgage value at the beginning of each payment period. The borrower will exercise this option and default if the value of the property, net of any costs of exercising the option, falls below the mortgage value. Vandell and Thibodeau (1985) extended the option-based model by including market conditions that affect property values. They confirmed that current net equity had a significant impact on default risk.

Borrowers facing negative equity, however, may not exercise the default option immediately. Applying FHA 203(b) data to the option-based model, Foster and Van Order (1984) found that the current and lagged measures of negative equity could explain more than 90 percent of the default variance. The lagged form of negative equity was proven significant. Epperson et al. (1985) pointed out that the significance stemmed from the complexity of calculating the value of the option. The current value of mortgage contains the intrinsic default option value, as its value is related to the option to default in the future. In addition, the cost of exercising the option is difficult to estimate (Quigley and Van Order, 1991).

Double trigger. Although recent studies have reached consensus on the importance of negative equity in explaining the rise in defaults in the housing crisis (Bhutta et al., 2011; Campbell and Cocco, 2015; Foote et al., 2008; Goodman et al., 2010), the imperfect exercise of the option in the face of negative equity had led earlier researchers to consider whether a trigger or crisis event, like job loss and divorce, is required (Foster and Van Order, 1984, 1985; Kau et al., 1993; Riddiough, 1991). Recent studies show that negative equity is a necessary condition for default, but not a sufficient one.

Deng, Quigley, and Van Order (1996) presented a unified model of default and prepayment behavior in a proportional hazard framework, treating default and prepayment as competing risks.¹² The results showed the sensitivity of default to the initial LTV ratio and the course of housing equity. The latter is a measure of the extent to which the default option is in the money. This analysis also used regional unemployment and divorce rates as proxies for trigger events and highlighted the importance of these trigger events in affecting prepayment and default behavior. Deng, Quigley, and Van Order (2000) extended their 1996 paper, this time considering the two hazards as dependent competing risks that are estimated jointly. They used the option-based approach, in which the borrower will exercise the default option if it is in the money by a certain amount, and found that borrowers do not default immediately when home equity becomes negative, because default is irreversible and future home prices may rise. The authors also argued that unobserved heterogeneity, such as job loss and divorce, are important determinants of mortgage defaults. Foote et al. (2008) studied Massachusetts homeowners during the early 1990s and found that fewer than 10 percent of borrowers likely to have had negative equity at the end of 1991 experienced a foreclosure during the following 3 years. They argued that the defaults were the result of a double trigger event—negative equity and some adverse event, such as a job loss or health problems.

¹² Proportional hazard models were first used by Van Order (1990) and Quigley and Van Order (1991, 1992). These studies provided consistent evidence that LTV ratios had a significant negative effect on default.

Unlike previous studies that relied on regional unemployment rates as proxy for trigger events, Gerardi et al. (2013) found that individual level employment status and liquidity level were the most important determinants of default. They also found that severe negative equity, 20 percent or more, increased the default probability by 5 to 18 percent. Bhutta et al. (2011) constructed individual-level measures of negative equity and illiquidity by combining loan-level mortgage data with detailed credit bureau information about the borrower's broader balance sheet. This study found that both negative equity and illiquidity had comparable sizable effects on default. Moreover, the effect of illiquidity on default generally increases at high combined loan-to-value (CLTV) ratios, although it is significant even at low CLTVs.

Empirical studies show that initial downpayment (origination LTV) and mark-to-market LTV are both important. Most option-based default studies discussed previously focus more on the mark-to-market LTV. In these studies, downpayment or initial equity play less of a role in determining the probability of default. Other studies that include origination LTV as a separate variable in their default models, however, found it to be an important determinant of default probability even after controlling for mark-to-market LTV.

Deng, Quigley, and Van Order (1996) included both origination LTV and mark-to-market LTV in a proportional hazard model and showed the sensitivity of default to both the initial downpayment and the changes in housing equity over time. Lam et al. (2013) studied the relationship between initial LTV and default after controlling for borrower characteristics (credit score and debt-to-income) and housing market conditions, based on large GSE and FHA loan samples. They found that the lifetime delinquency and foreclosure rates increased monotonically and nonlinearly with the rise of initial LTV. To be specific, the baseline foreclosure rate for a GSE loan with 80 percent LTV was 9.2 percent. Using the same underwriting criteria for a 90 percent LTV loan, however, would have increased the foreclosure rate to 1.48 times the baseline rate, and for a 70 percent LTV mortgage, would have reduced it to 0.61 times the baseline rate. For FHA loans, when the LTV was reduced from 80 to 70 percent, the foreclosure rate fell to 0.72 times the baseline level, compared with a higher 1.62 times the baseline rate if the LTV was increased from 80 to 90 percent.

