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The Potential and Limitations of Mortgage Innovation in Fostering Homeownership in the United States

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Abstract

This article presents an empirical analysis of mortgage innovation as a vehicle to enable renters, especially those from traditionally underserved populations, to realize homeownership. It examines the financial and underwriting criteria of a typology of mortgage products, from those adhering to historical standards to some of today's most liberal loans, and develops synthetic models to account for all direct purchase costs. These models are calibrated using 1995 data on renter demographic and financial characteristics from the Survey of Income and Program Participation.

Compared with historical mortgages, today's more innovative loans increase the number of renters who could hypothetically qualify for homeownership by at least a million and expand potential home-buying capacity by $300 billion. Certain policies could greatly expand the potential gains. Nevertheless, even the most aggressive innovations can play only a limited role in efforts to deliver the material benefits of homeownership to underserved populations.

Keywords: Affordability; Mortgages; Underserved populations

Background and introduction: Homeownership in the United States and strategies to assist the traditionally underserved

Homeownership has long been associated with alleged economic and social advantages and considered to embody the "American Dream" (Rohe and Stegman 1994a, 1994b; Rohe and Stewart 1995; U.S. Department of Housing and Urban Development 1995, 1996; Wright 1981), but it is a dream that is unevenly attained. Racial and ethnic minorities are much less likely than the rest of the population to be homeowners (Long and Caudill 1992; Wachter and Megbolugbe 1992). As of the fourth quarter of 2000, the white (non-Hispanic) homeownership rate in the United States was 73.9 percent—much higher than the 47.8 percent rate for black households and the 47.5 percent rate for Hispanic households (U.S. Bureau of the Census 2001).

These racial and ethnic group disparities are the result of a complex set of economic, historical, institutional, and other (e.g., demographic) factors (Gyourko and Linneman 1993, 1997; Gyourko, Linneman, and

Wachter 1996). Historically, the nation's housing finance system was designed to serve predominantly the needs of white middle- or upper-income, nuclear families (Jackson 1985; Wright 1981). Economic barriers—minorities' lower income and wealth, levels of intergenerational wealth transfers, and upward class mobility—continue to suppress the homeownership rate of blacks and Hispanics (Gyourko, Linneman, and Wachter 1997). Moreover, there is evidence that racial discrimination and culturally related barriers persist in various forms in the housing and mortgage markets (Horne 1993; Hunter and Walker 1995; Ladd 1998; Munnell et al. 1996; Ratner 1997; Turner 1992; U.S. Department of Housing and Urban Development 1991; Yinger 1995, 1998).

Despite the barriers, numerous forces have prompted the recent broadening of access to homeownership financing. There is heightened enforcement of the Fair Housing Act, the Equal Credit Opportunity Act, and sister provisions to curb discrimination (Federal Reserve Bank of Boston 1993; Vartanian et al. 1995). The Community Reinvestment Act (CRA) has also prompted change (Fishbein 1992). Enacted in 1977 and since amended, the CRA requires financial institutions to meet their community's need for credit in low- and moderate-income neighborhoods, consistent with the safe and sound operation of the institution (Fishbein 1992). Fannie Mae and Freddie Mac, the government-sponsored enterprises (GSEs) that are the preeminent forces in the nation's secondary mortgage market, have also been called on to broaden access to mortgage credit and homeownership. The 1992 Federal Housing Enterprises Financial Safety and Soundness Act (FHEFSSA) mandated that the GSEs increase their acquisition of primary-market loans made to lower-income borrowers and to areas not served by private mortgage credit institutions (Can and Megbolugbe 1995; Carr et al. 1994a, 1994b). Spurred in part by the FHEFSSA, both GSEs embarked on multitrillion-dollar campaigns to help finance new homeowners in underserved populations and neighborhoods (Fannie Mae 2000).

The result has been a wider variety of innovative mortgage products. The GSEs have recently introduced a new generation of affordable, flexible, and targeted mortgages, thereby fundamentally altering the terms on which mortgage credit was offered in the United States from the 1960s through the 1980s (Gyourko, Linneman, and Wachter 1997; Linneman and Wachter 1989; Listokin and Wyly 1998). Moreover, these secondary-market innovations have proceeded in tandem with shifts in the primary markets: Depository institutions, spurred by the threat of CRA challenges and the lure of significant profit potential in underserved markets (two-thirds of new households between 2000 and 2010 will be minority), have pioneered flexible mortgage products (Listokin et al. 2000; Schwartz 1998).

The purpose of this article is to measure the effects of more flexible and affordable home financing ("mortgage innovation") on access to home-

ownership by renters, especially racial and ethnic minorities, low- to moderate-income (LMI) families, recent immigrants, and others referred to as traditionally underserved populations.[1] We use mortgage simulations based on research conducted from 1998 through 1999 to estimate the number of renters, especially those traditionally underserved, who could qualify for homeownership with contemporary mortgages that permit low down payments, higher debt ratios, and other liberal underwriting criteria. The simulations are based on a customized mortgage-underwriting program calibrated with household data from the U.S. Bureau of the Census' (1996) rich database, the Survey of Income and Program Participation (SIPP). To place today's broadened homeownership reach in perspective, we consider, in parallel, the number of renters who could realize homeownership under a typical historical mortgage product.

Our study does not address the question of mortgage-market discrimination. We start with the observed differences in homeownership attainment described earlier and, holding aside its complex causality, consider how mortgage innovation can be used to increase homeownership, especially among minority, LMI, and immigrant households. While we recognize that homeownership is not for everyone (e.g., lifestyle renters; see Varady and Lipman 1994) and that it would be counterproductive to bring marginally qualified families to homeownership if they would fail shortly thereafter, it is instructive to establish the baseline potential of renters to realize homeownership.

Literature review

Our approach both builds from and extends prior literature on mortgage simulation and other relevant studies (Bogdon and Can 1997; Duca and Rosenthal 1994; Galster, Aron, and Reeder 1999; Gyourko and Tracy 1999; Herbert 1995; Linneman and Megbolugbe 1992; Zorn 1989). In a recent paper, Calhoun and Stark spoke of "synthetic loan underwriting simulations as studies determining the number of households that would qualify to purchase a home under various mortgage assumptions" (1997, 3–4). The most relevant synthetic underwriting research has been produced by the National Association of Home Builders (NAHB) (1997), the National Association of Realtors (NAR) (1998), Savage (1997, 1999), Savage and Fronczek (1993), and Calhoun and Stark (1997). Another relevant study by Galster et al. (1996) examined the potential size of the homeownership market. Each of these studies is examined in the next section.

[1] Researchers have considered various aspects of the underserved market. Carr et al. (1994a), for example, analyzed the spatial distribution of loans acquired by Fannie Mae and Freddie Mac to define underserved and served mortgage markets. (See also Can and Megbolugbe 1995 and Carr et al. 1994b.)

Prior studies

Industry estimates of housing affordability

The intent of the NAHB and NAR work is to develop indices—the NAHB's Housing Opportunity Index (HOI) and the NAR's Housing Affordability Index (HAI)—of relative housing affordability over time and by place (Feroli 1998; Kochera 1997, 1998). The higher the HOI and HAI values, the greater the housing affordability. The HOI and HAI tap a variety of data sources and include numerous underwriting considerations. However, each measure has limitations. The HAI considers the affordability of only median-priced housing (the HOI considers the distribution of home prices), and both the HAI and HOI limit their affordability analysis to median-income families.[2] Further, the HOI and HAI approaches were never intended to be comprehensive financial underwriting models. The HAI considers only principal and interest (PI) payments as part of the housing expense to income (front-end) ratio. It omits property taxes (T), property insurance (I), and mortgage insurance (MI), all of which are included in typical front-end ratios used by underwriters.[3] Typical mortgage qualification processes also consider the combination of housing and other debt as a share of income; this is commonly known as the back-end ratio. Neither the HAI nor the HOI factors in the back-end ratio. These indices also exclude consideration of renter assets, credit profiles, and other important factors. In short, the HOI and the HAI serve their intended role as rough gauges of relative affordability over time and by place but do not offer the more refined synthetic underwriting approach we seek.

Savage and Fronczek's estimates

Savage (1997, 1999) and Savage and Fronczek (1993) offer a more expansive analysis in their *Who Can Afford to Buy a House* periodic series, which analyzes affordability for all owners and renters using the SIPP. Housing affordability is gauged for a range of six alternatively priced units, which Savage and Fronczek (1993) call *criterion homes,* that is, units priced at various ranges: the median, 25th percentile (*modestly priced* house), 10th percentile (*low-priced* house), new housing, and so on. The authors specify a criterion home and then determine its affordability on the basis of a potential buyer's financial profile (income, debt, and assets). They also calculate the maximum home affordable based on the applicant's financial characteristics.

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[2] One HAI variation, for first-time home buyers, targets units priced at 85 percent of the median and uses the median income of families with heads of household ages 25 to 44.

[3] The HOI compensates, in part, for this by applying a 25 percent front-end maximum ratio that is lower than the typical maximum allowed (28 percent).

Savage and Fronczek's (1993) financial model is comprehensive. Two alternative mortgage instruments—conventional and Federal Housing Administration (FHA)—are factored in, and all of the components of the front-end ratio (PI, T, I, MI) are calibrated. Existing debt is considered as well (thereby permitting the calculation of a would-be buyer's total debt obligations and back-end ratio), as are mortgage down payment requirements and closing costs.

Much valuable information is contained in this analysis, which is critically important to the field. However, this research has some limitations. Credit record—an important underwriting consideration, especially for those at the economic margin—is not considered. Additionally, although dual mortgage instruments—conventional and FHA—are incorporated, there is a much richer mosaic of loan products with respect to varying loan-to-(property) values (LTVs), front-end and back-end ratios, credit acceptability, and the like. Finally, the use of criterion-priced homes is also limiting. Although the use of six criterion homes is preferable to, say, the HAI's unitary median-priced property, the appropriate linkage between these levels of housing consumption and various household types and incomes (Follain 1999) remains unclear. For example, what is the appropriate home for a middle-aged household earning twice the median income? Should the association here be to the median-priced criterion home, a new house, or perhaps an upscale unit?

Calhoun and Stark's approach

In their 1997 paper titled "Credit Quality and Housing Affordability of Renter Households," Calhoun and Stark describe an approach to specify the *reference* house price—that is, the appropriate pairing of a given household to a given housing unit. These authors apply multivariate regression to National Survey of Families and Households data to specify reference house prices that can be reasonably paired with different renters based on the observed housing consumption behavior of similarly situated owners. Thus, a better-educated, higher-income renter living in a more affluent area would be linked to a more expensive reference house than a less educated, lower-earning renter residing in a less affluent location.

Next, the maximum-priced home affordable to each renter household is calculated by linking the household's financial resources to mortgage terms. The authors assume a 30-year fixed-rate mortgage with a range of terms (LTVs, front-end and back-end ratios, and interest rates), not the specific requirements of actual mortgage products. The confluence of these items and the renter household's financial resources produces the maximum-priced housing unit affordable to each renter. The target-priced home for each renter household—that is, the one based on historically observed consumption by comparable owners—is then compared

with the maximum-priced unit affordable to the renter household to see whether it can attain homeownership.

Calhoun and Stark (1997) have advanced the discussion on the subject, and our research model is grounded, in part, on their conceptual framework. Still, their analysis has some limitations. In their financial calculations, they did not factor in closing costs, which are not inconsequential outlays (Caplin et al. 1997), and there is also a far-from-transparent identification of the individual housing costs (PI, T, I, and MI) included in the front-end ratio.

The Galster et al. model

Galster et al. suggest an alternative approach for specifying the reference-price house in their 1996 study entitled *Estimating the Number, Characteristics, and Risk Profile of Potential Homeowners.* This important analysis developed a model that predicted the likelihood of renter households moving into homeownership during an 18-month span. In formulating that model, the basis was the observed behavior of white, suburban renters—those thought to be the least constrained in buying a home. The renter-to-homeowner transition of the white suburban subgroup was then applied to all households to gauge the potential overall homeowner market. In 1996, Galster et al. projected that just over 600,000 renter households (2 percent) would become homeowners over an 18-month span if the underwriting practices found in white suburban areas were employed uniformly across the nation.

