

GAO

Report to the Chairman, Subcommittee
on Housing and Community Opportunity,
Committee on Financial Services, House
of Representatives

April 2006

MORTGAGE FINANCING

HUD Could Realize Additional Benefits from Its Mortgage Scorecard





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Highlights of [GAO-06-435](#), a report to the Chairman, Subcommittee on Housing and Community Opportunity, Committee on Financial Services, House of Representatives

Why GAO Did This Study

Along with private mortgage providers, the Department of Housing and Urban Development’s (HUD) Federal Housing Administration (FHA) has been impacted by technological advances that began in the mid-1990s and that have significantly affected the way the mortgage industry works. As a result, in 2004, FHA implemented Technology Open to Approved Lenders (TOTAL) Scorecard—an automated tool that evaluates the majority of new loans insured by FHA. However, questions have emerged about the effectiveness of TOTAL. Given these concerns, you asked GAO to evaluate the way the agency developed and uses this new tool. This report looks at (1) the reasonableness of FHA’s approach to developing TOTAL and (2) the potential benefits to HUD of expanding its use of TOTAL.

What GAO Recommends

To improve how HUD uses and benefits from TOTAL, GAO recommends that the Secretary of HUD (1) develop policies for updating TOTAL, including using updated data, testing additional variables, and exploring the benefits of alternative modeling approaches, and (2) explore additional uses of TOTAL. HUD did not explicitly agree or disagree with our recommendations but indicated that it was taking some steps to update TOTAL and explore different uses for it.

www.gao.gov/cgi-bin/getrpt?GAO-06-435.

To view the full product, including the scope and methodology, click on the link above. For more information, contact William B. Shear, (202) 512-8678, shearw@gao.gov.

What GAO Found

Some of the choices that FHA made during the development process could limit TOTAL’s effectiveness, although overall the process was reasonable. Like the private sector, FHA and its contractor used many of the same variables, as well as an accepted modeling process, to develop TOTAL. However, the data that FHA and its contractors used to develop TOTAL were 12 years old by the time FHA implemented the scorecard, and the market has changed significantly since then. Also, FHA, among other things,

- did not develop a formal plan for updating TOTAL on a regular basis,
- did not include all the important variables that could help explain expected loan performance, and
- selected a type of model that limits how the scorecard can be used.

Despite potential problems with TOTAL, HUD could still see added benefits from it. As a result of TOTAL, FHA lenders and borrowers have seen two new benefits—less paperwork and more consistent underwriting decisions. However, FHA could gain additional benefits if, like private lenders and mortgage insurers, it put TOTAL to other uses (see table). These uses include relying on TOTAL to help inform general management decision making, price products based on risk, and launch new products. Adopting these scorecard uses from the private sector could potentially generate three other benefits for FHA, including the ability to react to changes in the market, more control over its financial condition, and a broader customer base. Additionally, HUD’s Government National Mortgage Association, a government corporation that guarantees securities of federally insured or guaranteed mortgage loans, could use credit scores that are used by TOTAL to help improve the transparency of the secondary mortgage market.

FHA Could Benefit Significantly More from TOTAL

Scorecard benefits	Scorecards previously used by FHA	TOTAL scorecard
Past/present benefits		
Ability to adjust underwriting standards	X	X
Majority of loans automatically underwritten	X	X
Faster decisions	X	X
Objective underwriting	X	X
Less paperwork for lenders		X
More consistent underwriting decisions		X
Potential benefits		
Ability to react to changes in the market		X
More control over financial condition		X
Broader customer base		X

Source: GAO.

