

CBO

Options to Manage FHA's Exposure to Risk From Guaranteeing Single-Family Mortgages



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Notes

Unless otherwise indicated, all years referred to in this report are federal fiscal years, which run from October 1 through September 30 and are designated by the calendar year in which they end.

Numbers in the text, tables, and figures may not add up to totals because of rounding.



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Summary

The Federal Housing Administration (FHA) insures the mortgages of people who might otherwise have trouble getting a loan, particularly first-time homebuyers and low-income borrowers seeking to purchase or refinance a home. During and just after the 2007–2009 recession, the share of mortgages insured by FHA grew rapidly as private lenders became more reluctant to provide home loans without an FHA guarantee of repayment. FHA's expanded role in the mortgage insurance market ensured that borrowers could continue to have access to credit. However, like most other mortgage insurers, FHA experienced a spike in delinquencies and defaults by borrowers.

Recently, mortgage borrowers with good credit scores, large down payments, or low ratios of debt to income have started to see more options in the private market. The Congressional Budget Office estimates that the share of FHA-insured mortgages going to such borrowers is likely to keep shrinking as credit standards in the private market continue to ease. That change would leave FHA with a riskier pool of borrowers, creating risk-management challenges similar to the ones that contributed to the agency's high levels of insurance claims and losses during the recession.

This report analyzes policy options to reduce FHA's exposure to risk from its program to guarantee single-family mortgages, including creating a larger role for private lenders and restricting the availability of FHA's guarantees. The options are designed to let FHA continue to fulfill its primary mission of ensuring access to credit for first-time homebuyers and low-income borrowers.

What Is FHA's Exposure to Risk?

As a guarantor of mortgages, FHA does not lend money directly to borrowers; instead, it insures lenders against borrowers' default. Under the terms of its insurance, FHA agrees to reimburse the lender for the unpaid balance of the mortgage and any accrued interest if the

borrower defaults. To partly offset the costs of that guarantee, FHA charges the borrower an up-front fee and annual insurance premiums.

FHA's exposure to risk on its mortgage guarantees creates uncertainty about how much they will end up costing the federal government. Those costs vary mainly because of the potential for unexpected changes in FHA's cash flows because of insurance losses (payments of lenders' claims minus recovered proceeds from selling foreclosed properties). Costs also vary, to a lesser degree, because of unanticipated changes in the amount of premiums collected and in market interest rates. FHA's insurance losses are subject to risk because the amount of loss depends on the extent to which economic conditions—and their effect on borrowers—differ from what was predicted when a mortgage was issued.

The cost of FHA's risk exposure can be measured in various ways. In this report, CBO uses the fair-value estimate of insurance losses, a market-based measure of the cost of the insurance losses generated by the single-family program. For the newly originated mortgages that the program is projected to guarantee in 2018, CBO estimates the fair value of insurance losses at \$19 billion over the life of those loans (9 percent of their total dollar amount). Successive years' cohorts of new guarantees could experience larger or smaller insurance losses over their lifetimes.

What Policy Options Did CBO Analyze?

Many changes have been proposed to reduce the cost of risk to the federal government from FHA's single-family mortgage guarantees. CBO analyzed illustrative versions of seven policy options, which generally represent the range of approaches that policymakers and others have proposed:

- Guaranteeing some rather than all of the lender's losses on a defaulted mortgage;
- Increasing FHA's use of risk-based pricing to tailor up-front fees to the riskiness of specific borrowers;

- Adding a residual-income test to the requirements for an FHA-insured mortgage to better measure borrowers' ability to repay the loan (as the Department of Veterans Affairs does in its mortgage guarantee program);
- Reducing the limit on the size of a mortgage that FHA can guarantee;
- Restricting eligibility for FHA-insured mortgages only to first-time homebuyers and low- to moderate-income borrowers;
- Requiring some borrowers to receive mortgage counseling to help them better understand their financial obligations; and
- Providing a grant to help borrowers with their down payment, in exchange for which FHA would receive part of the increase in their home's value when it was sold.

Although some of those approaches would require action by lawmakers, several of the options could be implemented by FHA without legislation. In addition, certain options could be combined to change the nature of FHA's risk exposure or the composition of its guarantees. CBO did not examine the results of combining options.

What Effects Would the Policy Options Have?

Making one or more of those policy changes would affect FHA's financial position, its role in the broader mortgage market, and the federal budget. All of the options would improve the agency's financial position by reducing its exposure to the risk of losses on the mortgages it insures (see Table 1). The main reason for that reduction would be a decrease in the amount of mortgages guaranteed by FHA. CBO projects that under current law, FHA would insure \$220 billion in new single-family mortgages in 2018. The options would lower that amount by anywhere from \$15 billion to \$77 billion (see Figure 1). Some options would also reduce FHA's risk exposure by decreasing insurance losses as a percentage of the value of the guaranteed mortgages.

The options would have differing effects on the composition of the portfolio of mortgages insured by FHA. Those changes would affect the expected level of borrowers' defaults across the portfolio and the number of first-time homebuyers and low-income borrowers who would receive an FHA-guaranteed loan.

The costs or savings associated with the options differ depending on how those effects are measured. The Federal Credit Reform Act of 1990 (FCRA) requires that the impact of the mortgages that FHA guarantees each year be recorded in the federal budget on a present-value basis. That present-value subsidy cost is calculated as the difference between the present values of the insurance losses expected to occur and the fees and premiums expected to be collected on those guarantees over their lifetime. (A present value is a single number that expresses a flow of income or payments in terms of an equivalent lump sum received or paid today.) On a FCRA basis, the \$220 billion in new single-family mortgages that FHA is projected to insure in 2018 will be recorded in the budget as producing *savings* of about \$7 billion because the present value of fees and premiums is projected to exceed the present value of insurance losses.

A more comprehensive way to measure the cost of FHA's guarantees is on a fair-value basis. Fair-value estimates account for the cost of market risk—the risk that taxpayers face because federal payments to cover losses on guaranteed mortgages tend to be high when economic and financial conditions are poor and resources are therefore more valuable. Such estimates reflect the cost that private institutions would assign to similar credit assistance based on market prices. On a fair-value basis, the new single-family mortgages that FHA is projected to insure in 2018 are estimated to *cost* the government about \$5 billion because the estimated market value of insurance losses is projected to exceed the estimated market value of fees and premiums.¹

The options that CBO analyzed would decrease the budgetary savings that the single-family program shows under FCRA accounting. The reason is that most of the loans that FHA would guarantee under current law but not under the options are projected to provide savings on a FCRA basis in CBO's baseline. On a fair-value basis, however, the reduction in the volume of guarantees would decrease the program's cost because those forgone loans are estimated to cost the government money, on average, with market risk taken into account.

1. For more information about the differences between the effects of FHA's guarantees on a FCRA basis and a fair-value basis, see Chad Chirico and Susanne Mehlman, "FHA's Single-Family Mortgage Guarantee Program: Budgetary Cost or Savings?" *CBO Blog* (October 21, 2013), www.cbo.gov/publication/44628.

Table 1.

General Effects of Various Policy Options on FHA's Single-Family Mortgage Guarantee Program

Option	FHA's Exposure to the Risk of Losses on Insured Mortgages Would Be Reduced Because of:		The Volume of FHA-Insured Mortgages to First-Time Homebuyers and Low-Income Borrowers Would:	On a FCRA Basis, Savings Would Decline Because of: ^b		On a Fair-Value Basis, Costs Would Decline Because of: ^c
	A Decline in the Volume of Guarantees	A Decrease in the Average Loss per Loan ^a		A Reduction in the Volume of Guarantees	An Increase in the FCRA Subsidy Rate	A Reduction in the Volume of Guarantees
Partial Guarantees	Yes	Yes	Decline because of higher interest rates or fees charged by private lenders to some borrowers	Yes	Yes	Yes
Risk-Based Pricing	Yes	Yes	Decline because of higher fees charged by FHA to some borrowers	Yes	No	Yes
Residual-Income Test	Yes	Yes	Decline because of restrictions created by income test	Yes	No	Yes
Lower Loan Limits	Yes	No	Be largely unaffected	Yes	Yes, a small one	Yes
Restricted Eligibility	Yes	No	Be unaffected	Yes	No	Yes
Mortgage Counseling	Yes	Yes	Decline as some borrowers opt to forgo loans because of the counseling requirement	Yes	No	Yes
Down-Payment Grants in Exchange for Shared Appreciation	Yes	Yes	Decline as some borrowers opt to forgo loans because of the shared-appreciation requirement	Yes	No	Yes

Source: Congressional Budget Office.

Details of the policy options that CBO analyzed are explained in the text.

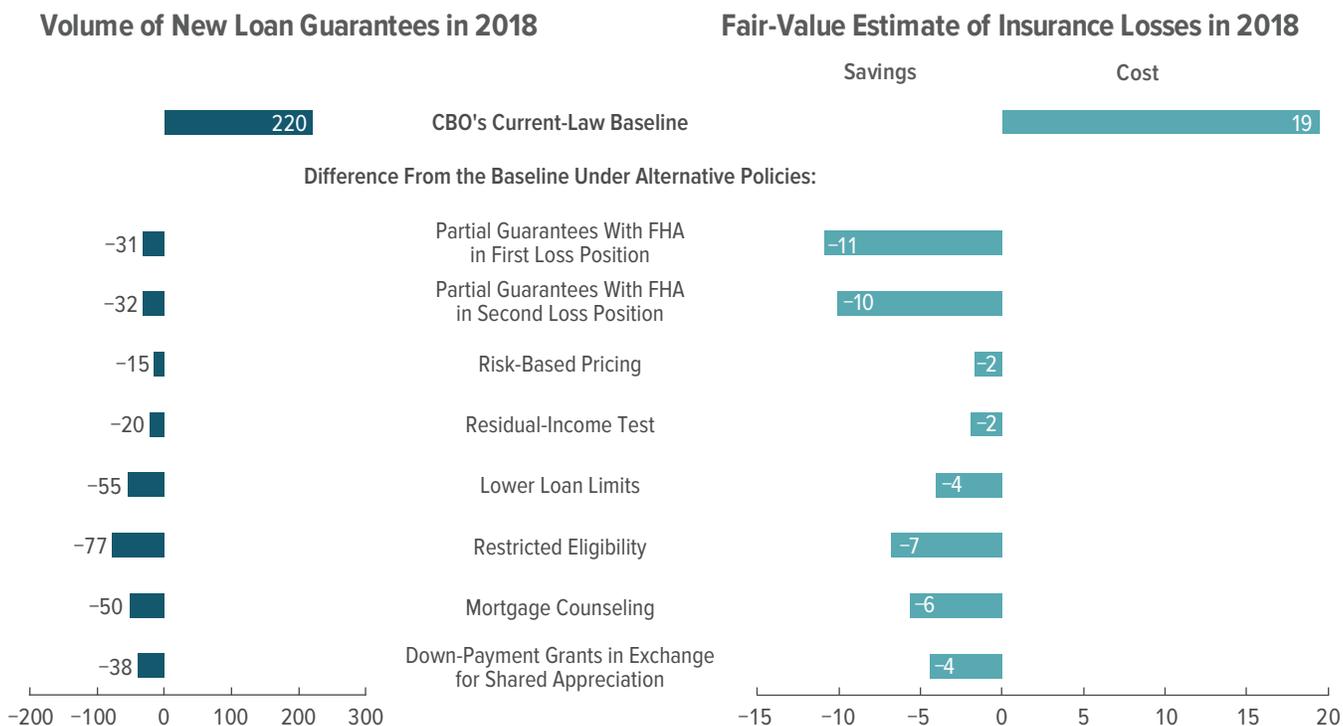
FCRA = Federal Credit Reform Act of 1990; FHA = Federal Housing Administration.

- a. The average loss per loan is also known as the weighted-average insurance loss rate.
- b. Under the requirements of the Federal Credit Reform Act, the impact of the mortgages that FHA guarantees each year is recorded in the federal budget on a present-value basis. That present value—also called a subsidy cost—is calculated as the difference between the present values of the insurance losses expected to occur and the fees and premiums expected to be collected on those guarantees over their lifetime. (A present value is a single number that expresses a flow of income or payments in terms of an equivalent lump sum received or paid today.) In all years, FHA's new single-family guarantees show savings in the budget because the present value of fees and premiums is projected to exceed the present value of insurance losses.
- c. On a fair-value basis, which is a more comprehensive way to measure the effects of federal loan guarantees, FHA's new single-family guarantees would show costs each year because the estimated market value of insurance losses is projected to exceed the estimated market value of fees and premiums. Unlike FCRA estimates, fair-value estimates account for the cost of market risk, the risk that taxpayers face because federal payments to cover losses on guaranteed mortgages tend to be high when economic and financial conditions are poor and resources are therefore more valuable.