Agarwal, Green, Rosenblatt, and Yao (2014) estimated default models and found that after controlling for mark-to-market LTV ratio, initial collateral remained an important predictor of mortgage default. To be specific, households that paid high downpayments had a lower hazard to default. Holding the mark-to-market LTV constant at 90 percent and increasing the origination LTV from 80 to 100 percent led to an increase in default rate from 1.1 to 1.79 percent. Conversely, holding the origination LTV constant at 80 percent and increasing the mark-to-market LTV from 90 to 100 percent also increased the default rate from 1.1 to 1.5, suggesting that both mark-to-market and the origination LTV are important predictors of default.

High-LTV lending can be safe. In 2014, Fannie Mae and Freddie Mac announced 97 percent LTV programs and once again began purchasing loans with downpayments as low as 3 percent. George, Goodman, and Zhu (2014) at the Urban Institute used Fannie Mae loan-level data and found that with appropriate compensating factors, the default rate of loans with downpayments of 3 to 5 percent was on par with that of loans with downpayments of 5 to 10 percent.

Substitute: Counseling

Hirad and Zorn (2001) noted that borrowers who attend counseling have, on average, a 19 percent lower delinquency rate than those who did not attend counseling; however, the authors also suggested that all counseling programs are not equally effective. For example, borrowers receiving counseling through individual programs experienced a 34 percent reduction in delinquency rates, while borrowers receiving classroom and home study counseling obtained 26 percent and 21 percent reductions, respectively, in the delinquency rate.

The Urban Institute (Mayer et al., 2009) conducted a 3-year evaluation of the National Foreclosure Mitigation Counseling (NFMC) program, a federal foreclosure counseling program, and concluded that the program was effective in reducing the number of foreclosure sales and helping homeowners cure serious delinquencies and subsequently remain current on their mortgages. About 880 borrowers in the NFMC program avoided going into foreclosure through December 2008. More generally, NFMC counseled borrowers were 65 percent more likely to remain current on their mortgages after curing a serious delinquency or foreclosure, compared with noncounseled borrowers. The relative effectiveness of different counseling techniques notwithstanding, literature discussed here and in previous sections strongly shows that counseling can significantly reduce the probability of default, making it a very good substitute for this function of cash downpayment.

Some evidence, however, also indicates that the strong positive effects of counseling on mortgage performance can have countervailing effects for lenders. Quercia and Spader (2008) demonstrated that classroom and individual counseling programs can improve the likelihood that borrowers will exercise the prepayment option by refinancing. Therefore, while lenders certainly benefit when counseled borrowers avoid defaulting on loans, this benefit can result in a negative profitability outcome for lenders because of higher refinancing activity.

Substitute: Community Land Trusts

Mortgages for CLT homes offer lender protection because of features inherent to the CLT model. A survey of 42 CLTs across 22 states comprising 2,200 CLT mortgages revealed striking differences between the performance of CLT mortgages and conventional mortgages for “market-rate” homes (Thaden and Rosenberg, 2010). According to this study, as of December 31, 2009, only 1.6 percent of CLT mortgages were seriously delinquent compared with 7 percent for prime loans, 30.6 percent for subprime loans, 9.4 percent for FHA loans, and 5.4 percent for VA loans. Similarly, the foreclosure rate for CLT mortgages was only a fraction of the foreclosure rate for conventional mortgages. Only 0.6 percent of CLT mortgages were being foreclosed as of December 2009, compared with 3.3 percent for prime loans, 15.6 percent for subprime loans, 3.6 percent for FHA loans, and 2.5 percent for VA loans. The survey also reported significantly higher cure rates for CLT mortgages than for conventional mortgages.

This survey attributed the superior performance of CLT homeowners to factors such as prepurchase education, restrictions on risky loans and features, ongoing assistance for homeowners after purchase, and early detection and intervention during delinquency and foreclosure. Strong performance of CLTs, especially considering it is a low-downpayment product, is a strong indication of its effectiveness as a substitute for cash downpayment’s role in reducing the probability of default.

Substitute: Borrower Reserves

As discussed earlier, reserves can reduce the likelihood of missed payments by providing borrowers a financial cushion. Reid (2013) summarized results from a survey showing that the timing of households' decision to buy a home coincided with a higher level of household prosperity owing to factors such as a new job or a promotion. It is more interesting that many of these households had also experienced significant changes in household composition in the past 5 years such as divorce, loss of an income earner, or childbirth. Perhaps most importantly, however, this survey also showed that these households were too optimistic and unwilling to consider potential future challenges and plans of action should they experience job loss, higher childcare costs, declining house prices, and so on.