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Abbreviations

ARM	adjustable-rate mortgage
CLUES	Countrywide Loan Underwriting Expert System
ECOA	Equal Credit Opportunity Act
FHA	Federal Housing Administration
Ginnie Mae	Government National Mortgage Association
HUD	U.S. Department of Housing and Urban Development
LTV	loan-to-value ratio
MGIC	Mortgage Guaranty Insurance Corporation
MMI	Mutual Mortgage Insurance Fund
TOTAL	Technology Open to Approved Lenders

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United States Government Accountability Office
Washington, D.C. 20548

April 13, 2006

The Honorable Robert W. Ney
Chairman, Subcommittee on Housing
and Community Opportunity
Committee on Financial Services
House of Representatives

Dear Mr. Chairman:

Since its inception in 1934, the Department of Housing and Urban Development's (HUD) Federal Housing Administration (FHA) has provided mortgage insurance for nearly 33 million properties, often for low-income, minority, and first-time homebuyers. Along with private mortgage providers, FHA has been impacted by technological advances that began in the mid-1990s and that have significantly affected the way the mortgage industry works. Among the most important of these innovations are the automated underwriting systems that mortgage providers now use to process loan applications.¹ With automated underwriting, lenders enter information on potential borrowers into electronic systems that contain an evaluative formula, or algorithm, called a scorecard. The scorecard uses a variety of variables that include the borrower's characteristics (credit score and cash reserves, for example) and loan characteristics to calculate the applicants' creditworthiness.²

In the mid-1990s, Freddie Mac and Fannie Mae developed the first automated underwriting systems and scorecards—Freddie Mac's Loan Prospector and Fannie Mae's Desktop Underwriter—that could be used to evaluate applications for FHA-insured loans and inform FHA's underwriting standards. However, these two systems' scorecards sometimes generated conflicting results for the same borrower. In part because FHA did not have access to these systems' proprietary scorecards, the agency chose to

¹Underwriting refers to a risk analysis that uses information collected during the origination process to decide whether to approve a loan. Different mortgage providers may have different underwriting standards.

²Credit scores, which assign a numeric value to a borrowers' credit history, have become a popular tool in assessing applications for loans. They are often called "FICO scores" because most scores are produced with software developed by Fair Isaac Corporation. FICO scores generally range from 300 to 850, with higher scores indicating better credit history. The lower the credit score, the more compensating factors lenders might require to approve a loan, such as a higher down payment or greater borrower reserves.

replace them with its own. In addition, HUD wanted to modernize its processes and improve its delivery to its business partners. Between 1998 and 2004, FHA worked with HUD's contractor, Unicon Research Corporation, to develop and implement the Technology Open to Approved Lenders (TOTAL) scorecard. Since 2004, FHA and its lenders have used TOTAL to evaluate applications for FHA-insured loans and inform underwriting standards.

Recently, questions have emerged about the effectiveness of TOTAL Scorecard, as well as concerns that FHA has not fully explored all possible uses of this new tool. Given these concerns, you asked us to evaluate the way the agency developed and uses this new tool. This report looks at (1) the reasonableness of FHA's approach to developing TOTAL and (2) the potential benefits to HUD of expanding its use of TOTAL.

To assess the reasonableness of FHA's approach to developing TOTAL, we reviewed agency documents and interviewed officials from HUD and Unicon Research Corporation to determine (1) the process used to develop TOTAL, (2) the reliability of the analysis used to evaluate it, and (3) the methods FHA used to establish policies on cut points (i.e., the points of separation within a population of mortgage scores that divide applications that are accepted from those that are not). To assess the benefits to FHA of expanding its use of TOTAL, we reviewed existing research on the uses and benefits of scorecards and interviewed private sector companies, academics, and HUD officials about these issues. We compared FHA's use of TOTAL with the private sector's use of scorecards in order to determine whether FHA could benefit from any private sector practices. We also examined the extent to which opportunities exist for FHA to extend the use of TOTAL, and the data it utilizes, throughout HUD by sharing information with other HUD offices that could benefit from it. Appendix I contains details of our scope and methodology, and appendix II contains information on the products that lenders can underwrite with TOTAL. We conducted our work in Washington, D.C., between April 2005 and February 2006 in accordance with generally accepted government auditing standards.