This is significantly different from Calhoun and Stark's (1997) model, which pairs a household with a reference-price house based on the observed consumption patterns of owners in the same racial/ethnic group. Thus, if minorities in the past bought lower-priced homes, then minorities are paired with the same reference-price house in the affordability analysis. By contrast, Galster et al. (1996) model potential behavior on the basis of the consumption patterns of the least-constrained population—white suburbanites who entered the homeownership market in the favorable economic and housing market conditions of the mid-1990s—and thus pair minority renters with the higher-priced housing sought by white renters in the suburbs. This reveals the size of the unserved market in a scenario free of all discrimination.[4]

[4] Other researchers have grappled with the issue of pairing certain types of housing in terms of price, amenities, location, and so on with various categories of households (e.g., minority versus majority; higher versus lower income). For instance, Linneman and Wachter (1989) related the housing services a family desires to purchase (with that capitalized value designated as V^*) as a function of the family's income (labeled as I) and a vector of preference variables labeled $\mathbf{X}$, with that overall relationship expressed as $V^* = V(I, \mathbf{X}; \mathbf{b})$, where $\mathbf{b}$ is a vector of parameters.

Context of the current investigation and prior literature

It is useful at this point to place our current investigation in the context of the relevant past literature and research.

1. Because the purpose of this study is to identify who is served and who is not served by mortgage innovation, we need to synthetically model the mortgage process as closely as possible.[5] For this reason, the HOI and HAI approaches do not suffice (they were not intended to perform such an application), but the work of others is more relevant.

2. We model our synthetic underwriting financial calculations on the *Who Can Afford to Buy a House* approach (Savage 1997, 1999; Savage and Fronczek 1993), the most comprehensive synthetic macroscale underwriting research done to date. Savage and Fronczek (1993) itemize the housing expenditures of the front-end ratio (PI, T, I, MI); include debt, so back-end ratio considerations can be incorporated; factor in closing costs; and approximate the realities of mortgage qualification in other ways.

3. We augment these financial calculations by applying synthetic underwriting for a menu of mortgages organized by a typology of loans described shortly. By comparison, Savage and Fronczek (1993) incorporated only two mortgage types: conventional and FHA. In this regard, our work functionally resembles the wide range of mortgage terms incorporated by Calhoun and Stark (1997), although we target specific mortgage products and they did not.[6]

4. While our financial analysis is an expanded version of this basic approach, we depart from Savage and Fronczek somewhat with respect to the benchmark housing used in analyzing affordability. These authors measure housing affordability with respect to the household's ability to purchase a benchmark (criterion) home and through dollar values (a mean- or median-priced affordable home under different mortgage products). We use a dollar measure of home-buying capacity and present affordability estimates for criterion homes

[5] The study estimates the number of renters who would be *served* by the various loan products—that is, the number of renter families that would qualify for a home purchase loan given the confluence of the families' financial resources and the terms of the respective mortgages. Renters not realizing homeownership from the alternative loan products are referred to as the *unserved*.

[6] We further augment the Savage and Fronczek (1993) (and Calhoun and Stark [1997]) analyses by incorporating credit record information into the synthetic underwriting. Since our credit data and credit score assignment have severe limitations, our credit underwriting must be regarded as an exploratory effort to be refined in the future. (We do not report on our simulation results using credit data in this article.)

priced at the metropolitan median, as well as estimates for modestly priced homes (25th percentile) and low-priced homes (10th percentile).[7] Yet as discussed earlier, such an arbitrary price-point approach does not consider the appropriate-shelter frame of reference for any given family. We therefore also link a renter family to a housing unit based on observed consumption, as introduced by Calhoun and Stark (1997) and others (e.g., Linneman and Wachter 1989). Our basic consumption model identifies the price of the housing unit each renter family would seek if its behavior conformed to the behavior of comparable renters who previously moved to homeownership. The unit with a price calibrated in this way is termed the *target house*. We note, however, that target prices would be higher if the Galster et al. (1996) approach were used; this is based on the housing consumption of white renters and would be appropriate in a world unconfounded by historical racial and other barriers.

5. Our analysis also uses the SIPP. We use it because it has rich information on income, debt, and assets that is particularly useful for a mortgage simulation. Our analysis focuses on the financial (income, asset, and debt) profile of renter families, defined here as related individuals residing together or persons living alone. Our information on families comes from the 1993 SIPP—the latest release available when we conducted the analysis. We use the seventh-wave panel of the 1993 survey, which reports information for 1995. Our data set contains 25,762,939 renter families (as we define them) in the United States. Our estimate varies from the 1995 American Housing Survey (AHS)[8] estimate for the total number of renters (34,150,000) for several reasons. First, we counted renter families while AHS counted renter *households*. Second, the AHS estimate is the total number of renter households in 1995. Our estimate is for families who were renters in 1993 *and* continued to be renters in 1995. Thus, for our purposes, anyone who owned a home in 1993 but rented one in 1995, or who entered SIPP after 1993, or who was under 18 in wave one would not be counted as a renter in 1993.

6. Our analysis of home-buying capacity is for all renters as a group and for all renters by race/ethnicity. In so differentiating renters, we parallel the approach of Savage and Fronczek (1993), Calhoun and Stark (1997), and Galster et al. (1996). Our race/ethnicity categories are non-Hispanic white, non-Hispanic black, non-Hispanic other, and Hispanic. These race/ethnicity groupings include both

[7] While Savage and Fronczek examine six different criterion homes, our investigation will use three that span the more modestly priced housing spectrum.

[8] The AHS figure is taken from the 1995 AHS, table 2–1. Introductory Characteristics—Occupied Units, p. 42 (U.S. Department of Housing and Urban Development 1997).

native-born Americans and immigrants (people not born in the United States, regardless of when they arrived). In addition, we present numbers for *recent* immigrants, defined as those renter families whose householder entered the United States after 1984.[9] The immigrant category is a subset of all renters and is not differentiated by race/ethnicity.[10]

7. Our analysis of the served versus the unserved is applied at the national level because the sample size is not large enough to differentiate mortgage simulations at a more microgeographic level (e.g., metropolitan statistical area [MSA]). While we do not report separate results at the MSA level, we, like Savage and Fronczek (1993), do incorporate important geographic distinctions in our analysis. In gauging homeownership, we incorporate differences in housing prices and renter incomes across the four census regions and nine census divisions.[11] We also incorporate area distinctions in property tax rates, closing costs, and other home-buying expenses for eight major and geographically dispersed MSAs: Atlanta, Chicago, Houston, Los Angeles, Miami, New York, Philadelphia, and Washington, DC. These area variations, however, are internal to the calculations, and our findings are reported only on an aggregate national basis.

Simulation framework and models

Our overall simulation framework and the data used to calibrate its component models are summarized in figure 1. The framework comprises three major models. The *Housing Consumption Model* estimates the price of the housing unit that each renter family would seek if its behavior conformed to that of all first-time home buyers entering the market in the mid-1990s. This model yields a target or reference unit of housing consumption for each renter family. To provide comparability with Savage and Fronczek (1993), criterion-priced homes are considered

[9] The SIPP uses the following categories to define periods of immigration: (1) 1911–59, (2) 1960–64, (3) 1965–69, (4) 1970–74, (5) 1975–79, (6) 1980–81, (7) 1982–84, and (8) 1985–93. Our recent immigrant groups are those indicating response (8) above.

[10] Non-Hispanic white, non-Hispanic black, Hispanic, and non-Hispanic other renter families are discrete. Combined, they sum to all renter families. Recent immigrant families, those entering the United States after 1984, overlap with the previously listed race/ethnic groups (e.g., non-Hispanic whites and non-Hispanic blacks).

[11] The census areas include the Northeast Region (New England and Middle Atlantic Divisions), Midwest Region (East, North, Central, and West North Central Divisions), South Region (South Atlantic, East South Central, and West South Central Divisions), and West Region (Mountain and Pacific Divisions).

here as well. The target or criterion home thus provides the reference or benchmarked unit of housing consumption. The *Mortgage Model* uses alternative mortgage instruments to estimate the maximum purchase price for which each renter family could qualify based on its financial characteristics. This also provides other measures of home-buying capacity for each mortgage product, such as the aggregate value of housing that could be purchased. Finally, the *Housing Affordability Analysis* model compares a family's reference house prices with the maximum-priced house for which that family could qualify and applies other measures of affordability.

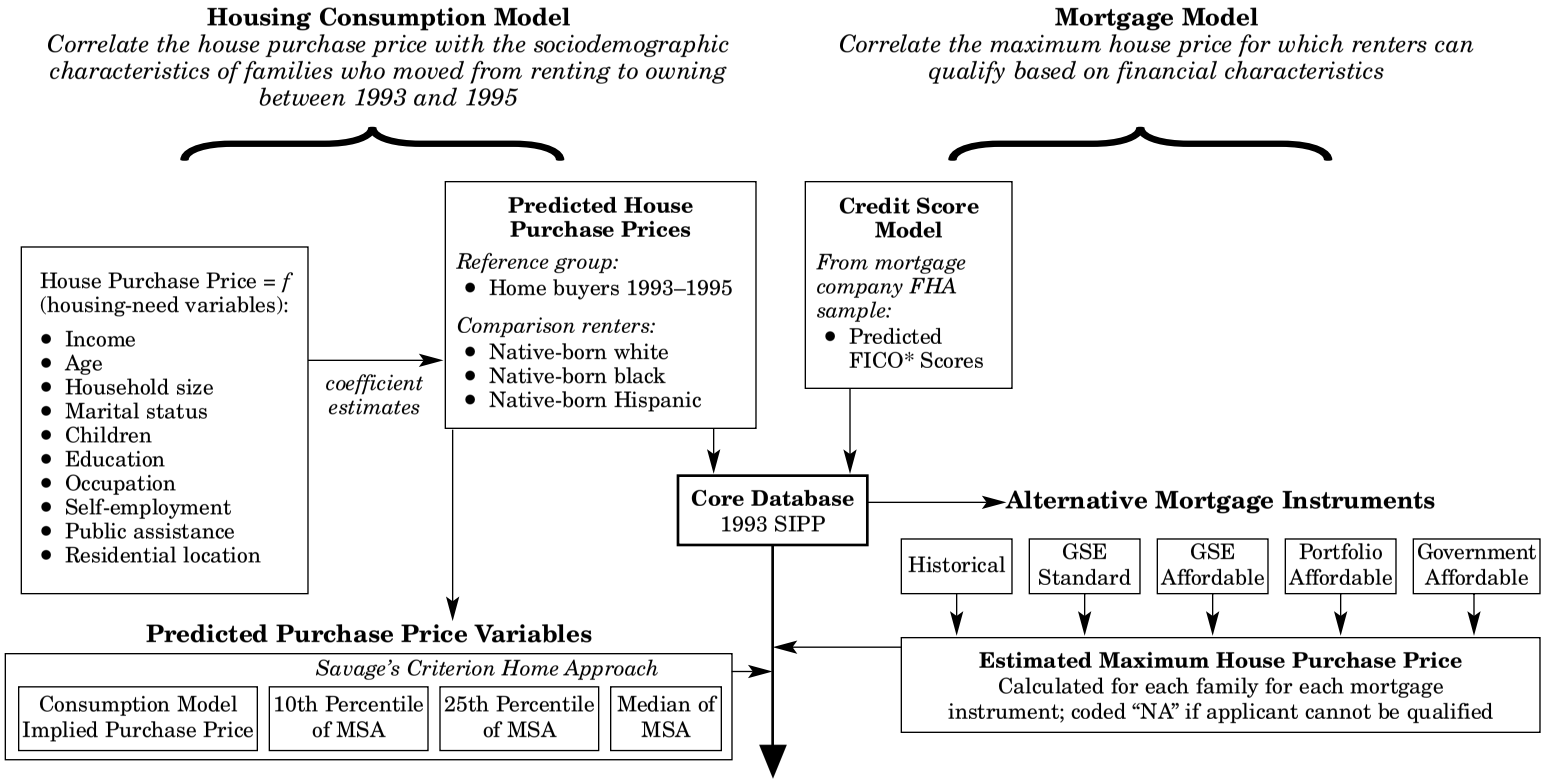
The overall simulation framework provides a measure of reference home-buying capacity because it establishes a benchmark (individually calibrated target or price-point criterion home) and then determines whether that referenced housing unit can be afforded, given the confluence of the renters' financial profile and the mortgage terms. There is much to be gained from such an approach; by establishing a benchmark, we have a point of reference by which we can gauge achievement. If the renter family can afford the reference home with a given mortgage product, it is served; if not, it is unserved. Thus, the loan product may be judged in terms of its capacity to allow the renter family to achieve the housing benchmark.