This lack of contingency planning makes the financial cushion provided by reserves very valuable from the point of view of preventing a default. Even when borrowers make a sizable downpayment, the risk of an unexpected job loss or a sudden major expense (due to a medical emergency, for example) still exists. The availability of reserves in such situations could give borrowers additional time to work out financial troubles, which could help either delay or prevent default. Because of this, reserves can prove to be even more effective than cash downpayment, which cannot be monetized quickly, in curtailing the likelihood of default when a major financial emergency strikes.

Substitute: Individual Development Accounts

A 2008 survey by the Corporation for Enterprise Development of several IDA programs across the country offered a glimpse into the performance of mortgages obtained by IDA participants (CFED, 2008). This survey revealed that of the 1,212 IDA savers who purchased a home in the 5 years preceding 2008, an overwhelming majority had taken out conventional fixed-rate mortgages. This survey also showed remarkably strong loan performance with only a few defaults and foreclosures, suggesting IDAs can be a good substitute for cash downpayment in protecting lenders against default. IDA programs attributed strong loan performance mostly to homeownership counseling and financial education. Several programs also reported having restrictions on the type of mortgages IDA participants could obtain. For example, loans with features such as adjustable rate, high fees, excessive interest rates, and prepayment penalties could be rejected. Other programs even had restrictions on the lenders who could provide mortgages. This suggests that IDA programs—especially those that place greater importance on counseling and conservative underwriting practices—can offer lenders some degree of protection against borrower default in lieu of cash downpayment.

Protecting Lenders Against Loss Severity

From the perspective of lenders and financial institutions that guarantee or insure mortgages, loss severity—which measures the expected loss—reflects risk exposure better than the probability of default. Loss severity is calculated as the net loss, once foreclosure is completed and a property is auctioned or resold, as a percentage of the defaulted loan amount. Loss severity depends partly on the probability of default and partly on what happens after default. Loss severity provides a more holistic measure of credit risk, which in turn serves as a basis for estimating the cost of mortgage insurance premiums, guarantee fees, and capital requirements for lenders, guarantors, and insurers. In this section, we will review two predominant channels for lenders to reduce loss severity—private mortgage insurance and FHA mortgage insurance.

The key takeaway from this section is that both forms of mortgage insurance are very effective substitutes for cash downpayment in the context of reducing loss severity for lenders.

As discussed in the Cash Downpayment section, loans with lower downpayments generally have a higher probability of default. Loan amount, on the other hand, has no effect on default rate, but has a significant negative effect on loss severity (Evans, Maris, and Weinstein, 1985). Clauretie (1990) also found that the loss rate on defaulted loans increases with the LTV ratio. FHA-insured mortgages with downpayments of 3 to 4 percent suffered heavy losses in the aftermath of the recent housing bubble. The FHA subsequently increased its mortgage insurance premium several times, before the 0.5 percent premium cut announced in January 2015, to shore up its Mutual Mortgage Insurance Fund. Much attention has been paid to the actuarial analysis of the fund (IFE, 2014a). Consistent with previous research, this analysis finds that high LTV ratios significantly affected FHA's claim rates, which in turn were driven by default. Moreover, this effect increases as LTV ratios increase. There was a sharp increase in claims when the LTV ratio was above 90 percent and an even a higher one when the LTV ratio exceeded 95 percent. The risks associated with high LTV loans ultimately have important implications for lender loss reserves. Quigley and Van Order (1991) found that other things being equal, loans with initial LTVs between 91 and 95 percent have loss rates about three times higher than loans with LTV ratios between 81 and 90 percent and therefore need higher loss reserves.

Substitute: Mortgage Insurance

Mortgage insurance, such as PMI or FHA insurance, can be a very effective instrument for reducing lender loss severity. The presence of insurance on a loan—either through the FHA or PMI—can curtail the risk posed to lenders by permitting lenders to transfer this risk. Because lenders traditionally have required a downpayment of at least 20 percent of the home value and because this requirement acts as a major barrier to homeownership for low- and moderate-income households, mortgage insurance through FHA or PMIs can be an extremely valuable path to homeownership for such households. Mortgage insurance can facilitate and expand homeownership opportunity by enabling homebuyers to purchase homes with as little as 3 to 5 percent downpayment (Qi and Yang, 2009).