Results in Brief

Some of the choices FHA made during the development process could affect TOTAL's effectiveness, although overall the process was reasonable. Like the private sector, FHA and its contractor used variables that reflected borrower and loan characteristics to create TOTAL, as well as an accepted modeling process to test the variables' accuracy in predicting default. As a

result, FHA and its contractors were able to create a scorecard similar to those used by private sector organizations. However, certain choices made while TOTAL was being developed and implemented could limit its effectiveness. For example, the data that FHA and its contractors used to develop TOTAL were 12 years old by the time FHA implemented the scorecard. The market has changed significantly since 1992, in part because many borrowers have lower credit scores and receive down payment assistance. FHA's TOTAL does not take these market changes into account. In addition, among other things, FHA

- did not develop a formal plan for updating TOTAL on a regular basis,
- did not include all the important variables that could help explain expected loan performance,
- selected a type of model that limits the uses to which the scorecard can be put, and
- did not base cut points on the loan data used to develop TOTAL.

HUD could see more benefits from TOTAL scorecard by expanding its use of this tool. As a result of TOTAL, FHA lenders and borrowers have seen two added benefits—less paperwork and more consistent underwriting decisions. Private lenders and mortgage insurers, however, put their scorecards to other uses, relying on them to help inform general management decision making, price products based on risk, launch new products, as well as regularly updating them. By increasing their use of scorecards, these lenders and brokers not only reduce application time and see more consistent results from underwriters but also are able to broaden their customer base and improve their financial performance. Adopting these “best practices” from the private sector could generate similar kinds of benefits for FHA. Additionally, HUD’s Government National Mortgage Association (Ginnie Mae), which guarantees the timely payment of principal and interest on securities issued by private institutions and backed by pools of federally insured or guaranteed mortgage loans, could use credit scores utilized by TOTAL to improve the transparency of the secondary market for securities backed by FHA-insured loans.

To improve how HUD uses and benefits from TOTAL, we recommend that the Secretary of HUD develop policies and procedures for regularly updating TOTAL and explore additional uses of TOTAL and the credit data it utilizes. In comments on a draft of the report, HUD did not explicitly

agree or disagree with our recommendations but indicated that it was taking some steps to update TOTAL and explore different uses for it.

Background

Congress established FHA in 1934 under the National Housing Act (Pub. L. No. 73-479) to broaden homeownership, protect and shore up lending institutions, and stimulate employment in the building industry. FHA's single-family programs insure private lenders against losses from borrower defaults on mortgages that meet FHA criteria and that are made primarily to low-income, minority, and first-time homebuyers of properties with one to four housing units. In 2004, some 77.5 percent of FHA loans went to first-time homebuyers, and 35 percent of these loans went to minorities. FHA insures most of its single-family mortgages under its Mutual Mortgage Insurance Fund (MMI Fund), which is supported by borrowers' insurance premiums.

FHA insures a variety of mortgages that cover initial home purchases, construction and rehabilitation, and refinancing. Its primary program is Section 203(b), the agency's standard product for single-family dwellings. As the mortgage industry has developed products such as adjustable-rate mortgages (ARM), FHA has followed suit and now insures ARMs on single-family properties. FHA insures a variety of refinancing products, including mortgages designed to promote energy efficiency. Finally, it insures specialty mortgages, such as the Hawaiian Home Lands mortgage, which enables eligible native Hawaiians to obtain insurance for a mortgage on a homestead lease granted by the Department of Hawaiian Home Lands.

Despite the products it insures, the number of loans FHA insures each year has fallen dramatically since 2000, largely because lending for conventional mortgage products (i.e., mortgages with no federal insurance or guarantee) has grown much more rapidly since the late 1980s than mortgages insured by government entities such as FHA and the Department of Veterans Affairs.³ As conventional markets have grown, so has the private sector's use of automated underwriting systems, which has streamlined the application process and allowed lenders to more quickly assess the risk of loans. FHA began approving specific automated underwriting systems for lenders in 1996 in an effort to streamline its manual underwriting process. When it began delegating underwriting tasks to approved lenders in the

³See GAO, *Housing Finance: Ginnie Mae Is Meeting Its Mission but Faces Challenges in a Changing Marketplace*, [GAO-06-9](#) (Washington, D.C.: Oct. 31, 2005).