In addition to the reference home-buying capacity, our affordability analysis includes absolute home-buying capacity, which provides monetized measures of the purchasing power afforded by the respective mortgage products. These measures include the total home-purchasing power of current renters under the different mortgage instruments, as well as the mean/median value of house prices affordable to renters using the respective products.

In measuring absolute home-buying capacity, we stipulate a threshold of consumption related to the "lumpy" and expensive consumption of housing: That is, we establish a minimum level of buying power required for inclusion in the absolute home-buying capacity measure. In this study, we stipulate the low-priced house as the minimum threshold. If, for example, the low-priced house costs $40,000, then buying power of $40,000 and up with no ceiling (unless otherwise indicated) would count toward the absolute home-buying capacity.

The absolute home-buying capacity builds off the Mortgage Model, which estimates the maximum purchase price for which each renter family could qualify, based on financial characteristics. A maximum purchase price estimate that exceeds the stipulated threshold equals the renter's total absolute home-buying capacity. The aggregate of each of these calculations constitutes the total absolute home-buying capacity. Mean/median values can be similarly derived.

Figure 1. **Housing Affordability under Alternative Mortgages: Overall Analytic Framework**



HOUSING AFFORDABILITY ANALYSIS:

1. *Reference home-buying capacity: a comparison of values from the Housing Consumption and Mortgage Models.*
2. *Absolute home-buying capacity: a tabulation of totals from the Mortgage Model.*

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Model calibration and analysis

Housing Consumption Model

The Housing Consumption Model builds on the work of Calhoun and Stark (1997), Galster et al. (1996), Gyourko, Linneman, and Wachter (1997), Jones (1995), Linneman and Wachter (1989), and other literature. The development of this model is described in a separate paper (Wyly et al. 1999) and a larger study reporting our methodology and findings (Listokin et al. 2001). In brief, after deciding to enter the homeownership market, a family chooses a desired level of housing consumption that is influenced by income (I), wealth (W), demographic and life course factors (X), and regional housing market conditions (R). These factors relate as follows:

$$H = f(I, W, X, R; \beta) \tag{1}$$

where f is commonly modeled in a linear regression framework. In our model, the dependent variable is defined as the natural log of house value, and we refer to H as the target house price that captures the various needs, financial resources, and housing market circumstances of different families.

Following the Calhoun and Stark (1997) approach, we predict the expected housing consumption of current renters, H, on the basis of the observed choices of all renters purchasing homes during the mid-1990s. The analysis involves three main procedures. First, we use the first and seventh waves of the 1993 SIPP files to identify families that moved from renting to homeownership between 1993 and mid-1995. (The 1993 SIPP contained a final sample of 4,565 renter families, of which 456 moved from renting to owning during the first and seventh waves of the survey.) Second, using the group that transitioned from renting to owning, we calibrate a regression model based on equation 1. Finally, the coefficients from this model are applied to the remaining renters in the core SIPP data set, providing an estimate of expected housing consumption for all renters in the sample. Together with the Savage (1997, 1999) approach that uses criterion homes, these target-priced homes are then used as the reference homes for each renter family.

The Housing Consumption Model, which develops the target-priced homes, certainly has limitations. On theoretical grounds, one may question the assumption that observed choices made by recent buyers can be used to describe the behavior of current renters, if they were to move into homeownership. On methodological grounds, the technique relies on a fairly small sample size of recent home buyers. Nevertheless, the target house price methodology provides a useful alternative to arbitrary criterion price thresholds. As with the simulations developed by Galster et al. (1996), our method is an explicit attempt to use the behavior of

recent home buyers as a critical benchmark by which to measure the effects of alternative mortgage market innovations.

Our larger study (Listokin et al. 2001) presents in detail the results of ordinary least-squares estimates of equation 1. It predicts the level of housing consumption that would be expected of current renters if they made the same choices as similar families that moved into homeownership during the mid-1990s. Demographic, regional, and financial variables are comparable to those used in similar studies of housing consumption and tenure choice (Calhoun and Stark 1997; Galster et al. 1996; Linneman and Wachter 1989; Quercia, McCarthy, and Wachter 1998). Diagnostics suggest a fairly robust fit for the model, in line with similar studies.[12]

The results from equation 1 allow us to predict desired housing consumption, which we term the *target house*. We assign or impute a target house price for each of the 4,109[13] remaining renter families in the 1993 SIPP. On the basis of the observed experience of first-time buyers who purchased a home between 1993 and 1995, the Housing Consumption Model suggests a median target-priced house of $85,210 and a mean price of $92,781 (in 1995 dollars). This median estimate stands at 75 percent of the median price of all existing single-family homes sold nationwide in 1995 ($112,900) (U.S. Bureau of the Census 1996). The gap reflects the higher purchase prices among trade-up home buyers, whose accumulated equity permits larger down payments and corresponding leveraging of income to purchase more expensive homes.

In addition to the target homes based on the Housing Consumption Model, we consider three criterion-priced homes: median, modestly, and low priced (see table 1).

Table 1. **Criterion-Priced Homes**

Type	National Weighted Median Price
Median priced (50th percentile)	$84,000
Modestly priced (25th percentile)	$58,500
Low priced (10th percentile)	$42,500

[12] The adjusted multiple coefficients of determination (0.59 and 0.60) are comparable to Calhoun and Stark's (1997) value of 0.45 and Quercia, McCarthy, and Wachter's (1998) value of 0.48.

[13] The 4,109 remaining renters are the difference between the starting figure of 4,565 renter families in the 1993 SIPP less the 456 that moved from renting to owning between the first and seventh waves of the survey.

The national modestly priced and low-priced criterion homes are, as expected, considerably less expensive than the national Housing Consumption Model–ascribed target price ($85,210 median). After all, renters buying homes typically want more than modest- or low-priced units. The national median-priced criterion home ($84,000) is just slightly less expensive than the median consumption-ascribed target figure ($85,210).

Prices of the criterion homes vary considerably by census region and division. For example, the low-priced unit is $75,000 in the Northeast Region–New England metropolitan division, while the low-priced home is $38,000 in the Midwest Region–East North Central metropolitan division. The array of target- and criterion-priced homes are the benchmarks to which we apply the Mortgage Model.

Mortgage Model

We consider alternative mortgage products in the form of a typology, described as follows:

1. *Historical Mortgage*—the standard mortgage as it existed through the two decades before 1990. This first mortgage type establishes the historical baseline, while the remaining groups are contemporary products.

2. *GSE Standard Mortgage*—loans conforming to the current (1990 and subsequent) standard mortgage guidelines of the GSEs.

3. *GSE Affordable Mortgage*—more affordable and flexible current loans developed by the GSEs that share characteristics such as high LTV ratios and credit flexibility. The GSEs use different programmatic terms for these loans, for example, the Fannie Mae Community Home Buyer's Program (CHBP), CHBP with 3/2 option (i.e., 3 percent minimum borrower contribution to the down payment; 2 percent additional amount allowed from gifts and grants), and Fannie 97, or Freddie Mac's Affordable Gold (AG), AG with 3/2 option, and AG 97. At the leading edge of this affordable group are products that were evolving at the time we conducted our research, which we term the Emerging GSE Affordable Mortgages. Examples are Fannie Mae's Flex 97 and Freddie Mac's Community Gold.

4. *Portfolio Affordable Mortgage*—more affordable and flexible current mortgage instruments that are held in portfolios by individual lenders. These loans typically exceed the parameters of the GSE

Affordable Mortgages.[14] Example products from the Bank of America are Neighborhood Advantage Credit Flex (requires a modest down payment) and Neighborhood Advantage Zero Down (requires no down payment for borrowers with strong credit).

5. *Government Affordable Mortgage*[15]—publicly backed loans, such as mortgages insured by the FHA (e.g., Section 203), which are often used by lower-income and minority borrowers.

The various mortgage typologies and the subsumed loan products differ in their financial characteristics and in their borrower and property underwriting criteria. Financial characteristics include such fundamental considerations as the loan's interest rate, the LTV, and the front-end and back-end ratios. Borrower and property underwriting criteria consider the credit, employment, and income record of the would-be mortgagor; the condition and attractiveness of the property to be mortgaged (as well as that of the surrounding neighborhood); and the assets acceptable to close the transaction. Our larger study (Listokin et al. 2001) describes the financial and underwriting requirements of each of the loan products in detail. We review some of the differences here.

The Historical Mortgage required a minimum 10 percent down payment, thus allowing a maximum 90 percent LTV. The front-end ratio had a 25 percent to 28 percent range, and the back-end ratio had a 33 percent to 36 percent range. The current version of this loan—the GSE Standard Mortgage—is more liberal. It allows a maximum 95 percent LTV. The maximum guideline ratios[16] are 28 percent for the front-end ratio and 36 percent for the back-end ratio. The GSE Affordable Mortgages have even more liberal terms. Because LMI mortgagors have very limited assets, only a modest down payment is required—3 percent to 5 percent of the purchase price. Also, not all of the down payment has to come from the borrower; 2 percent of the 5 percent is sometimes allowed to come from gifts or grants. The low down payments are mirrored by very high LTV ratios (as high as 97 percent). Because these ratios are so high, private mortgage insurance (PMI) is always required. Moreover, because closing costs can be a hurdle to homeownership, GSE Affordable Mortgages allow these costs to be paid by others rather than the borrower (for example, a grant or a subsidized loan from a nonprofit group). Because the mortgagor's income is constrained, higher front-end

[14] The mortgage parameter of what is salable to the secondary market is a moving target. Thus, the GSEs are beginning to buy portions of affordable loans that we have labeled as portfolio loans.

[15] This study includes the Government Affordable Mortgages as contemporary products (i.e., nonhistorical), even though FHA loans have been offered for many decades.

[16] The GSE front- and back-end ratios are guidelines that a lender uses to qualify a borrower. If the ratios exceed the guidelines of the program, a lender, with compensating factors documented, can make the loan with higher ratios.

and back-end ratios of 33 percent and 40 percent, respectively, are allowed.[17]

Some lenders offer terms that are even more liberal than those offered by the GSEs. To illustrate, both of the more liberal GSE Affordable Mortgages—Fannie Mae's Fannie 97 and Freddie Mac's AG 97—require a 3 percent minimum borrower contribution. By contrast, one portfolio mortgage, Bank of America's Neighborhood Advantage Zero Down, requires no down payment. To enhance affordability, some portfolio mortgages have rescinded PMI requirements, even on high LTV loans. For example, this was the policy of some lenders participating in the Delaware Valley Mortgage Plan (DVMP). (We refer to PMI portfolio products reflecting the DVMP experience as a Portfolio Composite.)

It is important to note that elements of each mortgage product are subject to change. For example, the Emerging GSE Affordable category shares numerous characteristics with the Portfolio Affordable category (e.g., very high front-end and back-end ratios). The Government Affordable Mortgage has also evolved. Loans guaranteed by the then Veterans Administration, important in the post–World War II era, are no longer significant today. The primary unsubsidized Government Affordable Mortgage loans insured under the FHA 203(b) program have also been changing. Before 1997, FHA 203(b) mortgages (termed FHA 203(b)—prior) had a maximum LTV of about 96 percent[18] on purchase amounts up to $125,000. Since 1997, the FHA 203(b) mortgage (termed FHA 203(b)—current) has increased the LTV to about 98 percent[19] on purchase amounts up to $125,000. Although the FHA 203(b)—prior allowed nonrecurring closing costs to be financed, that option ended with the FHA 203(b)—current. Both forms of the FHA 203(b) mortgage have been relatively lenient on credit underwriting.

To summarize, our mortgage framework comprises a multigroup typology and inclusive products listed in the left-most column of table 2.

The next step in the Mortgage Model is to obtain appropriate data so that the financial and underwriting facets of the alternative mortgages can be applied to renter families. This process is very detailed, and we summarize the major points below.

Some of the mortgage data elements are not family specific. These include the mortgage interest rate, property taxes, property insurance,

[17] Freddie Mac's GSE Affordable Mortgages have no maximum front-end ratio.

[18] The exact maximum LTV was 97 percent of the first $25,000 and 95 percent of the amount between $25,000 and $125,000.

[19] The exact maximum LTV is 98.75 percent of the first $50,000 and 97.65 percent of the amount between $50,000 and $125,000.