Private mortgage insurance. The presence of PMI, which usually insures the top 25 to 30 percent of the mortgage balance most at risk of loss, can provide significant credit enhancement for lenders by paying claims in the event of borrower default (Promontory Financial Group, 2011). Reimbursements from private mortgage insurers at the time of liquidation can comprise a significant portion of total proceeds (Berliner, 2009).

Goodman and Zhu (2015) used Freddie Mac data to analyze the loss severity for Freddie Mac guaranteed loans originated between 1999 and 2013. This paper showed that the loss severity for loans with LTV ratios over 80 percent was surprisingly *lower* than for loans with LTVs between 60 and 80 percent. It is more interesting that severities for above-80 percent LTV loans were less than severities for even under-60 LTV loans. The authors attributed this behavior to the presence of mortgage insurance for loans with LTVs over 80 percent. As a standard practice, PMI generally reduces an 85 LTV GSE mortgage down to 73 LTV, a 90-to-95 LTV mortgage to 65 LTV, and a 97 LTV mortgage down to 63 LTV. In addition, for loans covered by this study, private mortgage insurance coverage was generally deep enough that Freddie Mac was not exposed to losses unless the market value of the home fell by more than 20 percent. A key takeaway from this study was that PMI can be more effective in protecting GSEs against loss severity than is commonly assumed.

Qi and Yang (2009) similarly used private-label securities data to compare the loss given default with and without PMI benefit. They found that before PMI claim benefit was factored in, the sample average loss given default was 24.6 percent. After taking into consideration the benefit of PMI claim payments, however, the average loss given default was just 1.73 percent. These studies strongly demonstrate the success of PMI in reducing loss severity for entities that are exposed to mortgage credit risk, further signaling its effectiveness as a substitute for cash downpayment.

FHA mortgage insurance. The FHA traditionally has been the predominant provider of mortgage credit to first-time homebuyers and borrowers with limited downpayment savings. Before the Great Depression, most home mortgages were short-term, un-amortizing balloon loans with LTV ratios below 50 to 60 percent (Vandell, 1995). The National Housing Act of 1934, which was enacted in response to the Great Depression, created the FHA and set the maximum LTV ratio for FHA-insured mortgages to a statutory 80 percent, enabling more families to purchase a home than was possible ever before. Over the years, as these products proved sustainable, the FHA further lowered its downpayment requirements to five percent by the 1950s and to three percent by the 1960s, further expanding homeownership opportunities for low-income households, while also maintaining relatively modest claim rates in aggregate (Quercia and Park, 2012).

In addition to its role in making homeownership more accessible, the FHA also plays a critical role in ensuring continued flow of mortgage credit in all economic environments. This “countercyclical” role allows for the benefits of FHA’s mission to extend beyond just the lenders that originate FHA-insured mortgages. According to Quercia and Park (2012), the FHA’s full faith and credit backing from the federal government acts as a countercyclical mechanism that allows the FHA to step in when private capital is not willing or able, such as during economic downturns, ensuring that credit remains available through the cycle. This in turn prevents home buying activity from falling off the cliff and provides a floor for house prices. Ambrose, Pennington-Cross, and Yezer (2002) found that while conventional mortgage lending is either maintained or tightened during downturns, the FHA’s market share generally responds by expanding. This study further concluded that the FHA plays a special role in maintaining the supply of mortgage credit in declining housing markets. Research also indicates that in the absence of the FHA’s role during the recent housing crisis, home prices would have fallen by an additional 25 percent, and the unemployment rate would have skyrocketed to almost 12 percent (Golding, Szymanoski, and Lee, 2014).¹³ This suggests that FHA’s countercyclical role as a stabilizing agent benefits not only lenders of FHA-insured loans but also other lenders, homeowners, and the broader economy by arresting both rapid increases in borrower default and the loss severity experienced by lenders.

¹³ See also Griffith, John. 2012. *The Federal Housing Administration Saved the Housing Market*. Washington, DC: Center for American Progress. <https://www.americanprogress.org/issues/economy/reports/2012/10/11/40824/the-federal-housing-administration-saved-the-housing-market/>.

The role of the FHA has, however, been called into question several times, including after the most recent housing bubble. Goodman and Nichols (1997) questioned the FHA's role in influencing homeownership by asserting that FHA insurance at best accelerates home purchase as opposed to enabling homeownership for those who would never be able to buy homes. Szymanoski, Reeder, Raman, and Comeau (2012), however, pointed out that an accelerated path to homeownership is valuable, because it enables families to enjoy the benefits of homeownership when their children are young. Being able to purchase a home earlier in life, presumably has other benefits as well, such as the opportunity to benefit from house price appreciation and build wealth over a longer duration and the potential for paying off home mortgage debt before entering old age.