Figure 1.

Effects of Various Policy Options on the Volume of Guarantees and Insurance Losses in FHA's Single-Family Program in 2018

Billions of Dollars



Source: Congressional Budget Office.

Details of the policy options that CBO analyzed are explained in the text.

FHA = Federal Housing Administration.

FHA's Role in the Single-Family Mortgage Market

The Federal Housing Administration's single-family program provides federal guarantees of mortgages that lenders make to borrowers who might otherwise find it difficult to obtain credit, including first-time homebuyers and low-income borrowers. Because the program is discretionary, the volume of its new loan guarantees is limited through the annual appropriation process. Different methods can be used to measure the cost or savings of the program; those methods produce different estimates of the program's budgetary impact and riskiness.

FHA absorbs the credit risk inherent in mortgages by protecting the holders of those loans from losses they would otherwise incur when borrowers default. With that protection, lenders can charge lower interest rates to

FHA-insured borrowers than they would otherwise, thus increasing those borrowers' access to mortgage credit. FHA sets premium levels for its guarantees to offset the initial projection of their costs, but whether the agency realizes gains or losses on its guarantees depends mainly on the number of FHA-insured borrowers who default and the cost of those defaults.

FHA uses premiums and other policies to try to manage the cost and risk exposure of the single-family program. In doing so, FHA has to balance those objectives against its other operational goals, which change with overall economic conditions. For example, during periods of financial crisis, FHA's operational focus becomes ensuring that all mortgage borrowers have access to credit, not just the low-income borrowers and first-time homebuyers who are its priority at other times. (In addition to insuring mortgages on single-family homes,

Box 1.**FHA's Guarantees of Multifamily Loans and Reverse Mortgages**

The single-family mortgage guarantee program is the Federal Housing Administration's (FHA's) largest program. In addition, the agency operates several guarantee programs that focus on affordable rental units or on the unique housing needs of senior citizens.

To encourage the supply of rental housing for low- and moderate-income families, the federal government supports the market for multifamily mortgages in various ways, including through three FHA programs that guarantee mortgages on multifamily properties:¹

- The multifamily development program guarantees loans for the construction or rehabilitation of multifamily housing units. Those loans, which can finance up to 90 percent of a building's replacement cost, can have terms as long as 40 years. Developers that use the program to finance buildings are not required to make units available for rent to low-income families.
- The refinance program guarantees loans to purchase existing multifamily buildings or to refinance existing mortgages on such buildings. The program provides guarantees for mortgages with terms of up to 35 years and allows for refinancing up to 90 percent of a property's appraised value. Refinance loans can be insured by the program regardless of whether the existing mortgages being refinanced were guaranteed by FHA.
- The tax credit program insures loans that would be eligible for a guarantee under the two programs listed above but that are associated with projects that use federal tax provisions, such as the low-income housing tax credit (LIHTC). By design, loans guaranteed by this program support a

higher concentration of low-income multifamily rental units than similar loans guaranteed by FHA's other programs.

The LIHTC encourages the development of low-income housing by reducing the tax liabilities of private developers in exchange for their developing low-income rental units. Developers can sell those tax credits, raising money for their projects and reducing the amount of debt needed to complete construction. Lower debt-service costs enable developers to maintain the expected return on their projects while offering the lower rents required to receive the LIHTC.

Besides its multifamily guarantee programs, FHA also insures private home-equity conversion mortgages (HECMs) for elderly homeowners. Such loans—also called reverse mortgages—enable homeowners who are at least 62 years old to withdraw some of the equity in their home in the form of monthly payments, a lump sum, or a line of credit. As long as they live in the home, borrowers are not required to repay their loan. But if the home ceases to be the borrower's primary residence, the outstanding balance (including payments made to the homeowner and any interest accrued on those payments) must be repaid. The borrower or the borrower's estate can either retain the home by repaying the HECM in full or can sell the home and repay the loan with the proceeds from that sale.

If the proceeds are not sufficient to repay the HECM's outstanding balance, FHA will fulfill the terms of its guarantee by paying the private lender the difference. In addition to the cost of the risk associated with that guarantee, FHA bears the costs of servicing (collecting payments on) some of the HECMs it insures. Although private lenders initially bear the servicing costs of the FHA-backed loans they originate under the program, when the outstanding balance of an HECM reaches 98 percent of the guarantee amount, the loan is assigned to FHA, and the agency assumes the servicing costs.

1. For more information about FHA's activities in the multifamily mortgage market, see Congressional Budget Office, *The Federal Role in the Financing of Multifamily Rental Properties* (December 2015), www.cbo.gov/publication/51006.

FHA guarantees mortgages on multifamily rental properties and reverse mortgages for elderly homeowners. Those programs, which are not part of this analysis, are described in Box 1.)

FHA-Insured Mortgages

The mortgages that FHA insures for buying or refinancing a single-family home have some of the same terms as mortgages available without an FHA guarantee, including repayment that is amortized over a period of up to 30 years and fixed or variable interest rates. However,

the size of a mortgage eligible for an FHA guarantee is subject to limits, set in statute, that vary with the median home price in the area where the property is located. In 2017, those limits range from \$275,665 in low-cost areas to \$636,150 in high-cost areas. The interest rates paid on FHA-insured mortgages are generally negotiated between borrowers and lenders. But in the case of adjustable-rate mortgages, which make up a very small portion of FHA-insured loans, FHA restricts the extent to which rates can change over time.²

The lender, borrower, and property must satisfy a range of other conditions for a mortgage to be eligible for an FHA guarantee.³ In particular, the lender is required to collect and verify certain information about the borrower and the property and to provide the borrower with various disclosures about his or her rights and obligations. (Failing to meet such requirements could expose the lender to penalties, including losing insurance coverage on loans that are shown to be defective.) Borrowers are generally required to have a minimum credit score, make a down payment equal to at least 3.5 percent of the property's value, be able to document their income to show that they can afford their monthly mortgage payment, not be delinquent on any federal debts, and intend to use the property being purchased or refinanced as their primary residence. Borrowers who can make only small down payments typically face lower mortgage costs with an FHA-insured loan than they would with a mortgage not guaranteed by FHA.⁴

As part of its guarantee, FHA reimburses the holder of the mortgage for the unpaid balance of the loan and any accrued interest if the borrower defaults on the scheduled payments. (The mortgage holder is either the original lender or an investor that bought a security backed by the mortgage.) FHA then either begins a loss-mitigation

process aimed at returning the borrower to repayment, sometimes by changing the terms of the loan, or sells the property and uses the proceeds to recover some of the costs it incurred in paying the mortgage holder's claim for reimbursement.

FHA also partially offsets the costs of its insurance by charging the borrower both an up-front fee based on the original loan amount and annual premiums based on the current loan amount and certain characteristics of the borrower and the mortgage.⁵ (Those premiums are not included in the borrower's interest rate.) Annual premiums vary with the length of the loan's repayment period and the loan-to-value ratio (the amount borrowed from the lender as a percentage of the purchase price of the home).

FHA's insurance makes it easier for lenders to get funding to make future mortgages by selling their current mortgages in the secondary market. In that market, aggregators purchase mortgages and pool them into mortgage-backed securities, which they sell to investors—a process called securitization. The guarantees provided by FHA and other mortgage insurers play a key role in the securitization process by insulating investors from losses on the loans underlying a mortgage-backed security, thus making the security easier for investors to value and trade in the secondary market.

The Budgetary Cost of FHA's Guarantees

FHA's single-family program is discretionary, so the total volume of new mortgage guarantees it can issue is set by lawmakers in the annual appropriation process.⁶ The

2. See Department of Housing and Urban Development, *Actuarial Review of the Federal Housing Administration Mutual Mortgage Insurance Fund Forward Loans for Fiscal Year 2016* (prepared by Integrated Financial Engineering, November 15, 2016), p. 35, <http://tinyurl.com/y7fyoa5>.

3. See Department of Housing and Urban Development, *FHA Single Family Housing Policy Handbook*, Handbook 4000.1 (December 2016), Chapter II, <http://tinyurl.com/yaqdxkqw>.

4. For example, see the comparison of costs between mortgages insured by FHA and those insured by Fannie Mae or Freddie Mac in Urban Institute, Housing Finance Policy Center, *Housing Finance at a Glance—A Monthly Chartbook* (May 2017), p. 33, <http://tinyurl.com/ycaqft6>.

5. See Department of Housing and Urban Development, *FHA Single Family Housing Policy Handbook*, Handbook 4000.1 (December 2016), Appendix 1.0, <http://tinyurl.com/yaqdxkqw>.

6. Although the single-family program and FHA's other loan guarantee programs are discretionary, they can be modified outside the appropriation process. Authorizing committees may write legislation that affects FHA's programs. Changes to the programs could affect offsetting collections, but those changes would not directly affect the appropriations of other programs of the Department of Housing and Urban Development (HUD). However, in the broader appropriation process, offsetting collections allow appropriators to spend additional funds under specified caps. If changes to FHA's programs reduced offsetting collections, they could reduce the amount of funds that appropriators had available to allocate more broadly. Conversely, increases in FHA's offsetting collections would provide appropriators with additional funds to allocate to other programs, including programs outside HUD.

projected costs or savings of loan guarantees to be made in a given fiscal year are accounted for in the federal budget on an accrual basis, as specified by the Federal Credit Reform Act. The accrual amount, often referred to as the subsidy cost, is the estimated lifetime cost of a loan guarantee. More specifically, it is the present value of FHA's estimated claim payments—minus recoveries, fees, and premiums—over the life of the guarantee. In most years, FHA's new single-family guarantees are estimated to produce a budgetary savings under FCRA accounting (because recoveries, fees, and premiums are estimated to exceed claims). Each year, the initial projected surplus or deficit from those new guarantees is credited to the program's capital reserve. The balance of that reserve is also adjusted annually for changes in the realized or projected net surpluses or deficits associated with past years' cohorts of loans.⁷

To estimate the subsidy cost of FHA's mortgage guarantees under FCRA, the cash flows of the single-family program are discounted to the date the loans are disbursed, using an interest rate for each year of the cash flows that corresponds to the interest rate on Treasury securities of comparable maturity. For example, the projected yield on Treasury securities maturing in two years is used to discount cash flows two years from the disbursement date, a three-year Treasury rate is used for cash flows three years from disbursement, and so on.

CBO projects that in 2018, the single-family program will guarantee \$220 billion in new loans (slightly more than 14 percent of the approximately \$1.6 trillion in mortgages that CBO forecasts to be originated that year).⁸ On a FCRA basis, those new guarantees are estimated to produce savings of about \$7 billion over their lifetime. That subsidy figure does not include federal

costs to administer the single-family program, which are accounted for separately. Administrative costs, which totaled about \$130 million a year in 2016 and 2017, are recorded in the budget in the year they are paid and are subject to annual appropriations.

In addition to FCRA estimates, CBO routinely provides fair-value estimates of FHA's mortgage guarantees to lawmakers on a supplemental basis, as required by the Concurrent Resolution on the Budget for Fiscal Year 2016. Those fair-value estimates represent the market price an investor would require to assume the portfolio of FHA's loan guarantee obligations. CBO projects that on a fair-value basis, the \$220 billion in new mortgages that FHA is projected to insure in 2018 will have a cost of approximately \$5 billion, because the present value of fees and premiums is estimated to fall short of the present value of insurance losses (claims net of recoveries).