Table 2. **Impact of Alternative Mortgage Instruments: Absolute and Reference Home-Buying Capacity for All Renters, Nationwide**

	Absolute Home-Buying Capacity			Reference Home-Buying Capacity: Percentage of Renters Who Could Afford the Indicated House			
	Total National Home-Buying Capacity[a] (in $ Billions)	Average/Median Home-Buying Capacity[b]					
Loan Name		Mean ($)	Median ($)	Target House	50th Percentile House	25th Percentile House	10th Percentile House
Historical Mortgage	314.3	12,199	0	3.8	5.1	7.5	10.0
GSE Standard Mortgage (Fannie Mae and Freddie Mac)	387.7	15,049	0	5.0	6.3	9.2	12.1
GSE Affordable Mortgages							
Fannie Mae							
CHBP; CHBP, 3/2 Option (NA)[c]	477.3	18,526	0	6.4	7.8	11.0	14.3
CHBP, 3/2 Option (A)[d]	538.4	20,898	0	7.2	8.8	12.3	16.2
Fannie 97	445.0	17,273	0	5.9	7.1	10.6	14.1
Freddie Mac							
AG; AG, 3/2 Option (NA)[c]	516.1	20,032	0	7.0	8.4	11.4	14.9
AG, 3/2 Option (A)[d]	583.7	22,658	0	7.9	9.4	12.9	16.9
AG 97	518.0	20,108	0	7.0	8.5	11.5	14.8
Emerging GSE Affordable Mortgages							
Fannie Mae							
Flex 97	487.5	18,924	0	6.7	8.1	11.3	14.3
Freddie Mac							
Community Gold	539.5	20,940	0	7.5	8.7	11.8	14.9
Portfolio Affordable Mortgages[e]							
Bank of America Zero Down	511.4	19,850	0	7.1	8.5	11.7	14.9
Bank of America Credit Flex	546.4	21,208	0	7.7	8.8	11.9	14.9
Portfolio Composite[f]	584.1	22,674	0	8.0	9.4	13.0	17.0

Table 2. **Impact of Alternative Mortgage Instruments: Absolute and Reference Home-Buying Capacity for All Renters, Nationwide** *(continued)*

Loan Name	Absolute Home-Buying Capacity			Reference Home-Buying Capacity: Percentage of Renters Who Could Afford the Indicated House			
	Total National Home-Buying Capacity[a] (in $ Billions)	Average/Median Home-Buying Capacity[b]		Target House	50th Percentile House	25th Percentile House	10th Percentile House
		Mean ($)	Median ($)				
Government Affordable Mortgages							
FHA 203(b)—prior[g]	601.3	23,341	0	7.9	9.4	14.2	20.1
FHA 203(b)—current[h]	562.4	21,832	0	7.8	9.2	13.0	17.3

Source: Authors' analysis of 1993 SIPP data.
[a] The aggregate value of houses that could be purchased by current renters above a low-priced house threshold.
[b] For all current renters, not just renters who can afford at least a low-priced house.
[c] NA = 3/2 option is not activated (i.e., 2 percent of outside funding is *not* forthcoming).
[d] A = 3/2 option is activated (i.e., 2 percent of outside funding *is* forthcoming).
[e] These are selected as *examples* of the many portfolio mortgages currently offered.
[f] Incorporates the mortgage characteristics of a composite of portfolio products.
[g] Incorporated FHA 203(b) terms before 1997.
[h] Incorporated FHA 203(b) terms from 1997 onward.

mortgage insurance, and closing costs, all of which are determined in as specific a fashion as possible. For example, mortgage interest rates for eight metropolitan areas were obtained from the Federal Housing Finance Board and other sources. Property taxes by MSA were derived from the AHS and local data. Closing costs for the eight metropolitan areas were obtained from data provided by Countrywide Home Loans Inc. (1998), one of the nation's largest lenders. From these actual transactions, we derived closing costs as a percentage of the housing unit price. These costs varied from 3 percent to 4 percent of the housing unit price in the Atlanta and Los Angeles metropolitan areas to 5 percent to 6 percent in the New York and Philadelphia metropolitan areas.[20]

The Mortgage Model also calibrates family characteristics that influence mortgage qualification, such as income, debt, and assets. Although there are other possible data sources, such as the Panel Study of Income Dynamics (Stegman et al. 1991a, 1991b), we use the SIPP for these items because it is a comprehensive database that allows us to assemble information relevant to determining the degree of affordability ensuing from the alternative mortgages. For example, because the SIPP contains periodic, panel data, it allows an analysis over time of income fluctuations that bear on "stability," and some of our mortgage products (e.g., the Historical Mortgage) would discount for income instability.

On the basis of the SIPP, we develop asset, debt, and income for all renters and for the renter subgroups (non-Hispanic white, non-Hispanic black, Hispanic, non-Hispanic others, and recent immigrants). We observe that income is modest, especially for black and Hispanic renter families, as noted in table 3.

Table 3. **Median Family Income (1995)**

Type	Renter Families	All Families (Renters and Homeowners)
All	$18,786	$28,710
Whites (non-Hispanic)	$20,556	$30,600
Blacks (non-Hispanic)	$13,770	$19,515
Hispanics	$15,314	$19,791

[20] Closing costs were different for several reasons. Certain areas (for example, New York and Philadelphia) had very high mortgage taxes, while other locations had no mortgage taxes or much lower ones. Prepaid property taxes also varied; these payments were low in the Atlanta and Los Angeles metropolitan areas and high in the Northeast. It is interesting to note that items that one would have thought to be commodity items and therefore uniformly priced, in fact differed considerably in expense. For instance, title insurance amounted to 0.6 percent of the home's value in Miami, compared with 0.2 percent in Atlanta. There were also specific area idiosyncrasies. For example, the cost of hazard insurance was three times higher in Miami than in the other metropolitan areas—a result of the tremendous insurance company losses from Hurricane Andrew.

These modest renter incomes would not always be fully credited by underwriters. For example, the Historical Mortgage would discount or exclude such income components (reported in the SIPP) as Aid to Families with Dependent Children, child support, and alimony, which some renters draw on, and would also discount for income instability. Therefore, the median family income available for mortgage qualification (or the adjusted family income) for all renters and for white, black, and Hispanic renters under the Historical Mortgage would be $15,957, $17,879, $11,220, and $12,844, respectively (mean values of $19,933, $21,879, $15,666, and $16,265, respectively). These adjusted incomes are approximately 20 percent less than the gross (unadjusted or what we term "nominal") renter incomes we reported.

Renters are not heavily indebted. The median debt of all renters and white, black, and Hispanic renters, as derived from the SIPP, is $45, $500, $0, and $0, respectively (mean values of $3,609, $4,247, $2,443, and $2,308, respectively). Assets, however, are of a trace magnitude. The median assets of all renters and white, black, and Hispanic renters are $300, $649, $0, and $0, respectively (mean values of $7,904, $11,368, $1,601, and $2,000, respectively).

Of note is the financial profile of recent immigrants. With median assets, debt, and nominal family income of $250, $314, and $16,710, respectively (mean values of $9,076, $2,696, and $21,836, respectively), recent immigrant renters are considerably better off than their black and Hispanic counterparts. Recent immigrant assets, debt, and income, however, approach but fall short of the resources available to white renters.

After assembling or estimating renter financial characteristics and factoring in these data according to the standards used by the alternative mortgage products, the Mortgage Model calculates the maximum-priced affordable home for each of the renter families in the SIPP. Because of the number of families we are attempting to qualify and the 15 individual mortgage products considered, the Mortgage Model uses a software program for the calculations.

To summarize, the affordability analysis encompasses two measures of housing affordability:

1. Reference home-buying capacity is the ability of current renters to afford either the target-priced home (derived from the all-renter consumption model) or the criterion home (median-priced, modestly priced, and low-priced).

2. Absolute home-buying capacity is the dollar purchasing power of renters (measured in the aggregate and measured by considering mean/median purchasing ability).

We anticipate significant variations in the home-buying capacities for our typology of mortgage products. For instance, with comparatively rigid down payment minimums and debt ratios and other stringent financial and underwriting requirements, the Historical Mortgage is expected to yield the lowest home-buying capacity. The GSE Standard Mortgage should do better, and we would expect even greater improvement with the other products.

Given the very limited financial resources of renters, bringing large numbers of them to homeownership will remain a challenge for even the most aggressive mortgage products. Thus, we anticipate that a large share of renters will be unserved. Given their greater relative financial resources, we anticipate that more whites and recent immigrants will be served relative to their black and Hispanic counterparts.

Results: Homeownership affordability

The results of the affordability analysis are summarized in table 2 and detailed below.

Absolute home-buying capacity

We begin with the absolute home-buying capacity measures, which provide a first-cut estimate of the potential mortgage market. Consider first the case in which all current renter families apply for a mortgage and are evaluated on the basis of Historical Mortgage underwriting standards. Our models suggest that this mortgage provides approximately $314 billion in aggregate national home-purchasing power (table 2). This figure is the sum total of the prices of homes above the stipulated threshold (a low-priced house) for which renters can qualify with this product. Thus, it includes some renters who are able to afford very expensive homes, as well as a few unable to qualify for anything more than a low-priced house. Moreover, this figure does not consider variations in credit history (not examined in this article) or differences in preference for homeownership among different demographic groups. Nevertheless, the estimate of $314 billion may be interpreted as a baseline against which other mortgage instruments may be compared.

The past decade has seen dramatic integration in America's housing and capital markets. This shift has replaced the Historical Mortgage with standardized products conforming to the GSEs' purchasing guidelines. Our models suggest that the advent and diffusion of the GSE Standard Mortgage boosts total purchasing capacity by approximately $74 billion, to a total of $388 billion. The increment of purchasing power results from two factors: First, relaxed debt ratios and higher LTVs allow renters to qualify for larger loans, and second, many families that would be

disqualified by historical criteria from purchasing even a low-priced house can now afford such a unit with the GSE standard guidelines.

The GSE Affordable Mortgages (when the 3/2 option is not in effect) increase aggregate home-buying capacity to a range between $445 billion and $518 billion, depending on the individual product; GSE Affordable Mortgages from Fannie Mae provide aggregate home-buying capacity in the $445 billion to $477 billion range; Freddie Mac GSE Affordable Mortgages yield higher aggregate home-buying capacity in the $516 billion to $518 billion range because they have no front-end ratio; Fannie Mae GSE Affordable loans have a 33 percent front-end ratio. Additionally, the Freddie Mac back-end ratio guidelines are higher than those of Fannie Mae in the Affordable GSE category (39 percent compared with 36 to 38 percent).

For both the Fannie Mae and Freddie Mac GSE Affordable Mortgages, home-buying capacity is the same for the "base" affordable product (CHBP, AG) as it is with the 3/2 variation because we do *not* assume here that the 2 percent down payment is provided by a source other than the buyer.[21] For both the Fannie Mae and Freddie Mac Affordables, the "97" product (Fannie 97 and AG 97) has a somewhat lower (or equivalent) home-buying capacity than the base product; although the 97 product has a higher LTV (97 percent compared with 95 percent), this is somewhat offset by its other requirements (e.g., more costly mortgage insurance, because the LTV is higher, and more demanding reserves).

The Emerging GSE Affordable Mortgages incrementally increase home-buying capacity from the GSE Affordable baseline. Fannie Mae's Flex 97 realizes approximately $488 billion in home-buying capacity (compared with $445 billion to $477 billion with the Fannie Mae Affordable Mortgages). Freddie Mac's Community Gold reaches approximately $540 billion in home-buying capacity (compared with $516 billion to $518 billion with the Freddie Mac Affordable mortgages). For both GSEs, the gain is achieved because the Emerging Affordable mortgages have more aggressive features (e.g., higher debt ratio and LTVs), albeit with some offsets (e.g., higher required reserves and higher mortgage insurance costs).

The Portfolio products studied here achieve significant aggregate home-buying capacity in the $511 billion to $584 billion range—a function of their high LTVs and fairly aggressive front-end and back-end ratios. Of the two Bank of America portfolio products examined here, Zero Down and Credit Flex, the latter realizes greater home-buying capacity: Although Credit Flex has a lower LTV than Zero Down (97 percent compared with 100 percent), it has lower mortgage insurance requirements

[21] In the policy consideration section, we examine the impact of assuming that the 2 percent down payment is provided by a source other than the buyer. Results with the 3/2 option activated are also shown in all of the referenced tables.

(a "payback" from its lower LTV), it has no front-end ratio (recalling the Freddie Mac approach), and its back-end ratio is higher (43 percent compared with 41 percent).