FHA's 100 percent coverage of the mortgage balance also provides a valuable benefit by allowing lenders to transfer mortgage credit risk away from their balance sheets. To be clear, 100 percent loss coverage does not mean that servicers of FHA mortgages are not exposed to any losses. A 2003 survey of mortgage servicers showed that best practice servicers experienced losses of up to \$1,800 per defaulted FHA loan (PricewaterhouseCoopers, 2003). This represented roughly 1.8 percent of loan balance based on an average loan balance of \$100,000 in 2003 (Bank of America, 2007). The Bank of America study attributed these servicing-related losses to certain nonreimbursable foreclosure costs and other operational expenses incurred by servicers while working with troubled FHA borrowers. These losses can also vary with default activity. To be specific, loss severity tends to rise significantly with the volume of nonperforming loans because of the excessively high cost of servicing delinquent mortgages. This is true for all mortgage types (FHA and non-FHA insured). According to Goodman (2014), the annual cost of servicing a nonperforming mortgage in 2013 was on average 15 times that of servicing a performing loan. While these losses are much smaller and more manageable during normal housing markets when delinquency rates are low, this research suggests that the impact of these losses on the overall loss severity can become significant during housing market downturns.

Loss severities for insured mortgages—both PMI and FHA-insured—can also be influenced by state foreclosure laws, although the magnitude can vary by insurer. Clauretie and Herzog (1990) compared the effect of state foreclosure laws on losses for loans with PMI with those with FHA insurance. This paper found that judicial procedure and statutory right of redemption extended the foreclosure process and were associated with larger loan losses. They also showed that deficiency judgments reduced loss severity for PMI because of its coinsurance feature (that is PMIs are obligated to absorb credit losses up to a certain threshold, after which GSEs step in); by contrast, deficiency judgments had no significant impact on the recovery rate for FHA-insured mortgages because of a lack of coinsurance arrangement (FHA is obligated to absorb 100 percent of credit losses for the mortgages it insures).

Second liens as a substitute for PMI. Second lien piggyback loans, which were widely used as a cheaper substitute for PMI during the housing bubble, provide some benefit to both borrowers and lenders, but also come with higher risks. Calhoun (2005) found that piggyback loans enable borrowers to own a home without having to pay a large downpayment or the more expensive PMI premiums. Meanwhile, lenders earned additional origination fees on the second mortgages as profits at the expense of PMI. Calhoun cautioned, however, that piggyback loans were also risky for both borrowers and lenders, because they provided 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 substantial decrease in the use of PMI. A comparison of single-lien and multiple-lien households found that single-lien households tend to be slightly stronger financially than households with multiple liens. This study also found that absence of PMI can increase loss severity for lenders, because the proceeds from foreclosure can often be less than the sum of outstanding mortgage balance and other foreclosure costs incurred by lenders. Furthermore, the presence of a second lien often makes it difficult to restructure troubled loans. A key takeaway from this study 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 those originated at the same time as the first mortgage, can significantly increase the probability of borrower default. Leventis (2014) showed 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 increases the risk of default. Second, second liens increase the monthly debt expense that borrowers face. Elul et al. (2010) produced estimates of the impact of second liens on first-lien performance and found that the propensity of borrowers to default in a given quarter was about one quarter of a percentage point greater for borrowers with a second lien than those without one. Lee, Mayer, and Tracy (2012) compared the performance of second lien mortgages originated at the same time as the first lien with those originated later and found that contemporaneous second liens—presumably because they were used to bypass PMI—defaulted at significantly higher rates during the bubble years.

Protecting Lenders Against House Price Declines

With the collapse of house prices nationwide, subsequent double-digit unemployment rates, and a huge wave of defaults and foreclosures, the recent crisis also highlighted the role of market risk, that is, the risk of house price declines, faced by mortgage lenders. House price decline is a key driver of loss severity as discussed in the section on Protecting Lenders Against Loss Severity, and there exists a rich body of literature on house price risk and its relationship to default and foreclosure behaviors. Literature also shows that there are potential downpayment substitutes that can protect lenders specifically from the risk of declining house prices. Accordingly, in this section, we first discuss literature related to the house price risk faced by lenders followed by a description of two potential downpayment substitutes that could help mitigate this risk—house price index futures and home equity insurance.

We note that both these substitutes are largely new, untested, and conceptual. These products should be viewed more as opportunities for future product development as opposed to substitutes that can be deployed today. In addition, both these substitutes are similar to PMI and FHA insurance in the sense that they both ultimately protect lenders from loss severity. They are also different, however, in the sense that, unlike FHA and PMI—which pay claims only in the event of borrower default—these substitutes can offer protection regardless of whether the borrower is current or delinquent.