The \$12 billion difference between the FCRA and fair-value estimates occurs because participants in financial markets would assign a higher cost than the FCRA measure does to insurance losses on FHA's guarantees. The reason is that FHA's losses tend to be larger when overall economic conditions are weak. In financial markets, transactions in which losses fluctuate with overall economic conditions are said to have market risk.⁹ By including the cost of market risk in the program's costs, fair-value estimates more closely match how the private sector evaluates the costs of financial transactions with such risks. Investors would generally demand higher compensation to bear losses in weak economic conditions than in strong economic conditions. When the federal government takes on market risk in its programs, the cost of that risk is effectively passed on to taxpayers and beneficiaries of federal programs, because they ultimately bear the consequences of the government's financial losses.¹⁰

Measuring FHA's Risk Exposure

The cost of FHA's single-family program could be higher or lower than initially projected because of unexpected changes in the program's risky cash flows. Like other mortgage insurers, FHA is exposed to the

7. See Francesca Castelli and others, *Modeling the Budgetary Costs of FHA's Single Family Mortgage Insurance*, Working Paper 2014-05 (Congressional Budget Office, September 2014), www.cbo.gov/publication/45711. The balance in the capital reserve account can be misinterpreted as a measure of FHA's solvency or as a measure of real resources available to offset additional spending by the federal government. FCRA gives FHA permanent and indefinite budget authority to draw funds from the Treasury even if FHA's capital reserve is insufficient, so FHA is never at risk of insolvency. Furthermore, the budgetary savings from FHA's loan guarantees under FCRA accounting are reported as an offset to other spending in the year the loans are disbursed; those savings are not available to offset spending in future years.

8. See Congressional Budget Office, "Federal Programs That Guarantee Mortgages" (June 2017), www.cbo.gov/about/products/baseline-projections-selected-programs#5.

9. The premiums that FHA collects also fluctuate with overall economic conditions and therefore are also subject to market risk.

10. See the testimony of Douglas W. Elmendorf, Director, Congressional Budget Office, before the House Committee on Financial Services, *Estimates of the Cost of the Credit Programs of the Export-Import Bank* (June 25, 2014), pp. 8–10, www.cbo.gov/publication/45468.

risk of higher-than-expected losses mainly because of credit risk, which stems from its obligation to repay the mortgage holder when a borrower defaults.¹¹ The credit risk of a loan—one of the most significant risks posed by investments in mortgages—results from the possibility of unanticipated changes in the likelihood and severity of losses from a default by the borrower.

FHA issues guarantees for a group of mortgages every year, and the credit risk of that cohort is defined as the total credit risk of the individual loans in the group. The losses stemming from credit risk vary among cohorts mainly because of the composition of the loans in the cohort and the frequency and severity of defaults on those loans. For example, the cumulative default rate on FHA-guaranteed single-family mortgages six years after issuance was less than 5 percent for the 2002–2004 cohorts, rose to more than 10 percent for the 2006–2008 cohorts, and then fell back to less than 3 percent for cohorts after 2010.¹²

The severity of FHA's losses on insured mortgages has also varied over time, in part because of changes in the state of the housing market and the economy. For example, the loss rate on defaulted loans—the amount of the insurance loss on a mortgage as a percentage of the unpaid principal balance—averaged about 40 percent before the collapse of the housing market in 2007 but averaged 55 percent from 2007 to 2015.¹³ (The average loss rate dropped back to pre-2007 levels in 2016.)

There are many ways to measure FHA's exposure to credit risk, all of which ultimately attempt to capture aspects of the distribution of potential losses. In theory, potential losses range from zero (no FHA-insured loans

default) to 100 percent (all FHA-insured loans default, and the agency recovers nothing on any of them). However, even under the most adverse market conditions, FHA's ultimate risk exposure is less than 100 percent of the unpaid principal balance of its insured mortgages because the agency typically recovers a portion of its claim payments through loss-mitigation efforts (such as temporarily lowering borrowers' payments and offering flexible refinancing programs) or through sales of foreclosed property.

An increasingly common approach to measuring risk exposure is to use stress tests, simulations that provide estimates of losses under adverse economic conditions. From the perspective of federal budgeting, stress-test scenarios tied to adverse economic conditions have the desirable trait of drawing attention to outcomes that can occur when the pressure on federal spending and revenues is likely to be largest. But a limitation of stress tests is that they depend on specific economic scenarios that provide little guidance about the likelihood of the estimated losses.

One possible measure of the cost of the single-family program's exposure to credit risk is the present value of expected insurance losses based on the distribution of possible outcomes in a given year, which essentially weights those outcomes in proportion to their likelihood of occurring. That measure is the insurance-loss component of a FCRA estimate of the program's budgetary cost. For the new mortgages that the program is projected to guarantee in 2018, CBO's estimate of the present value of FHA's expected insurance losses is approximately \$8 billion, or less than 4 percent of the total amount of those mortgages.

The present value of expected losses would rise if FHA's policies changed in ways that widened the distribution of losses, such as a shift to guaranteeing mortgages with higher loan-to-value ratios. But the present value of expected losses would remain the same if policies changed in ways that increased the likelihood of losses in weak economic conditions and produced an equally likely reduction in losses in stronger economic conditions.

An alternative measure of the single-family program's exposure to credit risk—which CBO uses in this analysis—is the insurance-loss component of a fair-value estimate of the program's cost. That measure is more comprehensive than the FCRA measure described above because, by including an adjustment for market risk,

11. FHA is also exposed, to a lesser extent, to other types of risks inherent in the mortgage market. They include prepayment risk (the possibility that interest rates will fall, prompting more borrowers than expected to prepay their mortgages, thus reducing FHA's premium receipts), interest rate risk (the possibility that interest rates will differ from the discount rate used to calculate the present value of FHA's future premiums), and counterparty risk (the possibility that the institutions that service FHA-insured loans will not make premium payments to FHA in a timely manner or that lenders will not honor their obligations). The policy options considered in this report primarily affect FHA's exposure to credit risk.

12. See Department of Housing and Urban Development, *Actuarial Review of the Federal Housing Administration Mutual Mortgage Insurance Fund Forward Loans for Fiscal Year 2016* (prepared by Integrated Financial Engineering, November 15, 2016), p. H-3, <http://tinyurl.com/y7fyyoa5>.

13. *Ibid.*, p. E-4.

it implicitly puts more weight on losses that occur in adverse economic conditions. As a result, the fair-value measure of credit risk would rise (rather than remain the same) if policies changed in ways that increased the likelihood of losses in weak economic conditions and produced an equally likely reduction in losses in stronger economic conditions.

For the 2018 cohort of new single-family guarantees, CBO's estimate of the fair value of FHA's insurance losses is approximately \$19 billion, or 9 percent of the total amount of those mortgages. The fair-value estimate of insurance losses is higher than the FCRA estimate because of the market risk inherent in FHA's guarantees.

How FHA Manages Its Risk Exposure

Managing the risk of unexpected increases in the cost of the single-family program is an important operational goal for FHA. The agency manages its exposure to risk mainly through its policies on fees and premiums and on underwriting (the standards it sets for issuing a guarantee). But how high FHA sets its fees and premiums and how stringently it sets its underwriting standards may conflict with other goals of the agency. The Cranston-Gonzalez National Affordable Housing Act of 1990 specified the following aims for FHA: maintaining an adequate ratio of capital to risk exposure (known as capital adequacy), providing access to mortgage credit, minimizing the risks posed to the agency and borrowers by defaults, and avoiding adverse selection (that is, not insuring a disproportionately risky set of borrowers within a given risk pool).¹⁴ FHA must weigh the goals related to managing its risk exposure against the other operating goals of the single-family program.

FHA aims to maintain a 2 percent capital ratio for the program. The capital ratio is measured as the program's existing net capital resources plus the present value of projected fees and premiums (net of projected claims) on currently insured mortgages, divided by the total unpaid balance of those mortgages, using the same present-value concept used to compute the budgetary cost of the program. The capital ratio is not a measure of the actual resources available to offset losses in the single-family program. Instead, it is an accounting device used to track the net value of FHA's insurance obligations and to guide FHA in setting premiums.

To satisfy the capital-ratio requirement, FHA generally sets fees and premiums on newly insured mortgages such that the present value of fees and premiums exceeds the present value of expected insurance losses on those mortgages by at least 2 percent. If incurred losses cause FHA's capital ratio to fall below 2 percent, the agency may increase the fees and premiums it charges new borrowers to return the capital ratio to the target level over a given period. One way that FHA manages the risk exposure of individual cohorts is to pass the costs of unexpected losses on to future cohorts. However, doing that can conflict with FHA's other operational goals—in particular, the goal of ensuring access to credit.

FHA uses underwriting requirements to attempt to reduce its exposure to insurance losses. Although FHA sets fees and premiums primarily to cover its budgetary costs, differences between its fees and premiums and those of private lenders or other mortgage insurers can affect the demand for FHA's guarantees and hence the size of the agency's risk exposure. To better match premiums to risk exposure, FHA offers lower premiums to borrowers who make a down payment of more than 10 percent. How FHA sets its fees and premiums relative to those of lenders or other insurers also affects the composition and risk of FHA's portfolio of insured mortgages and the extent to which the agency will incur costs from adverse selection. FHA pursues loss-mitigation efforts to fulfill the goal of reducing the projected impact of defaults on itself and borrowers. However, it is not clear to what extent those various policies decrease FHA's exposure to risk.¹⁵

Shifts in FHA's Role in the Mortgage Market

Overall conditions in the mortgage market affect the role that FHA plays.¹⁶ During the financial crisis that began in 2007, private mortgage lenders and insurers in the single-family market tightened their credit standards. As a result, the share of newly originated mortgages insured by FHA rose from an average of less than 10 percent during the 2002–2007 period to approximately 20 percent during the 2008–2009 period. To stem the rising tide of foreclosures, FHA created programs to help borrowers refinance mortgages that had become unaffordable to them. In addition, a much larger share of FHA's

14. Cranston-Gonzalez National Affordable Housing Act of 1990, P.L. 101-625, 104 Stat. 4079.

15. See Janice Eberly and Arvind Krishnamurthy, "Efficient Credit Policies in a Housing Debt Crisis," *Brookings Papers on Economic Activity* (Fall 2014), pp. 73–136, www.brookings.edu/past-issues-archives/.

16. See John C. Weicher, "FHA in the Great Recession: Rebalancing Its Role," *Housing Policy Debate*, vol. 24, no. 3 (2014), pp. 637–643, <http://dx.doi.org/10.1080/10511482.2013.812572>.

guarantees went to borrowers who had better credit histories than those of typical FHA-insured borrowers before the financial crisis. Those changes were among the many federal interventions aimed at stabilizing the housing market and the economy during the financial crisis.

In the past several years, the recovery of the housing market and a stronger economy have improved the outlook for the performance of mortgages, including those insured by FHA. The recovery has also led private mortgage insurers to increase their participation in the market. Although FHA's share of the market has declined, the agency still guaranteed an average of almost 15 percent of the total number of newly originated mortgages issued in the single-family market between 2011 and 2016 (see Table 2). That percentage has led some analysts to call for FHA to shrink its role in the market further. Their view is consistent with the Office of Management and Budget's guidance to administrators of credit programs: "[Ongoing agency] review should estimate the extent to which the program substitutes directly or indirectly for private lending, and analyze any elements of program design that encourage and supplement private lending activity, with the objective that private lending is displaced to the smallest degree possible by agency programs."¹⁷

One challenge in shrinking FHA's portfolio is that such a reduction has adverse budgetary implications under FCRA accounting. Each new cohort of guarantees is recorded as producing savings, and under current budget enforcement rules, those savings can be used to offset other spending. That situation creates an incentive for lawmakers to retain or increase the size of FHA's portfolio.

Other analysts argue that despite FHA's expanded role in the mortgage market since the financial crisis, the agency has focused too little attention on ensuring the availability of credit to low-income borrowers and first-time homebuyers. That view is bolstered by the fact that the share of high-risk borrowers in the single-family program—usually defined as borrowers with credit scores below 620 and low income—fell during the financial crisis and has remained low since then (see Figure 2).

17. Office of Management and Budget, *Policies for Federal Credit Programs and Non-Tax Receivables*, Circular A-129 (revised January 2013), Section IIA, www.whitehouse.gov/omb/circulars_a129_rev2013.

Table 2.

FHA's Share of the Single-Family Mortgage Market

Calendar Year	Percentage of Newly Originated Single-Family Mortgages Guaranteed by FHA	
	By Loan Volume	By Dollar Volume
1996	12	9
1997	14	9
1998	11	8
1999	10	7
2000	12	9
2001	11	8
2002	7	5
2003	5	4
2004	5	3
2005	3	2
2006	3	2
2007	5	3
2008	20	16
2009	21	18
2010	18	15
2011	14	13
2012	12	11
2013	13	11
2014	13	11
2015	16	14
2016	16	13

Source: Congressional Budget Office, using data from Department of Housing and Urban Development, *FHA Single Family Market Share, 2016 Q4*, <http://tinyurl.com/y8mwa977>.