The Portfolio Composite product has the highest home-buying capacity ($584 billion) considered thus far because its parameters so extend beyond the "normal" market that it is essentially a subsidized loan (the product does not require mortgage insurance on a very high LTV and allows very high front-end and back-end ratios). (The DVMP-inspired Portfolio Composite Mortgage was so costly to its originators that it was ultimately rescinded. That recalls the 45 percent back-end ratio allowed by lenders in the Atlanta Mortgage Consortium, which was also ultimately dropped.)

The Government Affordable Mortgages realize very high home-buying capacity in the $562 billion to $601 billion range—a reflection of their high LTVs and high front-end and back-end ratios. Of the two FHA 203(b) products, the prior one has somewhat greater home-buying prowess than the current one does—perhaps because the former permits a portion of the closing costs to be financed.

Other measures in parallel denote varying housing affordability by mortgage type (table 2). Under the Historical Mortgage, the mean home affordable, including those with no home-buying capacity, is $12,199.[22] The mean affordable increases to $15,049 with the GSE Standard Mortgage; to a range between $17,273 and $20,940 with the GSE Affordable Mortgages (without the 3/2 option activated), including the Emerging GSE Affordable Mortgages group; to a range between $19,850 and $22,674 for the Portfolio Affordable Mortgages, and to a range between $21,832 and $23,341 for the Government Affordable Mortgages.

Table 4 disaggregates the absolute home-buying capacity by subgroups of renter families: whites, blacks, Hispanics, recent immigrants, and others. (Here and elsewhere in this study, the referenced white, black, and other groups are non-Hispanic.) For white renter families, absolute home-buying capacity increased from approximately $285 billion under the Historical Mortgage to approximately $347 billion under the GSE Standard Mortgage, and to approximately $505 billion for the Portfolio Affordable Mortgages. For black renter families, total purchasing capacity under these three mortgage products increased from approximately $11 billion to $17 billion and then to $36 billion. This progression means that mortgage innovation increases the total purchasing power of whites by about 77 percent; blacks, starting from a smaller base, realize a 227 percent gain. Hispanic families, like blacks, experience a quantum increase in total purchasing power (a 140 percent gain) from mortgage

[22] That is, renters who have a home-buying capacity of zero are included in the calculation of the mean.

Table 4. **Absolute Home-Buying Capacity for Renter Groups[a] by Mortgage Instrument, Nationwide (in Millions of Dollars)**

Loan Name	All Families	White Families (Non-Hispanic)	Black Families (Non-Hispanic)	Hispanic Families	Other Families (Non-Hispanic)	Recent Immigrant Families
1. Historical	314,291	285,347	11,356	9,631	7,957	9,059
2. GSE Standard	387,695	347,340	16,702	13,422	10,231	10,724
3. Fannie Mae CHBP; CHBP 3/2 (NA)[b]	477,289	421,454	24,602	16,604	14,629	13,243
4. Fannie Mae CHBP 3/2 (A)[c]	538,396	466,417	32,271	20,639	19,069	14,664
5. Fannie Mae 97	445,006	391,387	24,016	15,822	13,781	12,578
6. Freddie Mac AG AG 3/2 (NA)	516,087	455,364	26,427	18,680	15,616	14,497
7. Freddie Mac AG 3/2 (A)	583,749	505,947	34,754	22,764	20,284	16,424
8. Freddie Mac AG 97	518,046	457,728	26,054	18,783	15,481	14,747
9. Fannie Mae Flex 97	487,533	430,821	24,941	17,048	14,723	13,607
10. Freddie Mac Community Gold	539,486	475,988	27,567	19,784	16,147	15,229
11. Bank of America Zero Down	511,393	446,771	27,186	19,492	17,943	14,549
12. Bank of America Credit Flex	546,372	482,359	27,681	19,963	16,369	15,418
13. Portfolio Composite	584,144	505,042	35,649	23,053	20,400	16,446
14. FHA 203(b)—prior	601,325	507,648	41,687	27,887	24,103	15,792
15. FHA 203(b)—current	562,449	480,712	36,183	23,335	22,219	14,920
Weighted sample size	25,762,939	16,183,879	4,464,525	3,980,131	1,134,403	704,035

Source: Authors' analysis of 1993 SIPP data.
[a] Non-Hispanic white, non-Hispanic black, Hispanic, and other non-Hispanic renter families are discrete. Combined, they sum to all renter families. Recent immigrant families, those entering the United States after 1984, overlap with the previously listed racial/ethnic groups (non-Hispanic whites and blacks). Finally, if not otherwise noted, whites, blacks, and other groups are non-Hispanic.
[b] NA = 3/2 option is not activated (i.e., 2 percent of outside funding is *not* forthcoming).
[c] A = 3/2 option is activated (i.e., 2 percent of outside funding *is* forthcoming).

innovation, while the pattern for recent immigrant families resembles that of whites.

Reference home-buying capacity

Both the effectiveness and shortfalls of the mortgage instruments in expanding homeownership are apparent when we examine the percentage of renters able to secure the various reference-priced homes. For illustrative purposes, these figures are summarized in tables 5 and 6 for the most and least expensive reference-priced homes: the target house and the low-priced house. Only 3.8 percent of all renter families (approximately 0.986 million) can afford the target house under the Historical Mortgage. With the current innovative mortgage products, the percent-

Table 5. **Reference Home-Buying Capacity by Mortgage Instrument and Renter Group,[a] Nationwide: Target House (Number and Percentage of Renters Who Could Afford the Indicated House)**

	All Families		White Families		Black Families		Hispanic Families		Recent Immigrant Families	
Loan Name	Number	%	Number	%	Number	%	Number	%	Number	%
1. Historical	986,175	3.8	887,739	5.5	43,113	1.0	16,928	0.4	32,481	4.6
2. GSE Standard	1,288,186	5.0	1,138,266	7.0	66,321	1.5	39,384	1.0	32,481	4.6
3. Fannie Mae CHBP; CHBP 3/2 (NA)[b]	1,655,784	6.4	1,445,204	8.9	95,041	2.1	60,199	1.5	45,747	6.5
4. Fannie Mae CHBP 3/2 (A)[c]	1,860,780	7.2	1,621,625	10.0	115,810	2.6	68,060	1.7	45,747	6.5
5. Fannie Mae 97	1,517,669	5.9	1,317,934	8.1	89,666	2.0	60,199	1.5	32,481	4.6
6. Freddie Mac AG; AG 3/2 (NA)[b]	1,803,895	7.0	1,570,079	9.7	95,041	2.1	72,582	1.8	45,747	6.5
7. Freddie Mac AG 3/2 (A)[c]	2,045,191	7.9	1,782,816	11.0	115,810	2.6	80,438	2.0	45,747	6.5
8. Freddie Mac AG 97	1,793,796	7.0	1,572,264	9.7	95,041	2.1	65,975	1.7	45,747	6.5
9. Fannie Mae Flex 97	1,717,512	6.7	1,499,275	9.3	95,041	2.1	60,199	1.5	45,747	6.5
10. Freddie Mac Community Gold	1,932,272	7.5	1,685,227	10.4	104,961	2.4	65,991	1.7	53,724	7.6
11. Bank of America Zero Down	1,830,457	7.1	1,604,680	9.9	109,943	2.5	60,199	1.5	45,747	6.5
12. Bank of America Credit Flex	1,969,907	7.6	1,722,792	10.6	104,968	2.4	65,982	1.7	53,724	7.6
13. Portfolio Composite	2,048,781	8.0	1,785,274	11.0	115,814	2.6	73,837	1.9	45,747	6.5
14. FHA 203(b)—prior	2,028,033	7.9	1,736,207	10.7	133,221	3.0	74,986	1.9	45,747	6.5
15. FHA 203(b)—current	1,997,478	7.8	1,723,583	10.7	125,051	2.8	68,060	1.7	45,747	6.5
Weighted sample size	25,762,939	100.0	16,183,879	100.0	4,464,525	100.0	3,980,131	100.0	704,035	100.0

Source: Authors' analysis of 1993 SIPP data.
Note: Subtotals may not add to indicated totals because of rounding.
[a] The aggregate value of houses that could be purchased by current renters above a low-priced house threshold.
[b] NA = 3/2 option is not activated (i.e., 2 percent of outside funding is *not* forthcoming).
[c] A = 3/2 option is activated (i.e., 2 percent of outside funding *is* forthcoming).

Table 6. **Reference Home-Buying Capacity by Mortgage Instrument and Renter Group,[a] Nationwide: 10th Percentile Low-Priced House (Number and Percentage of Renters Who Could Afford the Indicated House)**

	All Families		White Families		Black Families		Hispanic Families		Recent Immigrant Families	
Loan Name	Number	%	Number	%	Number	%	Number	%	Number	%
1. Historical	2,580,006	10.0	2,296,689	14.2	128,499	2.9	79,090	2.0	59,325	8.4
2. GSE Standard	3,105,523	12.1	2,735,408	16.9	159,594	3.6	115,170	2.9	68,825	9.8
3. Fannie Mae CHBP; CHBP 3/2 (NA)[b]	3,692,602	14.3	3,204,732	19.8	228,360	5.1	125,295	3.1	93,616	13.3
4. Fannie Mae CHBP 3/2 (A)[c]	4,180,037	16.2	3,545,564	21.9	298,186	6.7	161,991	4.1	107,091	15.2
5. Fannie Mae 97	3,635,151	14.1	3,141,453	19.4	236,843	5.3	122,110	3.1	97,938	13.9
6. Freddie Mac AG; AG 3/2 (NA)[b]	3,841,512	14.9	3,312,840	20.5	246,040	5.5	148,339	3.7	99,487	14.1
7. Freddie Mac AG 3/2 (A)[c]	4,343,889	16.9	3,671,313	22.7	310,284	7.0	187,982	4.7	120,981	17.2
8. Freddie Mac AG 97	3,804,928	14.8	3,295,847	20.4	229,521	5.1	145,155	3.6	99,487	14.1
9. Fannie Mae Flex 97	3,694,663	14.3	3,215,251	19.9	223,048	5.0	122,110	3.1	93,616	13.3
10. Freddie Mac Community Gold	3,828,115	14.9	3,299,893	20.4	242,200	5.4	151,842	3.8	99,487	14.1
11. Bank of America Zero Down	3,828,630	14.9	3,290,183	20.3	231,753	5.2	145,036	3.6	111,498	15.8
12. Bank of America Credit Flex	3,838,076	14.9	3,309,805	20.5	242,185	5.4	151,846	3.8	99,487	14.1
13. Portfolio Composite	4,373,124	17.0	3,687,791	22.8	322,936	7.2	187,974	4.7	120,983	17.2
14. FHA 203(b)—prior	5,168,303	20.1	4,256,037	26.3	421,094	9.4	269,694	6.8	139,920	19.9
15. FHA 203(b)—current	4,467,036	17.3	3,721,483	23.0	342,831	7.7	205,096	5.2	120,284	17.1
Weighted sample size	25,762,939	100.0	16,183,879	100.0	4,464,525	100.0	3,980,131	100.0	704,035	100.0

Source: Authors' analysis of 1993 SIPP data.
Note: Subtotals may not add to indicated totals because of rounding.
[a] The aggregate value of houses that could be purchased by current renters above a low-priced house threshold.
[b] NA = 3/2 option is not activated (i.e., 2 percent of outside funding is *not* forthcoming).
[c] A = 3/2 option is activated (i.e., 2 percent of outside funding *is* forthcoming).

age of those able to afford the target-house increases to the following levels: 5.0 percent (approximately 1.288 million renter families) under the GSE Standard Mortgage; 5.9 percent to 7.0 percent (approximately 1.518 million to 1.804 million renters) under the GSE Affordable Mortgages (without the 3/2 option activated); 6.7 percent to 7.5 percent (approximately 1.718 million to 1.932 million renters) under the Emerging GSE Affordable Mortgages; 7.1 percent to 8.0 percent with the Portfolio Affordable Mortgages (approximately 1.830 million to 2.049 million renters); and 7.9 percent (approximately 2.028 million renters) for the highest-achieving Government Affordable Mortgage (FHA 203[b]—prior). There is a similar continuum by mortgage product, but at a higher share affording, when we change the reference home from the more expensive target-priced unit to the least expensive reference home considered here—the low-priced unit (see table 6). Ten percent of all renters (approximately 2.580 million) can afford the low-priced home under the Historical Mortgage. This percentage rises to the following levels under the more innovative mortgage products: 12.1 percent (approximately 3.106 million renters) under the GSE Standard Mortgage; 14.1 percent to 14.9 percent (approximately 3.635 to 3.841 million renters) under the GSE Affordable Mortgages, including the Emerging GSE Affordable Group (without the 3/2 option activated); 14.9 percent to 17.0 percent (approximately 3.828 million to 4.373 million renters) under the Portfolio Affordable Mortgages; and 20.1 percent (5.168 million renters) for the best-performing Government Affordable Mortgage (FHA 203[b]—prior). (As observed in the preceding section, the FHA 203[b]—prior again slightly outperforms the FHA 203[b]—current with respect to the reference home-buying capacity.)