Defaults are more likely to occur for loans with a high initial LTV ratio, because a small downpayment provides little cushion against negative equity when property value declines. Similarly, risk of default increases when the value of the house falls below the remaining mortgage balance. Therefore, given a high LTV ratio, a sharp decline in property values could lead to a higher risk of default. Deng, Quigley, and Van Order (1996) used Freddie Mac loan-level data to estimate default and prepayment equations in a proportional hazard framework. The

authors found that default decisions were sensitive to both LTV at loan origination and the mark-to-market LTV ratio. Furthermore, this paper showed that the cost of offering low or zero downpayment mortgages to low-income borrowers would depend heavily on the assumption of future house price appreciation.

House price volatility varies with time and geography (Engelhardt, 2003; Van Zant and Rohe, 2011). Although the U.S. housing market as a whole tends to be stable, local housing markets can be volatile (Li and Yang, 2010). Even large lenders with geographically diversified loan portfolios faced very high market risk during the recent housing bust when home prices declined nationwide.

One of the most commonly cited causes of the current foreclosure crisis is the mass origination of mortgages that many borrowers ultimately were unable to afford and sustain. Many subprime loans originated between 2003 and 2006 were characterized by high LTV ratios and nontraditional amortization schedules, such as interest-only mortgages. Low downpayments and delayed amortizations cause payments from borrowers to lenders to be back loaded compared with standard loans. By lowering payments initially, these features made it possible for more households to obtain the financing necessary to purchase a house. At the same time however, because these contracts were characterized by little accumulation of home equity early in the life of the loan, they were more prone to default when house prices fell. Gerardi et al. (2010) found that mortgages issued between 2005 and 2006 with high leverage and nontraditional amortization schedules defaulted at much higher rates than other loans once house prices began falling in late 2006.

Corbae and Quintin (2013) developed a model where households choose from mortgages with different downpayments and choose whether to default given certain income and housing shocks. By approximating housing market trends before and after the crisis, the model suggested that the increase in low downpayment mortgages originated before the crisis can explain more than 60 percent of the rise in foreclosure rates. The authors attributed this finding to two reasons. First, more borrowers with low downpayments will find themselves in negative equity following the price shock. Second, the relaxing of underwriting standards enables risky borrowers with low incomes and assets to select themselves into the market, thereby raising the aggregate risk level.

Garriga and Schlagenhaut (2009) developed a similar equilibrium model of long-term mortgage choice and default to understand how an increase in leverage exposes homeowners to additional risk in the event of a decline in house prices. The model captured the pattern of foreclosure rates across loan products and found that the decline in house prices can account for most of the observed increase in the foreclosure rate nationwide. These findings are consistent with the regional example studied by Gerardi et al. (2010). That study, focused on the Massachusetts housing market, found that subprime borrowers are six times more likely to end up in foreclosure than prime borrowers. Gerardi et al. further added that the dramatic increase in Massachusetts foreclosures during 2006 and 2007 could be largely attributed to the decline in house prices that began in the summer of 2005.

Bajari, Chu, and Park (2008) estimated a dynamic model of default behavior for subprime loans and found that the decline in home prices was the main driver of default. They also found that the increase in borrowers with low downpayments was another important driver. Palmer (2014) used an instrumental-variable method to establish a causal relationship between price declines and defaults and concluded that if 2006 borrowers had faced the same prices as the average 2003 borrower that the annual default rate would have dropped from 12 percent to 5.6 percent.

Substitute: Home Price Index Futures

In 2006, CME Group, Inc. announced the launch of Home Price Index Futures and Options—a financial derivative product designed to allow investors to profit from rising house prices, or buy protection against falling house prices, without actually buying or selling properties. This derivative product is based on the empirical framework presented by Case, Shiller, and Weiss (1995). The framework showed that home foreclosures can be predicted by movements in home prices and that derivative products based on house price movements could provide a vehicle for hedging house price risk. Jud and Winkler (2009) added that index futures and options based on house prices could allow individuals and financial institutions, such as lenders and builders, to lay off some of their house price risk, potentially making them good substitutes for the downpayment function of protecting lenders from house price decline. Because of very limited liquidity, trading volume, and large bid-ask spreads, however, this market remains largely untapped (Tokic and Tokic, 2008). Research geared toward identifying the causes of low liquidity in this market and, more importantly, steps that could be taken to address it would be a much needed addition to the literature.