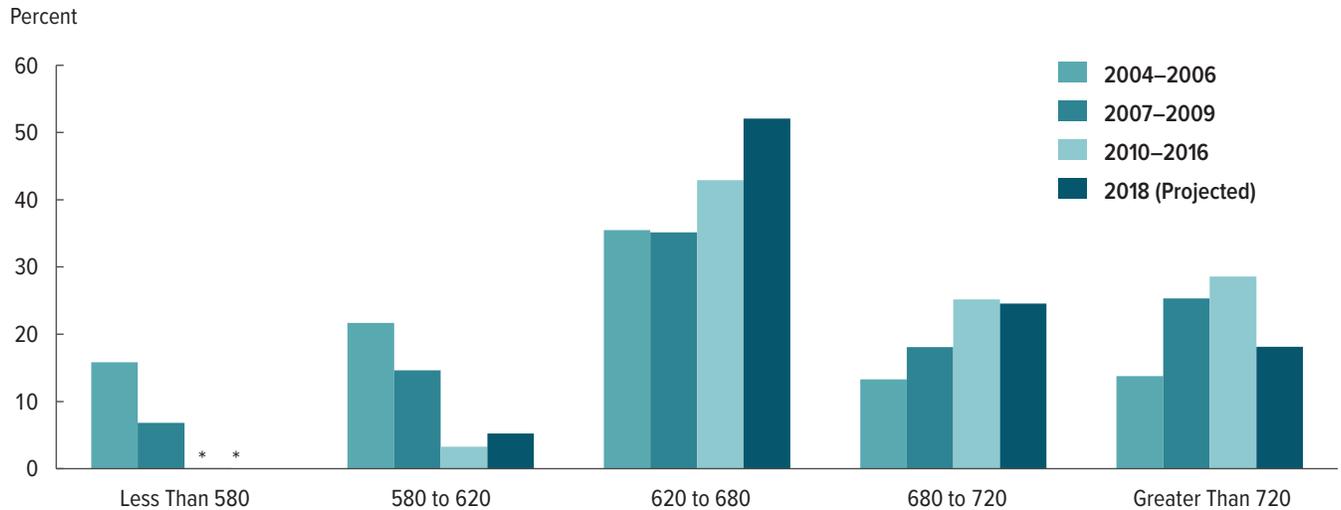
FHA = Federal Housing Administration.

CBO projects that by 2018, the composition of FHA's single-family mortgage guarantees will begin to shift back to focusing on borrowers with credit scores below 680. That shift is being driven less by changes in FHA's premiums or underwriting requirements than by projected changes in the market for private mortgage insurance.¹⁸ CBO estimates that private insurers will continue to expand their presence in the market, including insuring borrowers with low down payments but high credit scores. As a result, CBO estimates, FHA's share of those borrowers will decline.

18. Calculations by the Urban Institute show that under the pricing in effect in 2017, an FHA guarantee offers a lower initial monthly payment than a private guarantee does for borrowers with credit scores as high as 739. See Urban Institute, Housing Finance Policy Center, *Housing Finance at a Glance—A Monthly Chartbook* (May 2017), <http://tinyurl.com/ycaqftt6>. CBO's baseline projections do not imply that the shift in the composition of FHA's guarantees will stem from an increase in FHA's pricing for borrowers with high credit scores; rather, that shift is projected to result from a reduction in pricing by lenders not offering FHA-insured mortgages.

Figure 2.

Changes Over Time in the Distribution of Single-Family Mortgages Guaranteed by FHA, by Borrower's Credit Score



Source: Congressional Budget Office, using data from the Department of Housing and Urban Development.

The mortgages shown here, which are weighted by dollar volume, have loan-to-value ratios greater than 95 percent.

FHA = Federal Housing Administration; * = between zero and 0.2 percent.

How CBO Assessed Policy Options for Reducing the Risk of FHA's Mortgage Guarantees

In recent years, lawmakers have considered a variety of proposals to reduce FHA's exposure to losses from its mortgage guarantees while allowing it to keep providing those guarantees to first-time homebuyers and low-income borrowers. Such proposals are designed in part to avoid the elevated claims and losses that FHA experienced because of the 2007–2009 recession—particularly as the share of FHA's guarantees going to better-qualified borrowers is likely to continue to shrink in coming years. Such proposals are also designed to attract private capital to support mortgages outside FHA's primary mission of ensuring access to credit for first-time homebuyers and low-income borrowers.

In this report, CBO estimates the effects of a range of illustrative options for the single-family program that would help FHA achieve those outcomes. In particular, CBO examines how the options, which are described in the next section, would affect the following:

- FHA's exposure to credit risk from its single-family guarantees (as measured by the fair-value estimate of insurance losses, CBO's preferred measure of risk exposure in this analysis);

- The net cost or savings of FHA's single-family guarantees, on both a FCRA and a fair-value basis; and
- The degree to which FHA would continue to support home ownership by first-time buyers and low-income borrowers.

All of the options that CBO analyzed would reduce FHA's risk exposure, as measured by a reduction in the fair-value estimate of insurance losses (see Table 3). That reduction would occur mainly because the single-family program would guarantee a smaller volume of loans under the options than it is projected to do under current law. With some of the options, the reduction in risk exposure would be enhanced by a decrease in the average loss per loan guaranteed under the options, relative to CBO's current-law baseline projections. That average loss per loan—also called the weighted-average insurance loss rate—is defined as the market value of total insurance losses as a share of the total volume of loans guaranteed. With other options, the weighted-average insurance loss rate of the loans guaranteed under the options would be higher than in the baseline, partially offsetting the reduction in risk exposure stemming from a decrease in guarantees.

Table 3.

Effects of Various Policy Options on Loan Volumes, Losses, Subsidy Rates, and Costs of FHA's Single-Family Program in 2018

Option	Volume of New Loan Guarantees in 2018 (Billions of dollars)	Fair-Value Estimate for 2018 Cohort of Guarantees			FCRA Estimate for 2018 Cohort of Guarantees		
		Insurance Loss Rate (Percent)	Insurance Losses (Billions of dollars)	Subsidy Rate (Percent)	Cost of Program ^a (Billions of dollars)	Subsidy Rate (Percent)	Budgetary Cost of Program ^b (Billions of dollars)
CBO's Current-Law Baseline	220	8.9	19.5	2.3	5.1	-3.4	-7.4
Partial Guarantees							
With FHA in first loss position	189	4.6	8.6	1.0	1.9	-2.0	-3.7
With FHA in second loss position	188	5.0	9.4	1.8	3.3	-2.0	-3.7
Risk-Based Pricing	205	8.7	17.9	2.3	4.7	-3.4	-7.0
Residual-Income Test	200	8.8	17.5	2.3	4.6	-3.4	-6.7
Lower Loan Limits	165	9.4	15.5	2.7	4.4	-3.3	-5.4
Restricted Eligibility	143	8.9	12.7	2.2	3.2	-3.6	-5.1
Mortgage Counseling	170	7.9	13.4	2.2	3.7	-3.4	-5.8
Down-Payment Grants in Exchange for Shared Appreciation	182	8.3	15.1	2.6	4.8	-3.4	-6.1

Source: Congressional Budget Office.

Details of the policy options that CBO analyzed are explained in the text.

FCRA = Federal Credit Reform Act of 1990; FHA = Federal Housing Administration.

- a. On a fair-value basis, FHA's new single-family guarantees would show costs each year because the estimated market value of insurance losses is projected to exceed the estimated market value of fees and premiums. Unlike FCRA estimates, fair-value estimates account for the cost of market risk, the risk that taxpayers face because federal payments to cover losses on guaranteed mortgages tend to be high when economic and financial conditions are poor and resources are therefore more valuable.
- b. Under the requirements of the Federal Credit Reform Act, the impact of the mortgages that FHA guarantees each year is recorded in the federal budget on a present-value basis. That present value—also called a subsidy cost—is calculated as the difference between the present values of the insurance losses expected to occur and the fees and premiums expected to be collected on those guarantees over their lifetime. (A present value is a single number that expresses a flow of income or payments in terms of an equivalent lump sum received or paid today.) In all years, FHA's new single-family guarantees show savings in the budget because the present value of fees and premiums is projected to exceed the present value of insurance losses.

The impact of the options on the cost of FHA's single-family guarantees would depend on whether that cost was measured using a FCRA or a fair-value approach. On a FCRA basis, the single-family program is projected under current law to have a negative subsidy rate, -3.4 percent—meaning that the present value of projected insurance losses is smaller than the present value of the fees and premiums that FHA is projected to collect in exchange for providing the guarantees. (For a description of how CBO calculates subsidy rates for the single-family program, see the appendix.) Programs with negative subsidy rates generate savings for the federal budget. Because all of the options are estimated

to reduce the volume of guarantees, they would reduce the expected FCRA budgetary savings generated by the program, relative to CBO's baseline.

Measured on a fair-value basis, however, the single-family program has a positive subsidy rate, 2.3 percent—meaning that the present value of projected insurance losses, with market risk included, exceeds the present value of expected income from fees and premiums. All of the options would reduce the cost of the program on a fair-value basis because of the decrease in the volume of guarantees.

How a particular option would affect the risk exposure and cost of a cohort of mortgages would depend in part on how the option affected both individual loans and the composition of loans in the cohort. For example, an option might reduce the risk exposure or cost of a particular category of loans, such as those to first-time homebuyers, by decreasing the probability of default by those borrowers. However, if the option increased the number of such borrowers who obtained an FHA-guaranteed mortgage, the overall measures of risk and cost might increase, rather than reflect the decrease experienced on individual loans.

One way to measure the effects of an option on a category of borrowers is to analyze the change in the insurance loss rate (rather than the levels of insurance losses and budget subsidies) for those borrowers under the option. The insurance loss rate measures the expected present-value cost of a guarantee as a percentage of the original unpaid principal balance of the loan. The subsidy rate, by contrast, measures the difference between the insurance loss and the present value of fee and premium collections as a percentage of the original unpaid principal balance of the loan. The overall exposure to credit risk or overall cost can be measured as the weighted-average insurance loss rate or subsidy rate multiplied by the total dollar volume of guarantees made by FHA. Although CBO focuses on those overall measures when describing the potential effects of the various options below, for some options it also includes measures of the potential effects on types of borrowers central to FHA's mission.

Several of the options might increase the operational complexity of the single-family program, which could result in additional administrative expenses for FHA. However, because administrative costs are accounted for separately and are not part of subsidy estimates, those costs are not included in CBO's analysis of the options.

The options could also alter FHA's ability to help stabilize the mortgage market in times of crisis by providing more guarantees to borrowers outside its traditional mission, as it did during the financial crisis that began in 2007. Options that made it harder for FHA to play a similar stabilizing role in future crises might exacerbate those crises and worsen any downturn in the mortgage and broader financial markets. However, CBO's analysis assumed that none of the options examined here would keep FHA from playing a stabilizing role and thus would not generate additional effects on the agency or the mortgage market.

Illustrative Options and Their Effects

CBO analyzed illustrative versions of seven policy options for reducing FHA's exposure to risk on its single-family guarantees:

- Converting the current full guarantee to a partial guarantee of losses,
- Increasing the use of risk-based pricing,
- Imposing a residual-income test on borrowers,
- Reducing limits on the maximum size of an FHA-insured mortgage,
- Restricting eligibility for guarantees,
- Requiring mortgage counseling for some borrowers, and
- Providing down-payment grants in exchange for a share of any appreciation in a home's value.

Those options generally represent the range of approaches that policymakers and others have proposed. Many of the options were introduced in past Congressional legislation or were included in research or policy papers released by government agencies, think tanks, or academics.

Partial Guarantees

Like FHA, the Department of Veterans Affairs (VA) runs a program to guarantee single-family mortgages (mainly for current and former members of the military). Unlike FHA's guarantees, VA's cover only part rather than all of the losses on a defaulted loan. Lenders are responsible for the losses not covered by VA's guarantee.