We further detail home-buying capacity by population subgroups. Tables 5 and 6 identify the number, type, and percentage of various categories of renter families that can afford the target house and low-priced unit, respectively, under the respective mortgage products. For instance, under the Historical Mortgage, approximately 0.043 million black renter families (1.0 percent of the total 4.465 million black renter families) can afford the target house (table 5). With the application of the GSE Standard Mortgage, about 0.066 million black renter families (1.5 percent of the total) are able to afford the target house. Similar small increments of gain are achieved with the more liberal mortgage instruments—the GSE Affordable, Government Affordable, and Portfolio products. Thus, the most aggressive of these products brings just over 0.125 million black renter families (10.7 percent of the total) to homeownership at the target-price level (table 5). Greater numbers of black families are served at the less expensive reference-priced levels. For example, under the Historical Mortgage, approximately 0.128 million black renters (2.9 percent of the total) can secure the low-priced house (table 6). That low-priced homeownership attainment reaches approximately 0.421 million black renter families (9.4 percent of the total) with the FHA 203(b)—prior mortgage.

A similar result is observed for Hispanic renter families (tables 5 and 6). Their ability to purchase a reference-priced home increases from the Historical Mortgage as the more liberal loan instruments are applied. For any given mortgage, greater numbers of Hispanic families qualify for homeownership at the less expensive reference prices. In general, the specific percentage of Hispanic families able to secure a home for any given mortgage and reference-priced home combination is in order of magnitude similar to or slightly less than that of black renters.[23] Recent immigrant renter families fare better and come closest to the homeownership capability of white renter families. This last finding is consistent with the observed vigorous homeownership gains among immigrants in recent years (Joint Center for Housing Studies 1999).

Thus, while each of the alternative mortgages offers some improvement in affordability relative to the Historical Mortgage, a large affordability gap remains. Even very liberal mortgage products leave the vast majority of renters unserved at any level. Every mortgage product leaves at least 21 million renter families—or about 80 percent of the total—*unable* to enter homeownership at even the low-priced threshold. They are unserved as defined in this study. Less advantaged subgroups (e.g., blacks and Hispanics) fare even worse.

Explanation of the findings: Why are renters limited in their ability to realize homeownership?

Why are so many renters, especially minorities and LMI populations, unserved in the mortgage market? Recall that lender bias is not a barrier in the current study because every renter is treated fairly; that is, they are judged solely on the basis of their financial resources. This, however, is just the issue. Renters in general, and minorities and LMI families in particular, have very modest financial resources, and this condition limits their home-buying capacity.

These financial limitations were noted earlier. To recap, renters as a group had a median family income of only $18,786—about two thirds of the $28,710 median income of all families (renters and homeowners) as reported in the SIPP. Black and Hispanic renters trailed their majority counterparts considerably, with median family incomes of $13,770 and $15,314, respectively.

[23] The home-buying capacity of Hispanic renters is similar, but somewhat lower than that of their black counterparts, despite Hispanic renters' having on average higher incomes and assets. We hypothesize that the Hispanic home-buying capacity may be less for various reasons: First, the Hispanics' target-priced homes are more expensive. Second, Hispanics, relative to blacks, are disproportionately concentrated in regions (e.g., California) with higher-priced criterion homes (e.g., the mean modestly priced house for Hispanics is $77,049, compared with $61,802 for blacks).

Disparities are further apparent when assets and debts are considered. White renters have mean assets of $11,368, and recent immigrants have mean assets of $9,076; black and Hispanic renters have fractions of these resources, with mean assets of $1,601 and $2,000, respectively. Indeed, all renters have very limited assets, as indicated by the fact that the median assets for every subgroup considered here are $500 or less.

With such a trace level of assets, even a 100 percent LTV mortgage will not facilitate homeownership because of the resources required to meet substantial closing costs. Given the combination of modest income and assets, it is no wonder that home-buying capacity is a distant dream for many renter families, particularly minority families (Haurin, Hendershott, and Wachter 1997).

Which of the dual hurdles to homeownership is more significant—modest income or modest assets? Given the limited assets of renters, one would anticipate that a *down payment constraint*—not enough cash resources to cover the down payment and closing costs—would be a major hurdle to homeownership. Modest renter income also suggests an *income constraint*—not enough income to cover monthly mortgage costs. Because renters are both income- and asset-constrained, we anticipate a reasonably high incidence of dual down payment and income constraints.

These findings are borne out by an analysis of affordability for the modestly priced house/GSE Standard Mortgage combination. We find that 28.2 percent of all renters who cannot afford the modestly priced home are constrained only by down payment costs and that an additional 67.5 percent are dually constrained by the down payment and income. Only 4.4 percent of all renters are limited solely by income. These findings resemble those of Savage (1999), who found that 27.9 percent of all renters were constrained by down payment, 2.1 percent were constrained by income, and 69.9 percent had dual constraints.

Policy considerations

This section examines various policies aimed at enhancing the capacity of renters to achieve homeownership (DiPasquale 1990). We recognize that according to some researchers, there is already too much support for, and subsidization of, homeownership (Krueckeberg 1999). Further, even those who generally support homeownership may very well propose that it is not suitable for everyone and that by emphasizing homeownership we may very well not pay enough attention to other pressing housing needs, such as new rental housing and maintenance of the existing rental housing stock. One could also argue that government's job in the market should be limited to guarding against discrimination, as opposed to equalizing homeownership. We recognize these very valid

points. For the sake of discussion, however, we proceed under the assumption that homeownership is an important good deserving of public support.

A critical strategy to foster homeownership is to address renters' financial constraints (Eller and Fraser 1995; Engelhardt and Mayer 1994). Because so many renters are constrained by down payment costs, whether solely or in conjunction with income constraints, one reasonable intervention would be to supplement the assets available to them (Mayer and Engelhardt 1996). This could take the form of a voucher to be applied for the down payment and closing costs. An income supplement, say a voucher to pay for mortgage costs, would be a way of compensating for renters' modest incomes. The cost of both of these programs would depend on the magnitude and duration of the supplements.

We will consider hypothetical examples of both of these approaches: One is a $5,000 voucher to be used for the down payment or other up-front costs (e.g., closing expenses). The other is a housing payment supplement of $100 a month, or $1,200 a year. It is anticipated that this voucher would be in force for four years, amounting to $4,800 in cumulative payments. Although the voucher would expire after four years, it is anticipated that the renter's income would rise sufficiently over this period to compensate for the supplement. (The same reasoning underlies the concept of the adjustable rate mortgage, where the initial rate is pegged below the market rate.)

These different approaches address different constraints. We report the detailed findings in a larger study (Listokin et al. 2001) and summarize them here. Because down payment constraints present such a large barrier, it is not surprising that a down payment voucher dramatically enhances home-buying capacity. Approximately 2.8 million renter families (11.0 percent of all renters) can currently afford the modestly priced house with the CHBP mortgage. When a down payment voucher is added to CHBP financing, 7.6 million renter families (29.3 percent) can afford modestly priced homeownership. The increase in affordability is much lower with the income voucher–CHBP combination, which brings about 3.1 million renter families, or approximately 11.9 percent of the total, to homeownership.

Not surprisingly, these outcomes have different costs. The down payment voucher is a potent tool. Yet its cost in net present value terms—approximately $23.6 billion—far exceeds the approximately $0.92 billion expenditure for the income voucher. This disparity in cost is due to two factors. First, the down payment voucher moves many more renters into homeownership than the income voucher does. Second, the former is an up-front payment, making it more expensive in time-value terms than the latter, which is spread over four years.

In practice, an asset supplement approach underlies the design of the 3/2 option in the GSE Affordable Mortgages. Thus far, we have discussed the affordability outcomes using Fannie Mae's CHBP and Freddie Mac's AG, without considering each program's 3/2 option. We maintained this restriction because we wanted to determine the homeownership potential for renters based solely on their own resources. What happens if the 2 percent gift or grant is considered? A gift or grant is, in effect, an asset supplement and should increase homeownership. We simulate the impact of the 3/2 option, which increases absolute and reference home-buying capacities. For instance, while 11.4 percent of all renter families (2.945 million) can afford the modestly priced house with an AG mortgage without the 3/2 option activated, this proportion rises to 12.9 percent (3.323 million renter families) with the option in force.

In short, although mortgage innovation expands homeownership potential, other strategies, such as income and asset supplements, are needed to address the financial constraints faced by the vast majority of renters. In fact, there is a larger universe of policy options that we illustrate for the modestly priced house in tables 7 and 8. Each of these tables starts with a baseline: the percentage of renters who can afford the reference house with the GSE Standard Mortgage. Each exhibit then presents four generic approaches to improving homeownership potential. The first, *mortgage term adjustment*, relaxes the mortgage terms by (1) reducing the interest rate from the market level, (2) reducing the required down payment, and/or (3) reducing the PMI requirement. The second generic approach, *transaction-carrying cost adjustment*, reduces the transaction-carrying cost of homeownership by allowing for (1) closing-cost savings, (2) property tax savings, and/or (3) hazard insurance savings. In all instances, the savings are based on the lowest closing costs, property taxes, and hazard insurance expenses in the eight metropolitan areas for which we obtained such data. The third generic area, *housing price adjustment*, simply reduces the cost of the unit. This is an extension of the reference-priced gradation considered in this study. The fourth approach, *borrower financial supplement*, improves the borrower's finances by adding income or assets. In the former, we assume a varying annual income supplement of $1,000, $5,000, or $10,000. In the latter, we factor in a one-time asset transfer of $1,000, $5,000, or $10,000, respectively.

The improvements in homeownership potential from the respective baselines are indicated by the rising percentage of renters who can afford modestly priced homes. In all instances, the greatest gains are realized by the borrower financial supplement approach. That is followed by the mortgage term adjustment approach. A more modest improvement results from adjusting the transaction-carrying costs and the house price.

Table 7. **Effects of Policy Options by Renter Group: Percentage of Renters Nationwide Who Can Afford a Modestly Priced House**

	Renter Groups[a]					
Baseline/Option	All (%)	White (%)	Black (%)	Hispanic (%)	Other (%)	Recent Immigrants (%)
Baseline						
Modestly priced house, GSE Standard Mortgage	9.2	13.1	2.7	1.8	6.1	8.4
Options						
I. Mortgage term adjustment						
A. Interest rate reduction[b]						
5%	10.0	14.3	2.7	2.1	6.1	9.1
2.5%	10.6	15.1	2.7	2.1	6.7	9.9
0%	11.2	16.0	3.0	2.1	7.3	10.6
B. Down payment reduction						
3% down	9.8	13.9	2.8	2.0	6.1	8.4
0% down	11.3	15.6	4.0	2.4	10.2	11.2
C. Reduced PMI[c]						
0%	9.4	13.3	2.7	2.0	6.1	9.1
II. Transaction-carrying cost adjustment						
A. Closing-cost savings						
Lowest closing costs	9.6	13.6	2.8	2.0	6.6	8.4
B. Property tax savings						
Lowest property tax	9.4	13.3	2.7	1.8	6.1	8.4
C. Reduced hazard insurance						
Lowest insurance	9.3	13.1	2.7	2.0	6.1	8.4
III. House price adjustment						
–10%	9.9	14.1	2.7	2.0	6.1	9.1
IV. Borrower financial supplement						
A. Annual income supplement						
+$1,000	9.9	14.2	2.7	2.0	6.1	9.1
+$5,000	12.2	17.3	3.3	2.6	8.0	11.4
+$10,000	13.1	18.6	3.5	3.0	8.0	11.4
B. Asset supplement						
+$1,000	9.9	13.8	3.0	2.3	6.7	8.4
+$5,000	16.2	21.6	8.5	3.8	12.9	16.5
+$10,000	35.6	41.8	29.8	20.1	24.7	33.2

Source: Authors' analysis of 1993 SIPP data.