Substitute: Home Equity Insurance

Shiller and Weiss (1999) described a more industry-friendly version of home price index futures as a follow up to Case, Shiller, and Weiss (1995). Offered as a more traditional insurance product, home equity insurance would provide protection against falling house prices in exchange for an insurance premium. The insurer would manage its underwriting risk by using home price futures, in essence shielding the insureds from the intricacies of hedging in the futures market. This arrangement could make it easier for homeowners and lenders worried about falling house prices to buy protection for a price, once again helping replicate the role of downpayment in mitigating house price risk for lenders. Because this product is based on home price index futures, however, it suffers from the same liquidity and trading problems described previously. Shiller and Weiss (1999) highlighted several other impediments this product faces.

- Selection bias—only those who pay too much for a house or those who expect price declines would buy insurance.
- Cancellation—homeowners might cancel the insurance policy just when house prices rise on the theory they do not need insurance any longer, resulting in a loss to the insurer.
- Moral hazard—the presence of insurance could reduce the homeowner’s incentive to maintain the house.
- Value of index futures based on metropolitan statistical area-level or city-level house prices could deviate substantially from the price of the insured home given the localized nature of housing. This deviation could create unexpected losses for home equity insurers.

Conclusion

In this report, we studied the role of cash downpayment as a way for borrowers to demonstrate creditworthiness and for lenders to obtain protection against credit losses. We also reviewed literature on other instruments and structures that can replicate or satisfy certain functions of downpayments, and that therefore may be useful alternatives for borrowers who lack downpayments sufficient for that function or for lenders seeking protection against losses. The current state of the literature strongly suggests that cash downpayment is the single most effective mechanism for achieving both these objectives.

The literature also shows, however, that several downpayment substitutes can, to varying degrees, mirror some of the functions of the cash downpayment. These substitutes can be especially useful for low- and moderate-income borrowers and also for first-time homebuyers who want to buy a home but have difficulty purchasing because of insufficient downpayment savings. For example, the literature shows that borrowers with higher incomes, residual incomes, and reserves could use those assets to demonstrate the capacity to repay, in lieu of a cash downpayment, without necessarily exposing lenders to greater risk of default. Lower income borrowers on the other hand can benefit from products like IDAs and CLTs, which package multiple strategies—such as counseling, conservative underwriting, and other incentives—into a single substitute to achieve sustainable homeownership outcomes. IDAs and CLTs, however, have faced continued financial and operational constraints that have limited their true potential. The literature also strongly indicates that borrower counseling is a highly valuable educational tool that can help borrowers at different stages of homeownership, from prepurchase to postpurchase to foreclosure.

Our review also indicates that mortgage insurance, both FHA insurance and PMI, offers lenders a substantial degree of credit enhancement by absorbing losses should the proceeds from property disposition fall short of the outstanding mortgage balance. In addition, both PMI and FHA insurance enable households that do not have enough savings for a downpayment, but still desire homeownership, to fulfill their dream of owning a home. While both PMI and FHA insurance generally benefit the entities that own the insured loans (lenders or the GSEs, in the form of claim reimbursements), an additional and a unique benefit provided by FHA is its countercyclical role in ensuring an uninterrupted supply of mortgage credit through good economic times and bad. The literature shows that FHA's countercyclical role provides a critical floor for house prices, which in turn mitigates the magnitude of loss faced by all lenders, in addition to acting as a stabilizing agent for the broader economy.

We also reviewed the viability of more recent innovations, such as house price futures and home equity insurance, as substitutes for downpayment. The literature on these instruments, not surprisingly, is thin. Nonetheless, for various reasons, capital market liquidity of home price futures suffers from very low trading volumes and high bid-ask spreads, making insurance price discovery extremely difficult, if not impossible. Although more empirical research on these instruments would be certainly valuable, it may also be useful for policymakers and regulators to explore ways to incentivize firms to consider pilot implementations of these products.

There are also lessons to be learned from the literature about what does not work. There is wide agreement that certain financing instruments previously used as substitutes, such as seller-funded downpayment assistance programs and piggyback second liens obtained for the sole purpose of bypassing PMI, can significantly increase the risk of default unless adequate compensating

factors are present at the time of underwriting. Similarly, the literature also shows that mortgages with buydown features, especially when buydowns are financed by sellers, tend to default at higher rates than mortgages without buydowns.

Perhaps the most significant takeaway from this literature review is that most substitutes discussed here, with the exception of IDAs and CLTs, are individually unlikely to offer an adequate degree of credit enhancement. Given that different substitutes serve different functions, some more effectively so than others, overreliance on any single or set of substitutes could either expose lenders to greater risk or unnecessarily disqualify borrowers who might otherwise have qualified through other substitutes. To strike the right balance, underwriters need to use a mix-and-match approach that combines complementary substitutes to achieve a level of loss protection that is commensurate with the underlying risk.