FHA's full guarantee makes lenders more willing to offer mortgages to all borrowers who are eligible for that guarantee. Changing FHA's guarantee to cover losses equal to a certain percentage of the original loan balance, with lenders covering the rest, would produce the greatest reduction in FHA's risk exposure of all the approaches that CBO examined.¹⁹ In constructing illustrative versions of this option, CBO assumed that even with

19. Although FHA's exposure to risk would decline, taxpayers would still face some risk from the federal safety net covering banks and other lending institutions, including any implicit guarantee to support the banking system (as happened during the financial crisis) or the federal deposit insurance fund. CBO's analysis does not include the costs of that risk.

a partial guarantee, FHA-insured loans would still be eligible to be used as assets for mortgage-backed securities, in the same way that loans insured with VA's partial guarantee can be securitized. Those securities would be guaranteed by another federal entity, Ginnie Mae, thus exposing the government to some, but not all, of the risk no longer borne by FHA.²⁰

Changing FHA's guarantee to a partial one could make credit less available because lenders might be unwilling to accept their share of the risk on certain borrowers, or they might charge borrowers a higher interest rate or higher fees, which would discourage those borrowers from taking out an FHA-insured mortgage.²¹ If FHA did not reduce its fees in response, lenders' higher interest rates and fees might particularly affect borrowers central to FHA's mission—first-time homebuyers and low-income borrowers. By contrast, borrowers with good credit histories or high income might see little change in the terms of FHA-insured mortgages. Or they might be able to switch to a mortgage guaranteed by a private insurer or a government-sponsored enterprise (GSE) such as Fannie Mae or Freddie Mac, as long as they could provide a larger down payment than FHA requires.

Despite possibly reducing the availability of credit, a partial FHA guarantee could also have benefits for the broader mortgage market. Those benefits include providing more market-based price signals about the quality of the loans being guaranteed and encouraging lenders to

be more rigorous in applying their underwriting standards for loans with a partial guarantee.

Illustrative Versions of This Approach. CBO analyzed two illustrative versions of a partial guarantee that would differ in the way in which FHA and mortgage lenders would share losses. In the first alternative, FHA would cover initial losses up to 25 percent of the original loan balance—similar, but not identical, to the partial guarantee that VA offers.²² Lenders would be responsible for any losses beyond that 25 percent threshold. In the second alternative, those positions would be reversed: Lenders would cover initial losses up to 25 percent of the original balance, and FHA would cover any additional losses.

Other structures are possible for a partial guarantee. For example, rather than taking the first or second loss position, FHA and lenders could jointly share losses in specified proportions. Or instead of offering a partial guarantee on individual loans, FHA could replace its loan-level full guarantee with a pool-level partial guarantee, which would cover losses only up to a certain amount and would leave investors in the pool subject to losses above that amount. CBO did not include those alternatives in this analysis.

Having private lenders bear some exposure to insurance losses on FHA-backed mortgages would give them greater incentives to evaluate the credit risk of those mortgages and to find ways to receive compensation for their exposure, most likely by increasing the borrower's interest rate to cover the fair-value cost of their share of the guarantee. In its analysis, CBO assumed that FHA would charge premiums for the remaining share of its risk exposure designed to keep the FCRA subsidy rate at approximately -2 percent, consistent with the goal of capital adequacy established in the Cranston-Gonzalez Act. As a result, FHA would receive less premium income for the portion of the risk it retained than it does now, resulting in a higher average FCRA subsidy cost than in CBO's current-law baseline. (An alternative approach would be for FHA to price the remaining share of its guarantee to retain its current FCRA subsidy rate, resulting in a higher total cost for

20. When lenders securitize mortgages insured by FHA or VA, the resulting mortgage-backed securities are guaranteed by Ginnie Mae. With the current full FHA guarantee, Ginnie Mae does not assume any credit risk by providing a guarantee on securities backed by FHA-insured loans. Changing FHA's guarantee to a partial one, with a private lender assuming the credit risk not covered by FHA, would expose Ginnie Mae to the possibility that the lender (or counterparty) would not be able to meet the terms of its guarantee. (Ginnie Mae currently faces such counterparty risk for loans guaranteed by VA.) Exposure to counterparty risk increases during periods of economic distress, when lenders are less likely to be able to pay their share of losses. It also increases under normal economic conditions if the financial strength of the counterparties, as measured by capital and liquidity, declines. CBO did not estimate the additional exposure to counterparty risk that Ginnie Mae would face with a partial FHA guarantee.

21. A version of a partial catastrophic guarantee was proposed as part of the Protecting American Taxpayers and Homeowners (PATH) Act of 2013 (H.R. 2767, 113th Cong.). It was also discussed in Government Accountability Office, *Federal Housing Administration: Analysis of Options for Modifying Its Products, Market Presence, and Powers*, GAO-13-682 (September 9, 2013), www.gao.gov/products/GAO-13-682.

22. VA's guarantee varies with the size of the mortgage, from 50 percent on loans of less than \$45,000 to 25 percent on loans of more than \$144,000. In designing this alternative, CBO opted for a 25 percent guarantee because most of the single-family mortgages that FHA guarantees are larger than \$144,000. VA's mortgage guarantee program is smaller than FHA's because it is limited to borrowers with a connection to the military, so comparisons between the two programs are not exact.

borrowers. That increase would lead to a large reduction in the volume of FHA's guarantees, CBO estimates.)

Effects of the Option. CBO estimates that both of the alternatives for a partial guarantee would decrease the cost of FHA's exposure to credit risk, as measured by the fair-value estimate of insurance losses. In 2018, that risk exposure would shrink from about \$19 billion in CBO's baseline to slightly less than \$9 billion if FHA covered losses up to the first 25 percent of the original loan balance, or to slightly more than \$9 billion if FHA covered losses that exceeded the lender's 25 percent share (see Table 3 on page 12).²³

Part of that reduction in losses would come from a decrease in the volume of new FHA guarantees in 2018, which would drop from \$220 billion in the baseline to slightly less than \$190 billion under both policy alternatives. Those declines would mainly involve high-risk borrowers, who are assumed to face higher interest rates from private lenders than they would with a full FHA guarantee. FHA's exposure to credit risk would also decline because, with some of the risk borne by private guarantors, the weighted-average insurance loss rate on FHA-backed mortgages (the average loss per loan) would be lower.

Both of the alternatives for a partial guarantee would reduce the 2018 savings associated with the single-family program on a FCRA basis from approximately \$7 billion in the baseline to about \$4 billion. Those lower savings would result from both a reduction in the volume of guarantees and an increase in the FCRA subsidy rate. The FCRA subsidy rate would rise because the estimated insurance losses that FHA would avoid with a partial guarantee would be more than offset by the decrease in income as FHA reduced its up-front fees and annual premiums in exchange for reducing its share of the credit guarantee.

On a fair-value basis, the costs of the single-family program in 2018 would decline from \$5 billion in the baseline to \$2 billion if FHA covered losses up to the first 25 percent of the outstanding loan balance, or to about \$3 billion if FHA covered losses that exceeded the lender's 25 percent share. In both cases, the reduction in costs would stem from a drop in the volume of guarantees as

23. The potential for FHA's losses to rise in adverse circumstances would be greater if the agency was in the second loss position because losses would not be capped, as they would be if FHA was in the first loss position. As a result, CBO estimates that FHA would bear a greater share of the total risk exposure under the second alternative for a partial guarantee than under the first alternative.

well as from a decrease in the fair-value subsidy rate. The fair-value subsidy rate would decline because, although FHA would cede a portion of its up-front fees and annual premiums to compensate lenders for the fair-value cost of their share of the guarantee, CBO assumed that FHA would increase its premiums enough to achieve a target FCRA subsidy rate of -2 percent.

Under either alternative for a partial guarantee, the population of low-income borrowers and first-time homebuyers receiving an FHA-guaranteed mortgage would be lower than it would be under current law. Those borrowers make up a large share of the risky segments of the borrower population that would face an increase in interest rates or fees by private lenders.

Risk-Based Pricing

FHA generally sets up-front fees for its guarantees by taking into account its average rate of insurance losses from defaults among all borrowers. One way to better compensate FHA for the credit risk it bears is to use risk-based pricing when setting up-front fees, as the agency does to a limited extent when setting annual premiums. With that approach, the up-front fee that FHA would charge on a loan would better match the expected guarantee costs of the borrower, based on such characteristics as the borrower's credit history, income, down payment amount, and past defaults.

Risk-based pricing—which is used extensively by the GSEs as well as by private lenders and mortgage insurers—means that low-risk borrowers pay lower prices for mortgage credit and high-risk borrowers pay higher prices.²⁴ Despite those higher prices, high-risk borrowers may have better access to credit under risk-based pricing because the ability to charge higher fees to riskier borrowers allows lenders and insurers to better match their compensation to their expected costs.²⁵

24. See, for example, Fannie Mae, "Loan-Level Price Adjustment (LLPA) Matrix" (July 25, 2017), www.fanniemae.com/content/pricing/llpa-matrix.pdf (541 KB).

25. See the remarks of Ellen Seidman, Director, Office of Thrift Supervision, to the Neighborhood Reinvestment Training Institute, *Risk-Based Pricing: Promise or Perdition for Affordable Home Ownership?* (November 18, 1998), <http://tinyurl.com/y7xgplm4> (PDF, 38 KB). Risk-based pricing has been criticized by some observers for increasing the volatility of the housing market. See, for example, Kevin A. Park, *Risks of Risk-Based Pricing of Mortgage Credit* (University of North Carolina, Center for Community Capital, October 2014), <http://tinyurl.com/ybk5yr2t> (PDF, 115 KB).

FHA has altered the fees and premiums on its mortgage insurance many times over the years, but those changes typically affect all borrowers. In July 2008, FHA began a short-lived experiment in basing risk-based fees and premiums for new single-family guarantees in part on the borrower's credit score. However, lawmakers imposed a one-year moratorium on that policy in October 2008, and FHA has not reintroduced it since then.²⁶

An Illustrative Version of This Approach. CBO examined a version of risk-based pricing in which FHA would set up-front guarantee fees on the basis of borrowers' expected repayment behavior.²⁷ Specifically, those fees would depend on the borrower's credit score and the mortgage's loan-to-value ratio, as follows:

Borrower's Credit Score	Mortgage's Loan-to-Value Ratio	Difference From FHA's Usual Up-Front Fee (1.75 Percent of the Amount of the Mortgage)
Less than 660	95 percent or greater	Higher by 0.5 percentage points
	At least 70 percent but less than 95 percent	Higher by 0.25 percentage points
750 or greater	95 percent or greater	Lower by 1.75 percentage points
	Less than 95 percent	Lower by 2 percentage points ²⁸

CBO chose those risk-based adjustments so that FHA's guarantee fees would match the expected guarantee costs of the underlying loans more closely than under the current pricing approach while targeting a similar average FCRA subsidy rate for the overall cohort of loans.²⁹ FHA could also use risk-based pricing to target

specific characteristics of borrowers or loans that increase the risk of default, such as a high debt-to-income ratio or a refinance loan designed to extract equity from a property (known as a cash-out refinancing).

Effects of the Option. Charging risk-based fees would increase the price of a mortgage for some low-income or first-time homebuyers, particularly those considered less creditworthy, potentially causing them to seek financing elsewhere or deterring them from getting a mortgage. At the same time, this option would provide lower guarantee fees to borrowers considered less risky. Overall, the option would decrease FHA's volume of loan guarantees and total risk exposure, CBO estimates. The reason is that the number of riskier borrowers who would no longer receive

an FHA-guaranteed mortgage under this option—because they would seek loans insured by the GSEs or private lenders or would drop out of the market entirely as a result of the increased costs—would be higher than the number of less-risky borrowers who would be drawn to FHA-insured mortgages by the lower fees.

CBO estimates that this illustrative option for risk-based pricing would decrease the cost of FHA's exposure to credit risk in 2018—as measured by the fair-value estimate of insurance losses—from approximately \$19 billion to about \$18 billion (see Table 3 on page 12). Most of that reduction would come from a decrease in the expected volume of new FHA guarantees in 2018, which would drop from \$220 billion in CBO's baseline to \$205 billion under this option. The weighted-average insurance loss rate (the average loss per loan) would be largely unchanged relative to the baseline. In the cases of both the fee increase and the fee decrease, borrowers' response to the change would be relatively

26. The moratorium was contained in section 2133 of the Housing and Economic Recovery Act of 2008, P.L. 110-289, 122 Stat. 2654, 2843.