[a] Non-Hispanic white, non-Hispanic black, Hispanic, and other non-Hispanic renter families are discrete. Combined, they sum to all renter families. Recent immigrant families, those entering the United States after 1984, overlap with the previously listed racial/ethnic groups (non-Hispanic whites and blacks). Finally, if not otherwise noted, whites, blacks, and other groups are non-Hispanic.

[b] Current contract interest rate is 8.05 percent.

[c] For periodic or recurring (not up-front) PMI payment.

Table 8. **Effects of Policy Options: Absolute Home-Buying Capacity, Nationwide (in Millions of Dollars)**

	Renter Groups[a]					
Baseline/Option	All	White	Black	Hispanic	Other	Recent Immigrants
Baseline						
GSE Standard Mortgage	387,695	347,340	16,702	13,422	10,231	10,724
Options						
I. Mortgage term adjustment						
A. Interest rate reduction[b]						
5%	435,440	390,564	18,604	14,534	11,739	12,078
2.5%	487,135	435,904	21,015	17,030	13,186	13,057
0%	546,219	488,388	23,578	19,008	15,245	14,230
B. Down payment reduction						
3% down	414,703	370,026	19,289	14,872	10,516	11,929
0% down	472,154	409,383	27,865	17,960	16,945	12,908
C. Reduced PMI[c]						
0%	395,112	354,105	16,935	13,629	10,442	10,879
II. Transaction-carrying cost adjustment						
A. Closing-cost savings						
Lowest closing costs	413,291	369,075	19,018	14,377	10,821	11,420
B. Property tax savings						
Lowest property tax	408,611	366,486	17,232	14,335	10,559	11,663
C. Reduced hazard insurance						
Lowest insurance	390,833	350,143	16,802	13,581	10,307	10,790
III. House price adjustment						
–10%	437,327	391,979	18,847	14,914	11,587	12,616
IV. Borrower financial supplement						
A. Annual income supplement						
+$1,000	416,130	372,711	17,734	14,584	11,101	11,875
+$5,000	528,221	473,407	22,750	18,037	14,027	14,203
+$10,000	630,669	566,109	25,818	21,790	16,952	16,376
B. Asset supplement						
+$1,000	409,772	366,447	18,251	14,444	10,630	11,748
+$5,000	712,743	578,016	65,976	43,441	25,310	19,592
+$10,000	1,280,300	942,716	149,667	138,432	49,499	34,775

Source: Authors' analysis of 1993 SIPP data.

[a] Non-Hispanic white, non-Hispanic black, Hispanic, and other non-Hispanic renter families are discrete. Combined, they sum to all renter families. Recent immigrant families, those entering the United States after 1984, overlap with the previously listed racial/ethnic groups (non-Hispanic whites and blacks). Finally, if not otherwise noted, whites, blacks, and other groups are non-Hispanic.

[b] Current contract interest rate is 8.05 percent.

[c] For periodic or recurring (not up-front) PMI payment.

To illustrate these options, table 7 shows that 9.2 percent of all renters can afford a modestly priced house with the GSE Standard Mortgage. That share rises to 12.2 percent with a $5,000 income supplement, 16.2 percent with a $5,000 asset supplement, and 11.2 percent with a mortgage contract interest rate reduction from 8.05 percent to 0 percent. The baseline share of black renters who can afford a modestly priced

home with the GSE Standard Mortgage is 2.7 percent. The only way to bring that share up appreciably is through an asset supplement. A $10,000 annual income supplement boosts black renters' ability to realize modestly priced homeownership by about 1 percent (from 2.7 to 3.5 percent); however, a $10,000 asset supplement would allow 29.8 percent of black renters to purchase the modestly priced home and essentially bring them to parity with all renters, although they would still trail their white counterparts.

In a similar vein, the affordability rate for Hispanics for a modestly priced home can be increased from a baseline share of 1.8 percent to 20.1 percent with a $10,000 asset supplement. Other options have a measurable but less significant impact. For instance, a $10,000 income supplement allows only 3.0 percent of Hispanic renters to purchase the modestly priced unit. The impact of the various options on the affordability rate follows a similar pattern for recent immigrants. The $10,000 asset transfer would bring approximately 33 percent of them to homeownership; a $5,000 asset supplement would have half that impact (16.5 percent would be able to afford the modestly priced house).

The results are similar when the options are applied to a target-priced house. A $10,000 income supplement would allow approximately 10 percent of all renters to purchase a target-priced home (doubling the 5 percent reach of the unsubsidized GSE Standard Mortgage); a $10,000 asset supplement would allow approximately 20 percent of all renters to realize target-priced homeownership.

We can also calculate how these policy options can affect absolute home-buying capacity (table 8). Using the GSE Standard Mortgage as the baseline, all renters have approximately $388 billion in aggregate purchasing power. With the lowest closing costs, the absolute home-buying capacity is boosted by $25 billion (to approximately $413 billion). A $10,000 income supplement to each renter increases buying power to approximately $631 billion; a $10,000 asset supplement boosts the purchasing ability by about $890 billion dollars (to approximately $1.280 trillion). The same $10,000 asset supplement to each black renter would increase purchasing power about ninefold, from $17 billion (baseline) to $150 billion.

Tables 7 and 8 show the impact of item-by-item changes on homeownership affordability. Combining the items would magnify the increase in affordability and purchasing power. The two tables thus provide an informative matrix for policy consideration, but they do not exhaust the universe of possible changes. For example, we observe from our mortgage simulations that products with a back-end ratio but no front-end ratio have greater potential to expand homeownership. Therefore, a policy that eliminates the front-end ratio (while keeping the back-end ratio) would enable more renters to buy a house.

Assessments of policy options must also consider costs. The net present value (NPV) expense of the respective options is a critical consideration. Of the different policies presented in tables 7 and 8, the most potent in terms of enhancing the absolute and relative home-buying capacities were the income and asset supplements; we should therefore consider their costs in NPV terms. In making this calculation, we assume that the $1,000, $5,000, and $10,000 asset supplements are one-time infusions and that the $1,000, $5,000, or $10,000 income supplements are given annually and maintained for varying periods of time, from 4 to 12 years, depending on the amount (a shorter duration for the lesser amounts and a longer period for the larger ones).[24] After 4 to 12 years, it is assumed that the renter's income would have risen sufficiently to compensate for the termination of outside assistance.

We calculate the NPV cost of the $1,000, $5,000, and $10,000 annual income supplement applied to borrowers seeking to purchase a modestly priced house with a GSE Standard Mortgage at $0.154 billion, $2.980 billion, and $7.008 billion, respectively, based on the above assumptions. The $1,000, $5,000, and $10,000 asset supplement, which is even more potent in realizing modestly priced homeownership with the GSE Standard Mortgage, is also more expensive, resulting in a NPV cost of $0.164 billion, $8.390 billion, and $67.920 billion, respectively.

In short, supplementing income and, especially, assets can dramatically enhance home-buying capacity. Both options are expensive, and the larger asset supplements are especially expensive. Policy makers must make decisions about the trade-offs. Providing a $10,000 asset supplement would raise the share of renters able to afford a modestly priced house with a GSE Standard Mortgage from 9.2 percent to 35.6 percent. The cost of this intervention, however—a staggering $68 billion—must be balanced against economic and noneconomic benefits, including the interest on larger mortgages paid to investors, the increased demand for real estate and home improvement services, and a variety of alleged sociological benefits associated with stable neighborhoods in which owners have a long-term stake. Scholars and policy makers remain deeply divided on the question of whether public policy should attempt to equalize homeownership. We point out that economic and sociological benefits are routinely invoked to justify the current subsidy to middle-class homeownership. Our calculations simply indicate an explicit price tag if these benefits are expanded to all renters, especially the underserved.

Many other costs need to be considered, for example, the long-term loan performance implications of the innovative mortgage products (Calem

[24] We make the following assumptions. The $1,000 annual income supplement is provided for 4 years; the $5,000 annual income supplement is provided for 8 years; and the $10,000 annual income supplement is provided for 12 years.

and Wachter 1996; Quercia and Stegman 1992). Although the FHA qualifies many people for homeownership because of its generous mortgage terms, its delinquency rate has historically been much higher than that of more restrictive conventional mortgages (Berkovec et al. 1997). Innovative mortgage products also carry a greater risk because they allow an increasing share of income to be applied to housing, not leaving much leeway to meet household medical and other unexpected expenses. A high housing debt ratio may also be imperiled by future changes, such as rising utility costs or a downturn in the economy that raises unemployment rates and creates other adverse effects. For these and other reasons, innovative mortgage products may engender higher delinquency rates than conventional mortgages—surely a cost. Fully quantifying the costs of the many possible policy options, however, is beyond the scope of this investigation.

Another type of risk is that mortgage innovation may expand homeownership opportunities but not in locations with better school systems and the other sought-after neighborhood traits that support future house-price appreciation (Galster and Killen 1995). In many American metropolitan areas, that often means homeownership in newer suburbs as opposed to inner-ring suburbs or inner-city locations. The 1999 *State of the Nation's Housing* reports that "large and growing shares of both minority and low-income households are buying homes in the suburbs" (Joint Center for Housing Studies 1999, 18). Nonetheless, we still do not have a clear picture of the geography of housing opportunity offered by mortgage innovation.

Summary: The achievements and limitations of mortgage innovation

Our simulations show the following:

1. Compared with their predecessors, current mortgage instruments are much more potent in furthering homeownership. Total national absolute home-buying capacity, which was approximately $314 billion under the Historical Mortgage,[25] has increased to between $500 billion and $600 billion under some of today's more liberal mortgages (table 3). Affordability has also increased. Under the Historical Mortgage, only 3.8 percent of renter families (1.0 million) could afford to purchase the target-priced home. With today's more aggressive mort-

[25] The mortgage simulation can be extended to give further historical perspective. For example, the 1999 Fannie Mae Foundation Annual Housing Conference selected the FHA as one of the most significant housing achievements of this century. This is borne out by the Mortgage Model, which indicates that pre-FHA (i.e., before 1934), loan instruments would allow approximately $220 billion of national home-buying capacity among today's renters. That pre-FHA capacity is much lower than the roughly $600 billion afforded by the ultimately adopted FHA mortgage (FHA 203b—prior).

gage instruments, approximately 8 percent (2.0 million) can do so (table 5). Expressed another way, the *delta* or gain in home-buying capacity is about $300 billion. Compared with the historical baseline, approximately 1 million more renters can potentially buy the target house with the more liberal mortgage instruments.

2. The more liberal mortgage instruments offer incrementally rising home-buying opportunities. The national home-buying capacity is about $388 billion for the GSE Standard Mortgage. This figure increases to a range of $445 billion to $584 billion for the GSE Affordable Mortgages with the 3/2 option activated and including the emerging category, and it is in the $511 billion to $601 billion range for the Portfolio Affordable and Government Affordable Mortgages (table 2).

3. The FHA loans are some of the most potent mortgage products offered. Since these loans have, in fact, been offered for decades, the FHA must be credited as a trailblazer of contemporary mortgage innovation.

4. Major hurdles remain. Even the most aggressive mortgage considered here (FHA included) allows only 2.0 million renter families to realize target-priced homeownership, leaving approximately 24 million renters unserved (table 5).

5. Lowering housing expectations helps, but a large gap still remains. Even the most liberal mortgage products considered here leave the vast majority of renter families unserved at *any* level. The most aggressive product leaves at least 21 million renter families—or about 80 percent of the total—*unable* to enter homeownership at even the low-priced threshold. Less advantaged subgroups (blacks and Hispanics) fare even worse (table 6).

6. Although many renters cannot shift their tenure status solely through mortgage innovation, the incremental gains provided by these products are important achievements, especially among minority populations. Absolute home-buying capacity for black and Hispanic renters, about $11 billion and $10 billion, respectively, under the Historical Mortgage, increases to approximately $42 billion and $28 billion, respectively, using the more liberal loan products considered here (table 4). Under the Historical Mortgage, the ability of blacks and Hispanics to afford a modestly priced house was barely measurable (approximately 2 percent of these renter groups); the most aggressive mortgage products considered here would allow approximately 4 to 6 percent of these minority groups to own the modestly priced house. Recent immigrant renters also gain from mortgage innovation.