Appendix A

Mapping Between Downpayment Substitutes and Downpayment Functions

	Demonstrates borrower commitment, capacity, and creditworthiness					Protects lenders from losses in the event of default			Protects lenders against prepayment
	Capacity and Willingness to Repay	Capacity and Willingness to Pay for Assistance and Unanticipated Events	Commitment to Home Ownership	Skin in The Game	Protecting Lenders Against Probability of Default	Protecting Lenders Against Loss Severity	Protecting Lenders Against Prepayment		
Cash Down Payment	Keynes (1936) and Browning and Lusardi (1996); Lee and Steiner (2007); Harris et al. (2002); Lusardi and Mitchell (2008); Harrison et al. (1996); Lusardi and Mitchell (2007); Collins et al. (2015); Harrison et al. (2004); Brunckner (2000); Karlan et al. (2014); Bryan, Karlan and Nelson (2010); Hayashi (1985)	Li and Yang (2010); Megbolugbe and Linneman (1998); Coulson (1995); Coulson and Seccombe (2000)	Rossi (1980); Megbolugbe and Linneman (1998); Pennie-Moat (1977); Morduch (1988); Kuyama and Seki (1989); Haurils et al. (1996); Shiener (1993); Yoshikawa and Ohtake (1989); Engelhardt (1994);	Li and Yang (2010); Theodos, Stutz, Morrison (2013); Miller (2011); Goodfman and Zhu (2014); Agarwal, et al. (2014)	Quercia and Stagnin (1992); Von Furstenberg (1993); 1970s, 1970s; Williams, Bearek and Kencel (1983); Forder and Van Order (1984); Vandeik and Thibodeau (1985); Epperson et al. (1984); Quigley and Van Order (1991); Campbell and Cocco (2015); Goodman et al. (2010); Bhutta et al. (2011); Foote et al. (2008); Foster and Van Order (1984); Deng, Quigley, and Van Order (1996); Deng, Quigley, and Van Order (2003); Forder et al. (2003); Genardi et al. (2009); Jam et al. (2013); Agarwal, Green, Rosenblatt and Yoo (2014); George, Goodman and Zhu (2014);	Evans, Maris, and Weinstein (1985); Chaurite (1990); HUD (2013); Quigley and Van Order (1993);	Deng, Quigley and Van Order (1996); Engelhardt (2009); Li and Yang (2010);		
Borrower Credit History	Agarwal et al. (2010); Vantage (2013); Pendley et al. (2007)	Guo and Tracy (2006); Li and Yang (2010)							
Borrower Income and Residual Income	Freddie Mac (2011); Ching (1994); Carroll (1998); Harris et al. (2002); Harris et al. (1996); Goodman et al. (2014); Pendley et al. (2007)								
Individual Downpayment Accounts	Han, Grinstein-Weiss and Sheridan (2007); Similek, Lohb and Bird (2009); Aspen Institute (2003); Weber and Smith (2001); Adams (2005)		Mills et al. (2004); Herbert and Tsien (2007); Lalib and Bird (2009); Han, Grinstein-Weiss and Sheridan (2007); Grinstein-Weiss et al. (2011)		GFEC (2008)				
Borrower Reserves	Corbett (2015)				Reid (2013);				
Counseling		Collins and O'Rourke (2011); Wind and Zorn (2001); Ziedt and Rohle (2011); Melber (2012)	Wind and Zorn (2001); Agarwal et al. (2009);		Wind and Zorn (2001); Mayer et al. (2009); Cuervo and Spader (2008);				
Community Land Trusts			Housing Assistance Council (1993); Thaden and Rosenberg (2010); Theodos et al. (2015); Thaden (2012); Weiss (2005)		Thaden and Rosenberg (2010);				
Short Term Mortgage Products				American Enterprise Institute (2014); Seidman et al. (2014); Cotterman (1992); Walden (1991);					
Shared Appreciation Mortgages				Morrongiello and White (2006); Davis (2006); Theodos et al. (2015); Jacobus and Davis (2010); Temkin, Theodos, and Price (2013); GAO (2005); Kelly (2008); Lee and Steele (2007); Collins (2015); Orlor and Barrett (2006); Engelhardt and Mayer (1995); Cotterman (1992);					
Down Payment Assistance									
Mortgage Insurance (PMI, FHA, Section 801)									
Home Price Futures									
Home Equity Insurance									

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