27. That approach is discussed in Satyajit Chatterjee and others, "A Quantitative Theory of Unsecured Credit With Risk of Default," *Econometrica*, vol. 75, no. 6 (November 2007), pp. 1525–1589, <http://dx.doi.org/10.1111/j.1468-0262.2007.00806.x>; Wendy Edelberg, "Risk-Based Pricing of Interest Rates for Consumer Loans," *Journal of Monetary Economics*, vol. 53, no. 8 (November 2006), pp. 2283–2298, <https://dx.doi.org/10.1016/j.jmoneco.2005.09.001>; and Liran Einav, Mark Jenkins, and Jonathan Levin, "Contract Pricing in Consumer Credit Markets," *Econometrica*, vol. 80, no. 4 (July 2012), pp. 1387–1432, <http://dx.doi.org/10.3982/ECTA7677>.

28. Because this adjustment is larger than FHA's usual up-front fee, it would cause the borrower to receive a rebate equal to 0.25 percent of the amount of the mortgage.

29. Alternatively, FHA could implement a risk-based pricing approach designed to either raise or lower its average FCRA subsidy rate. It could also target a particular fair-value subsidy rate. However, setting fees to fully recover fair-value rather than FCRA costs would be more difficult because raising fees tends to

create adverse selection. Less-risky borrowers—who could receive either a lower price outside FHA from a guarantor not charging full fair value or a better set of loan terms and conditions than those available from FHA with the new fee—would forgo the single-family program, thus increasing the program's subsidy costs and partially (or fully) offsetting the fee increase.

small and would have only a moderate effect on the composition of FHA's guarantees, CBO estimates.

This version of risk-based pricing would reduce the 2018 budgetary savings associated with the single-family program on a FCRA basis by less than \$1 billion relative to CBO's baseline projection. Those slightly lower savings would result from the reduction in the volume of guarantees, the effect of which would be partly offset by a small reduction in the FCRA subsidy rate. That rate would decline because the slight change in the composition of loans under this option would leave FHA with a population of borrowers who would be expected to have a slightly lower FCRA insurance loss rate, and generate slightly higher fee income, than the borrowers in the baseline. On a fair-value basis, by contrast, the costs of the single-family program in 2018 would decline by less than \$1 billion, driven by the reduction in guarantee volume and a small decrease in the fair-value subsidy rate.

Residual-Income Test

Another way to decrease the risk of losses on FHA's guarantees is to increase the likelihood that potential borrowers could afford their mortgage payments and still have the funds necessary to maintain a fair standard of living and cover some unexpected expenses. FHA could add an eligibility requirement for its single-family guarantees that a borrower have a certain amount of income above expenses. Such a requirement is known as a residual-income test.

An Illustrative Version of This Approach. For this policy option, CBO examined a residual-income test like the one that VA requires borrowers to meet for its mortgage guarantees. Under that test, the difference between a borrower's total gross monthly income and monthly expenses (state income taxes, federal taxes, municipal taxes, retirement or Social Security payments, monthly mortgage payments, maintenance and utility costs, and transit and child care expenses) must exceed a specific threshold. For VA-insured mortgages, the threshold varies by family size and region, ranging from about \$400 per month for a single person to about \$1,000 for a family of five.

Residual income may be a better measure of borrowers' ability to pay their mortgage than the various ratios of debt to income before expenses that FHA uses to determine eligibility for its guarantees. Adding a residual-income test to FHA's single-family program would cause some borrowers who are eligible for an FHA-insured mortgage under current policies to become ineligible.

The test would tend to screen out borrowers more prone to default, particularly low-income borrowers, for whom monthly expenses are likely to make up a greater share of their income. The test could prompt other borrowers to purchase a less expensive home, thereby taking out a smaller mortgage with a smaller monthly payment that would pass the residual-income test.

Some analysts have suggested that VA's residual-income test is one reason that VA-insured mortgages have historically had a lower rate of default than FHA-insured mortgages (after accounting for differences in the observable characteristics of borrowers).³⁰ For example, the Urban Institute estimates that VA's cumulative default rates—even when controlling for the borrower's credit score, income, debt-to-income ratio, and location—were lower than FHA's rates throughout the 2000–2012 period, by an average of 3.5 percentage points.³¹ However, other differences between the two programs—including how delinquent loans are treated, requirements for sharing risk with lenders, and VA's focus on military borrowers—may explain some or all of the difference in default rates. As a result, the direct effect of the residual-income test is difficult to quantify.

Modifying FHA's underwriting process by introducing a residual-income test could reduce the guarantee costs of FHA-insured mortgages, CBO estimates. Adding such a test might require FHA to make other changes to its underwriting requirements related to debt-to-income ratios. CBO incorporated those changes into its analysis of this option.

Effects of the Option. CBO estimates that adopting a VA-style residual-income test would decrease the cost of FHA's exposure to credit risk in 2018—as measured by the fair-value estimate of insurance losses—from approximately \$19 billion to about \$18 billion (see Table 3 on page 12). Most of that reduction would come from a decrease in the expected volume of new FHA guarantees in 2018, which would decline from \$220 billion in CBO's baseline to \$200 billion under this option. The weighted-average insurance loss rate would be largely unchanged relative to the baseline. The reason is that the population of borrowers who would be excluded by the residual-income test—although riskier than the borrowers who would pass the test—would not be a large

30. See Laurie Goodman, Ellen Seidman, and Jun Zhu, *VA Loans Outperform FHA Loans. Why? And What Can We Learn?* (Urban Institute, July 16, 2014), <http://tinyurl.com/y8gfykel>.

31. *Ibid.*

enough group to have a material effect on the average loss per loan.

Nevertheless, the people who would be excluded by the residual-income test, or who would need to take out a smaller mortgage to pass the test, would disproportionately be low-income borrowers and first-time homebuyers, CBO estimates—borrowers who are central to FHA's primary mission. Those borrowers would probably not be eligible for a GSE-insured mortgage unless they had other compensating factors, such as a large down payment or a high credit score. For borrowers who continued to qualify for an FHA guarantee under this version of the option, the fair-value estimate of insurance losses would be the same as in CBO's baseline because the option would not affect their propensity to repay or default on their loan.

This version of a residual-income test would reduce the 2018 budgetary savings associated with the single-family program on a FCRA basis by less than \$1 billion relative to CBO's baseline. Those slightly lower savings would result solely from a reduction in the volume of FHA's guarantees, because the FCRA subsidy rate would not change. On a fair-value basis, by contrast, the costs of the single-family program in 2018 would decline by less than \$1 billion, driven entirely by the reduction in guarantee volume.

Lower Loan Limits

Under current law, the maximum size of a single-family mortgage that FHA will guarantee is \$636,150 in metropolitan areas designated as having high costs and \$275,665 in other areas. FHA can alter those limits if housing prices change. CBO projects that in 2018, mortgages with balances greater than \$275,665 will make up nearly 25 percent of the total dollar volume of the single-family program's new guarantees. Many of those larger loans are taken out by borrowers who do not fit within the program's mission of supporting typical first-time homebuyers and low-income borrowers. Larger loans also pose more risks for FHA, compared with smaller loans with similar credit characteristics, because they produce larger losses if a default occurs.

An Illustrative Version of This Approach. CBO analyzed an option in which FHA would reduce its limit for guaranteeing a single-family mortgage to \$275,665, effectively eliminating the exemption for high-cost metropolitan areas. Low-income borrowers and many

first-time homebuyers, who rely mainly on FHA-backed loans, would probably be unaffected by the change because their mortgage would fit within the lower limit. The median selling price of an existing single-family residence in 2016 was about \$234,000 nationwide (meaning that half of the single-family homes sold in the United States in 2016 cost less than that).³² With the 3.5 percent down payment required by FHA, a \$234,000 home would require a mortgage of \$226,000. Reducing FHA's loan limit to \$275,665 in 2018 would not affect many moderate- and low-income borrowers unless they lived in an area where the median home price was higher than that nationwide figure.

Effects of the Option. CBO estimates that this option would decrease the cost of FHA's exposure to credit risk in 2018—as measured by the fair-value estimate of insurance losses—from approximately \$19 billion to about \$15 billion (see Table 3 on page 12). That reduction would come from a decrease in the expected volume of new FHA guarantees in 2018, which would fall from \$220 billion in CBO's baseline to \$165 billion under this option. The decrease in FHA's exposure to credit risk would be partly offset by an increase in the weighted-average insurance loss rate, relative to the baseline, because reducing the loan limit would exclude many low-risk, high-income borrowers.

Decreasing the maximum size of an FHA-insured mortgage to \$275,665 would reduce the 2018 budgetary savings associated with the single-family program on a FCRA basis from approximately \$7 billion in the baseline to about \$5 billion. Those lower savings would result from both a reduction in the volume of guarantees and a small increase in the FCRA subsidy rate. On a fair-value basis, by contrast, the costs of the single-family program in 2018 would decline by about \$1 billion, with the effects of the reduction in guarantees partly offset by an increase in the fair-value subsidy rate. Both the FCRA and fair-value subsidy rates would increase because, with a lower loan limit, the program would attract fewer low-risk, high-income borrowers.

Restricted Eligibility

Under current law, FHA's guarantees of single-family mortgages are generally available to any borrower who meets the eligibility requirements. FHA could decrease

32. See National Association of Realtors, "Existing Single Family Home Sales" (2017), <http://tinyurl.com/y8l4et9q> (PDF, 28 KB).

its exposure to risk by narrowing the types of borrowers who could qualify for those guarantees.

An Illustrative Version of This Approach. Many of FHA's current borrowers are not in the categories central to the agency's mission: first-time homebuyers and low-income borrowers. CBO examined the option of limiting eligibility for single-family guarantees only to those two categories. (People who have purchased a home before or who have high income would probably be able to obtain a mortgage guaranteed by the GSEs or a private insurer—although possibly at greater cost than FHA offers under current policies—particularly during normal economic conditions.)

Effects of the Option. Under this eligibility restriction, the cost of FHA's exposure to credit risk in 2018—as measured by the fair-value estimate of insurance losses—would drop from approximately \$19 billion to about \$13 billion, CBO estimates (see Table 3 on page 12). That reduction would occur because the expected volume of new FHA guarantees in 2018 would drop from \$220 billion in CBO's baseline to \$143 billion under this option—the largest decline among the options that CBO analyzed. The weighted-average insurance loss rate would be largely unchanged relative to the baseline. The reason is that the population of borrowers who would no longer be eligible for an FHA guarantee—although slightly less risky than the borrowers who would remain eligible—do not represent a large enough difference in risk to have a material effect on the average loss per loan.³³

This option would reduce the 2018 budgetary savings associated with the single-family program on a FCRA basis from approximately \$7 billion in CBO's baseline to about \$5 billion. Those lower savings would result from the decrease in the volume of guarantees, the effect of which would be partly offset by a small reduction in the FCRA subsidy rate. On a fair-value basis, by contrast, the costs of the single-family program in 2018 would decline from \$5 billion in the baseline to \$3 billion, resulting from the smaller volume of guarantees and a slight reduction in the fair-value subsidy rate. Both the FCRA and fair-value subsidy rates would decline because

the change in the composition of loans under this option would leave FHA with a population of borrowers who would be expected to have a similar insurance loss rate, but generate slightly more fee income, than the borrowers in the baseline.

Mortgage Counseling

A limited body of evidence suggests that receiving mortgage counseling before or after buying a home can help borrowers better understand their obligations and reduce the likelihood that they will default on their mortgage. Thus, one approach that might help decrease FHA's exposure to insurance losses would be to make mortgage counseling a part of the eligibility criteria for the single-family program. FHA has already added such counseling to its reverse-mortgage program (described in Box 1 on page 5) to promote greater understanding of the loan process and access to credit—as have some lenders and some state or local programs that provide down payments.

Prepurchase counseling is intended to improve borrowers' knowledge of the consequences of their housing decisions and the day-to-day requirements for repayment before they decide to apply for a mortgage. Postpurchase counseling is intended to help borrowers better understand their options at any point during their borrowing experience, particularly when they enter a period of financial distress.

The effectiveness of both pre- and postpurchase counseling has been debated in the academic literature.³⁴ Sound studies are rare, and the literature generally suffers from the lack of a strong causal link between

33. If the option also narrowed eligibility in other ways, such as by limiting the program only to borrowers with low credit scores and to mortgages with high loan-to-value ratios, the option would probably result in a notable increase in the weighted-average insurance loss rate.