7. The challenge of realizing homeownership is daunting, given renters' scant financial resources. Renters generally face both income and asset constraints, with the latter posing a major challenge. Traditionally underserved renters in particular are financially constrained. Black and Hispanic renters have an average family income of less than $20,000 and average assets of about $2,000. Nearly all of the renters in these groups, therefore, lack the resources to buy a target-priced home at a cost of almost $100,000.

8. Accepting the expansion of homeownership as an important societal goal will require layered interventions, such as furthering mortgage innovation along the continuum sketched here (e.g., lowering down payment costs and raising front-end and back-end ratios); reducing the price of housing (analogous to lowering the "housing bar" from the target-priced house to the lower-cost benchmarks); reducing transaction costs and the carrying costs of housing; and offering various asset and income subsidies. The most potent interventions are income and, especially, asset supplements. A $10,000 asset infusion could potentially allow more than one-third of all renters (and 20 percent of Hispanic and 30 percent of black renters) to realize modestly priced homeownership (table 7). However, income and asset supplements, especially the latter, can be very expensive (the $10,000 asset supplement for renters just described costs about $68 billion).

In attempting to expand homeownership opportunities through mortgage innovation, we must recognize some of the attendant risks. Traditionally underserved households that attain homeownership may be challenged to meet their mortgage obligations in an economic downturn. We must also work to expand the geography of housing opportunity so that mortgage innovation broadens access to favored suburban markets.

These pessimistic conclusions from the mortgage simulation must be tempered, however, with substantial real-world progress in expanding homeownership. We will conclude by contrasting simulation results with observed real-world progress.

Evaluation of simulation results

Our simulations indicate that relatively few renter families and hardly any minority renters can realize homeownership. These findings are similar to those of prior researchers. Since we have modeled much of our work on Savage (1997, 1999) and use a common database, it is appropriate to compare our results with his. We find an order-of-magnitude parallelism when we examine homeownership affordability for all renters (see table 9).

Table 9. **Percentage of All Renter Families That Can Afford Variously Priced Houses Using a GSE Standard Mortgage**

House Price	Savage (1997) (%)	Savage (1999) (%)	Listokin et al. (%)
Target	NA	NA	5.0
Median	8.6	6.7	6.3
Modestly priced	11.7	9.9	9.2
Low priced	15.1	12.8	12.1

NA = Not applicable.

Table 10. **Percentage of Renter Families by Type That Can Afford a Modestly Priced House Using a GSE Standard Mortgage**

Renter Type	Savage (1997) (%)	Savage (1999) (%)	Listokin et al. (%)
All	11.7	9.9	9.2
White (non-Hispanic)	14.2	14.4	13.1
Black (non-Hispanic)	3.3	3.2	2.7
Hispanic	4.1	3.3	1.8

The overall similarity of outcomes is also evident in table 10 when homeownership affordability of a modestly priced house is compared by renter category (race and Hispanic origin).

The small deviations between our results and those of Savage are likely due to differences in SIPP panels, variations in criterion home values and interest rates caused by different study periods, variations in assumed closing costs and underwriting procedures related to income, and different definitions of family.

It is important to understand the limitations of our simulation analysis, especially in light of empirical evidence of vigorous gains in homeownership, particularly among the traditionally unserved. Therefore, we next compare our results with data on actual growth in homeownership during the 1990s.

There are approximately 35 million renter households in the United States, including about 12.6 million black renter households. Our mortgage simulations suggest that, even without factoring in credit underwriting, only 9.2 percent of all renter households and 2.7 percent of black renter households[26] could afford the modestly priced house with the GSE Standard Mortgage (likely to be the most common mortgage product). That would translate into about 3.2 million total and 0.35 million black renter households having the capacity to become homeowners.

[26] This applies, in a gross fashion, our family-based simulations to households.

The above figures are stock rather than annual flow figures: That is, they are based on an application of the mortgage simulation model to all renters and represent the stock of renters that might qualify for homeownership at a given point in time. We would expect the stock figures to substantially exceed the flow of renters actually moving into homeownership in any given year.

In reality, actual net flow numbers on homeownership suggest that our estimated stock figures are too low. Between 1993 and the first quarter of 1999, there was a net increase of 7.8 million homeowners in the United States (Joint Center for Housing Studies 1999). Over that six-year period, there was a net gain of 1.2 million black homeowners. These numbers indicate that the number of homeowners increased on average by about 1.3 million annually for all groups and 0.2 million per year for blacks.[27] Both figures are high relative to our estimates of the total stock of renters who could afford homeownership.

Further, credit underwriting was not performed in our simulations. In other words, the mortgage simulations represent a best-case scenario. In the real world, credit is surely considered and would dampen affordability.

Other statistics also suggest more progress in real-world homeownership than is suggested by our simulation results. Home Mortgage Disclosure Act (HMDA) statistics, for example, show considerable recent progress in home purchase lending. For example, blacks secured 257,233 home purchase loans in 1997 versus 94,624 in 1990. The comparable figures for Hispanic home purchase loans were 254,382 in 1997 versus 100,022 in 1990. While the HMDA data include home purchase loans made to existing as well as new homeowners, the above gains in loans made to blacks and Hispanics stand in contrast to the results of our study, which indicate that very low numbers of black and Hispanic renters can purchase a home. To comport the above HMDA data with ours, one would have to assume that almost all of the minorities receiving a home purchase loan were move-up minority home buyers, as opposed to first-time purchasers, and that is unlikely.

Longitudinal analysis of the SIPP also poses incongruities. Of the 4,565 total families in the 1993 SIPP, 4,109 remained renters and 456 (4,565 – 4,109) became owners over the course of the panel interviews. This tenure change allows a backcast test. The mortgage simulation model

[27] It is quite possible that the gross number of renters converting to homeownership in a given year substantially exceeds the net increase in the number of homeowners because net gains reflect several gross flow components, some of which add to and some of which detract from the total number of homeowners. Although we do not have estimates for the time period covered by our study, during both the late 1970s and the late 1980s, the number of renters who converted to homeownership was almost double the net increase in homeowners (Crowe 1991).

allows us to predict the maximum home affordable to the 456 families as of the time they were renters. This, after all, is exactly what we do for the 4,109 renter families who remained renters. However, for the 456 families that changed tenure, we can compare our predicted maximum home-buying capacity with the price of the home that was actually bought. One would not expect that actual purchase values would mirror the modeled prices because some fluctuation around the latter is to be expected (e.g., renters may elect to buy a house that is priced at less than their absolute maximum home-buying capacity). However, within that fluctuation, we should not find many instances where families are consuming much more than what our mortgage simulation indicates is the ceiling.

In fact, the backcast analysis described above shows that 93 percent of the 456 families are buying houses that are priced higher than the affordable levels forecast by the mortgage simulation model. The gap between the modeled purchasing power and the actual home resource consumed is quite large. We find that *almost 88 percent of the 456 families purchased a home that is at least 50 percent more expensive than the price we model as affordable.* This gap must give considerable pause to SIPP-based mortgage simulation research.

These disparate statistics suggest that renters—especially traditionally underserved renters—have a home-purchasing capacity far greater than that suggested by SIPP-based mortgage simulations. That does not mean that the SIPP-based simulations are wrong, but rather that we must understand their limitations.

There are numerous reasons why observed homeownership gains may exceed what we and similar studies predict. First, SIPP data may understate the resources available to renters; respondents may underreport informal income or the hidden wealth associated with intergenerational or other wealth transfers (Boehm 1987; Gale and Scholz 1994; Gyourko, Linneman, and Wachter 1997). The mortgage industry is recognizing this underreporting phenomenon. For example, one Bank of America portfolio product, Zero Flex, will allow up to $600 a month in undocumented income. However, we apply a very stringent standard when conducting simulations based on the income statistics in the SIPP. These simulations might be improved by obtaining guidance from lenders, community groups, and others who deal with renter populations (especially the traditionally underserved) on the hidden financial resources that may be available to renters from relatives and other sources.

We must also recognize that the SIPP renter data, even if fully accurate, represent a fixed point in time and that renters electing to become homeowners can bootstrap themselves financially. For example, the head of a household can take a second job, a nonemployed spouse can enter the labor force, or discretionary spending can be reduced. Given the low

LTVs of today's mortgages and therefore the tremendously lower down payment requirements, the actions just noted can quickly yield results.

Researchers are increasingly recognizing the endogenous relationship between savings and the decision to purchase (Haurin, Hendershott, and Wachter 1997). Thus, renters may very well raise their savings rate just before buying a home. Traditionally underserved renters, many of whom have the income but not the down payment to buy a house, may simply delay saving until they are ready to choose homeownership.

Thus, we must be careful when we draw conclusions from a SIPP-derived model. Similar cautions apply to others working with other data sources. If we apply the simulation model with the data as given, we are likely to underestimate renters' true home-buying capacity. The results that we, as well as Savage, and others, have obtained are informative, but they also convey gross orders of magnitude or relative order of accomplishment across mortgage instruments as opposed to literal potential market penetrations. For example, we find that 1.0 percent of black renter families (43,113) could have afforded a target-priced home with a Historical Mortgage. The figures increase with today's loan products: 1.5 percent of black renter families (66,321) can afford the target-priced house with a GSE Standard Mortgage and 2.1 percent (95,041) can be served with both the Fannie Mae CHBP and the Freddie Mac AG. Product managers at the GSEs should *not* take these figures literally as representing maximum market captures. Instead, the lessons are that the GSE affordable products offer a slight gain in affordability over the Historical Mortgage, and that the Freddie Mac mortgages as a whole offer a slight gain in affordability relative to their Fannie Mae equivalents. The simulations also indicate that although commendable progress has been made from the historical baseline, much remains to be done to expand homeownership opportunities to traditionally underserved populations.

Refining the results of the mortgage simulations will require better data on and understanding of renters. We need more insight into the relationship between savings and the decision to purchase. Access to credit score data is especially critical for improving the simulations. In addition, simulations do not consider housing availability, another component of the affordability equation worthy of future study.

Finally, even with enhanced data, the mortgage simulations report only the mathematical calculation of home-buying capacity based on the confluence of the renter's financial profile and the loan terms. As the mortgage industry changes the latter, home-buying capacity expands. This study documents the significant gain provided by mortgage innovation as of 1998–1999, yet mortgage innovation is only a first step to a more comprehensive approach to expanding homeownership.

The more encompassing approach adds other components to the very real contributions of mortgage innovation. Subsidies from the public sector, foundations, intermediaries, and other sources help bridge the financial gap. Partnerships of various types—lenders joining forces with other for-profit entities, government, and the nonprofit sector—are also commonly used to address the multiple barriers to homeownership that arise at different stages of the home-buying process. To reach the disaffected, for example, a lender will typically join forces with a church or neighborhood group. Counseling to address credit issues and educating prospective home buyers often involve similar alliances. Also, ensuring that traditionally underserved households remain long-term, successful borrowers often requires a joint effort by the lender and a nonprofit counselor.

A companion study to the current investigation presents detailed case studies of the comprehensive approach described above (Listokin et al. 2000). One example is the Little Haiti Housing Association (LHHA), which is bringing homeownership to one of the most disadvantaged populations—very low income Haitian immigrants living in an impoverished neighborhood (Little Haiti) in Miami. LHHA is currently qualifying households earning approximately $18,000 to $20,000 to purchase homes costing about $80,000. To bring these Haitians to homeownership, LHHA undertakes a broad array of activities, from outreach to innovative financing to extensive postpurchase contact with new owners. The financial interventions alone involve intricate, multilayered subsidies with participation by private lenders, soft seconds from Miami–Dade County and the federal government, third mortgages from the Federal Home Loan Banks' Affordable Housing Program, and other nuanced adjustments. The key implication of LHHA's creative and entrepreneurial approach to homeownership, as well as the examples of similar "market-making" efforts by other groups and institutions (Listokin et al. 2000; Rohe et al. 1998), is the limited role of mortgage innovation alone. Although innovative products and liberalized underwriting occupy a central role in expanding homeownership by delivering affordability gains through widely diffused, standardized practices, many parts of the underserved market require comprehensive partnership strategies between community and nonprofit groups, philanthropic foundations, public agencies, and private-sector institutions (Listokin and Wyly 1998; Listokin et al. 2000; Rohe et al. 1998).

These comprehensive partnership strategies are contributing to impressive homeownership gains in the United States. It remains to be seen, however, whether these recent gains are conferring equivalent homeownership benefits on different groups and can be sustained if the current uncertainty in macroeconomic conditions foreshadows a significant or prolonged downturn.

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