34. See, for example, Scott R. Brown, "The Influence of Homebuyer Education on Default and Foreclosure Risk: A Natural Experiment," *Journal of Policy Analysis and Management*, vol. 35, no. 1 (Winter 2016), pp. 145–172, <http://dx.doi.org/10.1002/pam.21877>. See also Stephen Roll and Stephanie Moulton, "The Impact of Credit Counseling on Consumer Outcomes: Evidence From a National Demonstration Program" (paper presented at the Federal Deposit Insurance Corporation's Sixth Annual Consumer Research Symposium, Arlington, Va., October 28, 2016), <http://tinyurl.com/y7o9dpls>; and the testimony of Alicia Puente Cackley, Director of Financial Markets and Community Investment, Government Accountability Office, before the Subcommittee on Insurance, Housing, and Community Opportunity of the House Committee on Financial Services, *Homeownership Counseling: Although Research Suggests Some Benefits, Implementation and Evaluation Challenges Exist*, GAO-11-925T (September 14, 2011), www.gao.gov/products/GAO-11-925T.

counseling and mortgage defaults. However, some studies have found that providing prepurchase counseling to first-time homebuyers and low- and middle-income families promotes informed decisionmaking by increasing their understanding of the risks of a mortgage.³⁵ Studies of postpurchase counseling generally provide less precise guidance about how such counseling would affect borrowers with FHA-insured mortgages. That lack of quantitative support led CBO to focus this option on prepurchase counseling.

An Illustrative Version of This Approach. CBO examined an option in which all first-time homebuyers and low-income borrowers would have to complete an approved prepurchase counseling program to be eligible for an FHA-insured mortgage. Borrowers would pay for the counseling program themselves, but in return, their up-front guarantee fee would be reduced by 1 percentage point. The counseling requirement could be implemented without a fee reduction, which could cause a larger decline in the volume of FHA's guarantees by removing an incentive for borrowers to participate. However, offering a reduction in interest rates or fees is a common practice among programs that require some form of counseling for borrowers, and FHA used it briefly in the single-family program in the late 1990s.³⁶

35. See, for example, Neil S. Mayer and Kenneth Temkin, "Prepurchase Counseling Effects on Mortgage Performance: Empirical Analysis of NeighborWorks America's Experience," *Cityscape*, vol. 18, no 2 (July 2016), <http://tinyurl.com/yccefbm9>. In addition, the Federal Reserve Bank of Philadelphia performed a randomized field experiment and found that prepurchase counseling had positive long-term effects on people's credit score, debt level, and delinquency on their debt; see Marvin Smith, Daniel Hochberg, and William H. Greene, *The Effectiveness of Pre-Purchase Homeownership Counseling and Financial Management Skills: A Special Report by the Community Development Studies and Education Department* (Federal Reserve Bank of Philadelphia, April 2014), <http://tinyurl.com/yc7s8t83>. The Department of Housing and Urban Development cites several studies on the effectiveness of prepurchase and postpurchase counseling in its appropriation request to increase counseling programs; see Department of Housing and Urban Development, "Housing Counseling Assistance, 2016 Summary Statement and Initiatives," <http://tinyurl.com/y9wfmof> (PDF, 182 KB).

36. See Department of Housing and Urban Development, *Actuarial Review of the Federal Housing Administration Mutual Mortgage Insurance Fund Forward Loans for Fiscal Year 2016* (prepared by Integrated Financial Engineering, November 15, 2016), p. 3, <http://tinyurl.com/y7fyyoa5>.

Effects of the Option. CBO estimates that this option would decrease the cost of FHA's exposure to credit risk in 2018—as measured by the fair-value estimate of insurance losses—from approximately \$19 billion to about \$13 billion (see Table 3 on page 12). That reduction would stem from a decrease in the expected volume of new FHA guarantees in 2018, which would drop from \$220 billion in CBO's baseline to \$170 billion under this option. The decrease in exposure to credit risk would be enhanced by a decline in the weighted-average insurance loss rate, relative to the baseline, resulting from the expected impact of counseling on prospective borrowers.

Prepurchase mortgage counseling would have two effects on the borrowers who received it, CBO projects. First, some borrowers who would otherwise have taken out an FHA-insured mortgage would no longer do so because of the requirement to complete counseling. If the counseling was directed at high-risk borrowers, that deterrent effect would lower FHA's overall default rates. However, the people who would decide not to pursue an FHA-insured loan would probably include many low-income borrowers and first-time homebuyers, CBO estimates—borrowers who are central to FHA's primary mission. Second, among borrowers who would take out an FHA-insured mortgage after receiving counseling, there would be a small improvement in default rates.

This option would reduce the 2018 budgetary savings associated with the single-family program on a FCRA basis from approximately \$7 billion in CBO's baseline to about \$6 billion.³⁷ Those lower savings would result entirely from the reduction in the volume of guarantees, because CBO designed this option to retain the same FCRA subsidy rate as in the baseline for borrowers who completed the counseling program. On a fair-value basis, by contrast, the costs of the single-family program would decline by approximately \$1 billion, stemming from the reduction in the volume of guarantees and a small decrease in the fair-value subsidy rate.

37. In certain circumstances, allocating additional federal funds—or, in this case, reducing fee collections—in an attempt to reduce the costs of a loan guarantee might create a situation in which some of the savings associated with the reduction in costs might not be counted for budgetary purposes. CBO would make that assessment on the basis of the specific language of a legislative proposal and in consultation with the Congress.

Down-Payment Grants in Exchange for Shared Appreciation

Many first-time homebuyers and low-income borrowers find it difficult to afford a down payment or ongoing mortgage payments. To help address some of those affordability concerns, governments and private lenders introduced shared-appreciation mortgages (SAMs) more than 30 years ago, when high interest rates prevented some borrowers from qualifying for a mortgage. In exchange for a percentage of the property's increase in value at resale, the lender offered concessions designed to make the loan more affordable, such as a lower interest rate, reduced up-front fees, or assistance to decrease the amount borrowed. Although that loan structure is designed to make it easier for borrowers to afford a mortgage, SAMs remain a negligible part of the broader mortgage market.³⁸

In addition to their potential benefits to borrowers, SAMs can have disadvantages. In particular, although a SAM may be structured at origination to offer the borrower a lower monthly payment, lower fees, or a smaller loan amount than a conventional mortgage under reasonable projections of home appreciation, the realized lifetime cost of a SAM to the borrower may be much higher than that of a standard loan if the value of the home appreciates significantly more than projected (or conversely, the cost may be much lower if it does not).

An Illustrative Version of This Approach. CBO examined a version of shared appreciation in which borrowers with a loan-to-value ratio greater than 95 percent would be required to give FHA 16 percent of the increase in their home's value that accrued over the life of their FHA-insured mortgage. In exchange, FHA would offer borrowers a grant of 5 percent of their home's initial value, which would be used to increase the borrower's down payment.

38. More recently, shared appreciation has been used, on a limited basis, as an element in private-sector initiatives to modify delinquent mortgages by offering principal reductions in exchange for a share of future appreciation. In addition, SAMs have emerged during the recovery in the housing market as an alternative to home equity lines of credit. Other countries, such as the United Kingdom, have also used SAMs to try to promote home ownership in markets with high home prices. See, for example, Anthony B. Sanders and V. Carlos Slawson Jr., "Shared Appreciation Mortgages: Lessons From the UK," *Journal of Housing Economics*, vol. 14, no. 3 (September 2005), pp. 178–193, <https://dx.doi.org/10.1016/j.jhe.2005.07.007>.

The resulting shared-appreciation mortgages would be projected to have a lower default rate than similar loans without a grant because borrowers would have more initial equity in their home. (Other concessions for borrowers, such as a reduced interest rate or lower up-front fees, could also be considered, but they would not have the same effect as directly reducing a borrower's loan-to-value ratio through a grant, CBO estimates.) In designing this option, CBO chose the percentage of appreciation given to FHA and the size of the down-payment grants so that, when combined with the expected reduction in defaults, they would produce a FCRA subsidy rate for participating borrowers that would be roughly consistent with the subsidy rate for similar borrowers in CBO's baseline. To help potential borrowers fully understand the benefits and costs of the SAM program, FHA would need to work with lenders to provide suitable borrower education.³⁹

Effects of the Option. CBO estimates that this option would decrease the cost of FHA's exposure to credit risk in 2018—as measured by the fair-value estimate of insurance losses—from approximately \$19 billion to about \$15 billion (see Table 3 on page 12). That reduction would come from a decrease in the expected volume of new FHA guarantees in 2018, which would drop from \$220 billion in CBO's baseline to \$182 billion under this option. The decrease in exposure to credit risk would be enhanced by a decline in the weighted-average insurance loss rate, relative to the baseline, driven by the expectation that borrowers who participated in the SAM program would be less likely to default because of the initial equity created by the down-payment grant.

Although participating borrowers would be expected to have a lower likelihood of default, some borrowers who would take out an FHA-insured mortgage under current policies would decide not to get one under this option because they would not want to share future appreciation in exchange for the initial grant. CBO estimates that such borrowers would probably include many people central to FHA's primary mission: low-income borrowers and first-time homebuyers. (A smaller number of eligible

39. See Jeffrey Lubell, "Filling the Void Between Homeownership and Rental Housing: A Case for Expanding the Use of Shared Equity Homeownership" (paper presented at the Harvard Business School symposium Homeownership Built to Last: Lessons From the Housing Crisis on Sustaining Homeownership for Low-Income and Minority Families, Boston, Mass., April 1–2, 2013), <http://tinyurl.com/y8mf8phx>.

borrowers who would not obtain an FHA-insured mortgage under current policies would find doing so more attractive under this option, CBO estimates.)

This version of shared appreciation would reduce the 2018 budgetary savings associated with the single-family program on a FCRA basis from approximately \$7 billion in the baseline to about \$6 billion. Those lower savings would come solely from the reduction in the volume of guarantees. The FCRA subsidy rate would remain largely unchanged, as this option was designed to do. On a

fair-value basis, by contrast, the costs of the single-family program would decline by less than \$1 billion, with the effects of the reduction in guarantees partly offset by a small increase in the fair-value subsidy rate. That rate would increase because of this option's design to produce a FCRA subsidy rate consistent with the baseline. If the SAM program was structured to produce a consistent fair-value subsidy rate instead, FHA would need to receive about 18 percent of a home's appreciation rather than 16 percent.



Appendix:

Modeling the Budgetary Costs of FHA's Single-Family Mortgage Insurance

To estimate the costs of the Federal Housing Administration's (FHA's) single-family guarantee program, the Congressional Budget Office simulates defaults, recoveries, and prepayments on cohorts of FHA-insured mortgages using key parameters estimated from a data set of such mortgages. Those simulations are used to estimate the subsidy rates on cohorts of single-family guarantees: the lifetime cost of FHA's payments of insurance claims—minus recoveries, fees, and premiums—expressed as a percentage of the original loan amounts.¹

Such estimates require a model of mortgage cash flows. The cash flows associated with a mortgage guarantee depend on the up-front fees and annual premiums collected over the life of the loan and any claim payments, minus recoveries, resulting from a default. The schedule for fees and premiums is specified in the mortgage contract, but the actual amount collected will depend on whether and when the loan ends through default or prepayment. Likewise, claim payments and recoveries will depend on the timing of a potential default. Thus, models of mortgage default and prepayment, a model of loss rates from defaults, and forecasts of overall economic conditions are necessary to predict the cash flows associated with FHA's loan guarantees.

CBO uses a multinomial logit duration model to analyze the default and prepayment behavior of borrowers with FHA-insured mortgages. The model builds on theoretical and empirical work to capture determinants of a borrower's likelihood of default or prepayment. The model includes a mortgage's loan-to-value ratio, interest rates, and measures of the borrower's creditworthiness, such as credit score and debt-to-income ratio (to reflect the borrower's liquidity). CBO also models FHA's expected losses from defaults and expected income from fees and premiums.

1. For more details about how CBO calculated subsidy rates under a similar version of its model, see Francesca Castelli and others, *Modeling the Budgetary Costs of FHA's Single Family Mortgage Insurance*, Working Paper 2014-05 (Congressional Budget Office, September 2014), www.cbo.gov/publication/45711.

The data set underlying this analysis was drawn from the roughly 4 million 30-year, fixed-rate, single-family mortgages that FHA guaranteed between 1992 and 2014. (The analysis focused on 30-year, fixed-rate mortgages because they receive the bulk of FHA's guarantees.) From those loans, CBO randomly selected a smaller estimation sample of 1 million mortgages for which all of the essential data were available. That sample was converted to a quarterly panel data set, meaning that each quarter of a loan's active life is counted as one observation.

The composition of FHA-insured mortgages that underlies CBO's baseline projections is based on averages of key characteristics of loans that FHA guaranteed during the 2009–2015 period. CBO adjusts those characteristics to reflect expected changes in the composition of FHA-insured loans because of shifts in the mortgage market and pricing decisions that FHA has made since 2015. CBO also makes a distinction between fully underwritten refinance loans and streamline refinance loans (in which the mortgage being refinanced was insured by FHA, so the process is simpler) to account for their different fee structures and other characteristics. The dollar volume of guarantees is based on an analysis of FHA's recent history, on industry projections, and on estimates that reflect CBO's analysis of the overall mortgage market.

To estimate the effects of different policy options, CBO adjusts elements of its FHA model such as loan volume, composition, and fees (see Table A-1). Those adjustments are based on the expected responses of borrowers, lenders, and other participants in the mortgage market to a given policy change. The adjustments are supported by a review of academic literature and analysis of other mortgage guarantee programs that have features similar to those of the modified FHA program under a particular policy option.

To estimate subsidy rates for FHA's mortgage guarantees under the baseline and different options, CBO uses its projections of the lifetime behavior of the mortgages to

Table A-1.

Modeling Changes That CBO Made to Analyze the Policy Options

Option	Changes in the Volume and Composition of FHA-Insured Single-Family Mortgages	Changes to CBO's Model of the Single-Family Program	Support for Modeling Changes
Partial Guarantees With FHA in First Loss Position	<ul style="list-style-type: none"> ■ Reduced volume by 50 percent for borrowers with credit scores below 600 and for borrowers with credit scores below 650 and LTV ratios greater than 70 percent ■ Changes reflect the expectation that lenders would increase their fees for the riskiest borrowers, causing some to no longer obtain an FHA-guaranteed loan 	<ul style="list-style-type: none"> ■ Modified the severity calculation for FHA to set losses from a default at no more than 25 percent of the original loan balance ■ Reduced FHA's up-front fee from 1.75 percent to zero and annual premiums from 85 basis points to 53 basis points to reflect the share that lenders would retain to guarantee the second loss position ■ Reduced the measure of the cost of market risk used in calculating the fair-value subsidy rate to reflect that FHA would no longer guarantee the second loss position 	<ul style="list-style-type: none"> ■ FHA's cost of market risk would be consistent with CBO's estimate of the cost for the mortgage guarantee program administered by the Department of Veterans Affairs, with an adjustment to reflect higher average defaults under the FHA program
Partial Guarantees With FHA in Second Loss Position	<ul style="list-style-type: none"> ■ Reduced volume by 50 percent for borrowers with credit scores below 600, for borrowers with credit scores below 650 and LTV ratios greater than 70 percent, and for borrowers with credit scores below 700 and LTV ratios greater than 97 percent ■ Changes reflect the expectation that lenders would increase their fees for the riskiest borrowers, causing some to no longer obtain an FHA-guaranteed loan 	<ul style="list-style-type: none"> ■ Modified the severity calculation for FHA to set losses from a default at the entire amount above 25 percent of the original loan balance ■ Reduced FHA's up-front fee from 1.75 percent to zero and annual premiums from 85 basis points to 49 basis points to reflect the share that lenders would retain to guarantee the first loss position ■ Reduced the measure of the cost of market risk used in calculating the fair-value subsidy rate to reflect that FHA would no longer guarantee the first loss position 	<ul style="list-style-type: none"> ■ FHA's cost of market risk would be consistent with CBO's estimate of the cost for the mortgage guarantee programs administered by Fannie Mae and Freddie Mac (which use private mortgage insurers to cover the first loss position for loans with LTV ratios greater than 80 percent), with an adjustment to reflect higher average defaults under the FHA program
Risk-Based Pricing	<ul style="list-style-type: none"> ■ Reduced volume by 20 percent for borrowers with credit scores below 660 and LTV ratios greater than 70 percent ■ Increased volume by 10 percent for borrowers with credit scores of 750 or greater ■ Changes reflect the expectations that some high-risk borrowers receiving a fee increase would no longer obtain an FHA-guaranteed loan and that more low-risk borrowers receiving a fee decrease would obtain an FHA-guaranteed loan 	<ul style="list-style-type: none"> ■ Increased FHA's up-front fee from 1.75 percent to 2.25 percent for borrowers with credit scores below 660 and LTV ratios of 95 percent or greater ■ Increased FHA's up-front fee from 1.75 percent to 2 percent for borrowers with credit scores below 660 and LTV ratios of at least 70 percent but less than 95 percent ■ Reduced FHA's up-front fee from 1.75 percent to zero for borrowers with credit scores of 750 or greater and LTV ratios of 95 percent or greater ■ Reduced FHA's up-front fee from 1.75 percent to -0.25 percent for borrowers with credit scores of 750 or greater and LTV ratios of less than 95 percent 	<ul style="list-style-type: none"> ■ Volume adjustments were based on a review of FHA's pricing relative to the pricing for mortgages guaranteed by Fannie Mae or Freddie Mac (which carry private mortgage insurance, when required)

Continued

project the cash inflows and outflows of the single-family program. The cash flows are then discounted (using interest rates on Treasury securities with similar terms to maturity) to the time of loan disbursement so that a net present value and associated subsidy rate can be assigned to each cohort of loans. For this analysis, CBO

calculated subsidy rates both on a Federal Credit Reform Act (FCRA) basis and on a fair-value basis. Because the fair-value subsidy rates include a charge for the cost of market risk, they are substantially higher than the FCRA subsidy rates.

Table A-1.

Continued

Modeling Changes That CBO Made to Analyze the Policy Options

Option	Changes in the Volume and Composition of FHA-Insured Single-Family Mortgages	Changes to CBO's Model of the Single-Family Program	Support for Modeling Changes
Residual-Income Test	<ul style="list-style-type: none"> ■ For borrowers with DTI ratios below 35 percent, reduced volume by 5 percent if loan was less than 90 percent of average loan size ■ For borrowers with DTI ratios between 35 percent and 41 percent, reduced volume by 10 percent if loan was less than 90 percent of average loan size, and reduced volume by 5 percent if loan was between 90 percent and 100 percent of average loan size ■ For borrowers with DTI ratios greater than 41 percent, reduced volume by 25 percent if loan was less than 90 percent of average loan size, reduced volume by 15 percent if loan was between 90 percent and 100 percent of average loan size, and reduced volume by 10 percent if loan was greater than 100 percent of average loan size ■ For borrowers whose DTI ratios were missing, reduced volume by 15 percent if loan was less than 90 percent of average loan size, reduced volume by 10 percent if loan was between 90 percent and 100 percent of average loan size, and reduced volume by 10 percent if loan was greater than 100 percent of average loan size ■ Changes reflect the expectation that borrowers with higher DTI ratios and smaller loans would be more likely to fail the residual-income test and would no longer obtain an FHA-guaranteed loan 	<ul style="list-style-type: none"> ■ No changes 	<ul style="list-style-type: none"> ■ Volume adjustments were based on a review of loan-level data from FHA
Lower Loan Limits	<ul style="list-style-type: none"> ■ Reduced volume by removing all loans with an original balance of more than \$275,665 	<ul style="list-style-type: none"> ■ No changes 	<ul style="list-style-type: none"> ■ Volume adjustment was based on a review of loan-level data from FHA

Continued

Table A-1.

Continued

Modeling Changes That CBO Made to Analyze the Policy Options

Option	Changes in the Volume and Composition of FHA-Insured Single-Family Mortgages	Changes to CBO's Model of the Single-Family Program	Support for Modeling Changes
Restricted Eligibility	<ul style="list-style-type: none"> ■ For borrowers with DTI ratios below 35 percent, reduced volume by 40 percent if loan was for purchasing a home, and reduced volume by 100 percent if loan was for refinancing an existing mortgage ■ For borrowers with DTI ratios between 35 percent and 41 percent, reduced volume by 30 percent if loan was for purchasing a home, and reduced volume by 80 percent if loan was for refinancing an existing mortgage ■ For borrowers with DTI ratios greater than 41 percent, reduced volume by 20 percent if loan was for purchasing a home, and reduced volume by 50 percent if loan was for refinancing an existing mortgage ■ For borrowers whose DTI ratios were missing, reduced volume by 100 percent ■ Changes reflect the expectation that borrowers with lower DTI ratios would be less likely to pass a stricter eligibility test for low-income borrowers. Changes are smaller for loans used to purchase a home because some of the borrowers with lower DTI ratios might be first-time homebuyers. 	<ul style="list-style-type: none"> ■ No changes 	<ul style="list-style-type: none"> ■ Volume adjustments were based on a review of loan-level data from FHA
Mortgage Counseling	<ul style="list-style-type: none"> ■ Reduced volume by 25 percent if loan was for purchasing a home with a down payment of less than 5 percent (with that category approximating the loans made to first-time homebuyers) or if borrower's DTI ratio was greater than 41 percent and loan was for refinancing an existing mortgage (with that category approximating the loans made to low-income borrowers) ■ Changes reflect the expectations that some borrowers who would be required to receive counseling would no longer obtain an FHA-guaranteed loan and that some borrowers who completed counseling would postpone their decision to get a mortgage and no longer obtain an FHA-guaranteed loan at the current time 	<ul style="list-style-type: none"> ■ Reduced fee income by 1 percent of original loan amount for borrowers required to complete counseling ■ Increased credit score by 40 points for borrowers who completed counseling, reflecting the expectation (based on experience with counseling) that those borrowers would perform better on their loans 	<ul style="list-style-type: none"> ■ Adjustments to loan volume and performance were based on a review of studies of prepurchase mortgage counseling

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Table A-1.

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Modeling Changes That CBO Made to Analyze the Policy Options

Option	Changes in the Volume and Composition of FHA-Insured Single-Family Mortgages	Changes to CBO's Model of the Single-Family Program	Support for Modeling Changes
Down-Payment Grants in Exchange for Shared Appreciation	<ul style="list-style-type: none"> ■ Reduced volume by 25 percent for loans with an original LTV ratio greater than 95 percent ■ Change reflects the expectation that, on net, 25 percent fewer borrowers for whom shared appreciation would be mandatory would no longer obtain an FHA-guaranteed loan 	<ul style="list-style-type: none"> ■ Reduced fee income by 5 percent of original loan amount for borrowers required to participate in the shared-appreciation program, reflecting the policy that grants would represent an up-front cost to FHA ■ Reduced LTV ratio by 5 percentage points for borrowers required to participate in the shared-appreciation program, reflecting the policy that grants would be used to increase borrowers' down payment ■ Created new appreciation cash flow element, reflecting the policy that for loans with a shared-appreciation agreement that terminate in each period, FHA would receive 16 percent of the appreciation in the home's value over the life of the loan 	<ul style="list-style-type: none"> ■ Adjustments to loan volume and performance were based on a review of studies of shared-appreciation mortgage programs

Source: Congressional Budget Office.

A basis point is one one-hundredth of a percentage point.

DTI = debt-to-income (ratio); FHA = Federal Housing Administration; LTV = loan-to-value (ratio).



About This Document

This report was prepared at the request of the Chairman of the House Committee on Financial Services. In keeping with the Congressional Budget Office's mandate to provide objective, impartial analysis, the report makes no recommendations.

Mitchell Remy of CBO's Financial Analysis Division prepared the report with guidance from Sebastien Gay. Kim Cawley, Michael Falkenheim, Daniel Fried, Wendy Kiska, Jeffrey LeFave, Susanne Mehlman, Damien Moore (formerly of CBO), Jeffrey Perry, Chayim Rosito, and David Torregrosa provided useful comments on various drafts of the report. In addition, Laurie Goodman of the Urban Institute, Richard Green of the University of Southern California, Deborah Lucas of the Massachusetts Institute of Technology, Brian Montgomery of the Collingwood Group, and Robert Van Order of George Washington University provided helpful comments. (The assistance of external reviewers implies no responsibility for the final product, which rests solely with CBO.)

Wendy Edelberg and Jeffrey Kling reviewed the report, Christian Howlett edited it, and Jorge Salazar prepared it for publication. An electronic version of the report is available on CBO's website (www.cbo.gov/publication/53084).

Keith Hall
Director
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