1980s, lenders manually underwrote loans before submitting the loan applications and required documentation to an FHA field office for approval. Once automated underwriting systems for FHA lending came into use, “direct endorsement lenders” (i.e., lenders certified by HUD to underwrite loans and determine their eligibility for FHA mortgage insurance without obtaining prior review) could streamline the loan application process by bypassing some documentation requirements.⁴ According to FHA officials, automated underwriting has allowed FHA to reduce the amount of time needed to approve insurance for a loan from several days to 1 day.

The key to automated underwriting is a mortgage scorecard algorithm that attempts to objectively measure the borrower’s risk of default quickly and efficiently by examining the data that has been entered into the system. To underwrite a loan, lenders first enter into the electronic system data such as application information and credit scores. A scorecard compares these data with specific underwriting criteria (e.g., cash reserves and credit requirements) using a mathematical formula. Because the scorecard electronically analyzes each variable, it can quickly predict the likelihood of default. According to FHA officials, this process not only reduces underwriting time but also decreases the amount of documentation needed to assess the borrower’s credit risk.

Private mortgage insurers, such as United Guaranty and Mortgage Guaranty Insurance Corporation (MGIC), were among the first to develop mortgage scorecards in the early 1990s. Beginning in the mid-1990s, Freddie Mac and Fannie Mae began to create their own automated underwriting systems and scorecards to evaluate conventional loans for purchase.⁵ More specifically, Freddie Mac implemented its Loan Prospector automated underwriting and scorecard tool by 1996, and Fannie Mae

⁴Direct endorsement lenders underwrite the large majority of FHA loans.

⁵Fannie Mae and Freddie Mac are government-sponsored enterprises that purchase mortgages from lenders across the country, financing their purchases by borrowing or issuing securities backed by the mortgages (mortgage-backed securities). Most of the mortgages they purchase are conventional mortgages.

implemented a similar tool, Desktop Underwriter, in 1997.⁶ Experience with these scorecards prompted Freddie Mac in 1998 and Fannie Mae in 1999 to develop versions of these scorecards for FHA that lenders first used to automatically underwrite FHA-insured loans. Both entities used performance data on FHA-insured loans as part of the loan data used to create the FHA versions of their scorecards.

However, while FHA cooperated in the development of Freddie Mac's and Fannie Mae's scorecards for FHA-insured loans, they were nonetheless proprietary to those entities, and some important details (e.g., the weighting of the variables) were withheld from FHA. In addition, the two scorecards sometimes yielded contradictory results for the same borrower. As a result, FHA decided to replace the Loan Prospector and Desktop Underwriter scorecards and develop its own scorecard that would provide uniform outcomes.⁷

Between 1998 and 2004, FHA contracted with Unicon Research Corporation to develop TOTAL.⁸ Direct endorsement lenders now use TOTAL in conjunction with automated underwriting systems that meet FHA standards—Loan Prospector, Desktop Underwriter, and Countrywide Loan Underwriting Expert System (CLUES)—to determine the likelihood of default.⁹ Although TOTAL can determine the credit risk of a borrower, it does not reject a loan; FHA requires lenders to manually underwrite loans that are not accepted by TOTAL to determine if the loan should be accepted or rejected.

⁶In addition to Fannie Mae's and Freddie Mac's automated underwriting systems and scorecards, other major lenders we spoke with, such as Countrywide, also have tools that they use internally to score conventional loans. These lending companies use TOTAL in conjunction with external automated underwriting systems, such as Loan Prospector and Desktop Underwriter, to underwrite FHA-insured loans.

⁷HUD rescinded lenders' authority to use the Loan Prospector and Desktop Underwriter scorecards to underwrite FHA-insured loans once TOTAL Scorecard was implemented in 2004. However, lenders can continue to use Loan Prospector and Desktop Underwriter automated underwriting systems in conjunction with TOTAL scorecard to underwrite loans.

⁸Fair Isaac Corporation was a subcontractor to Unicon in this effort. Although Unicon was the primary contractor FHA used to help develop TOTAL, FHA also contracted with other firms to assist with TOTAL's implementation.

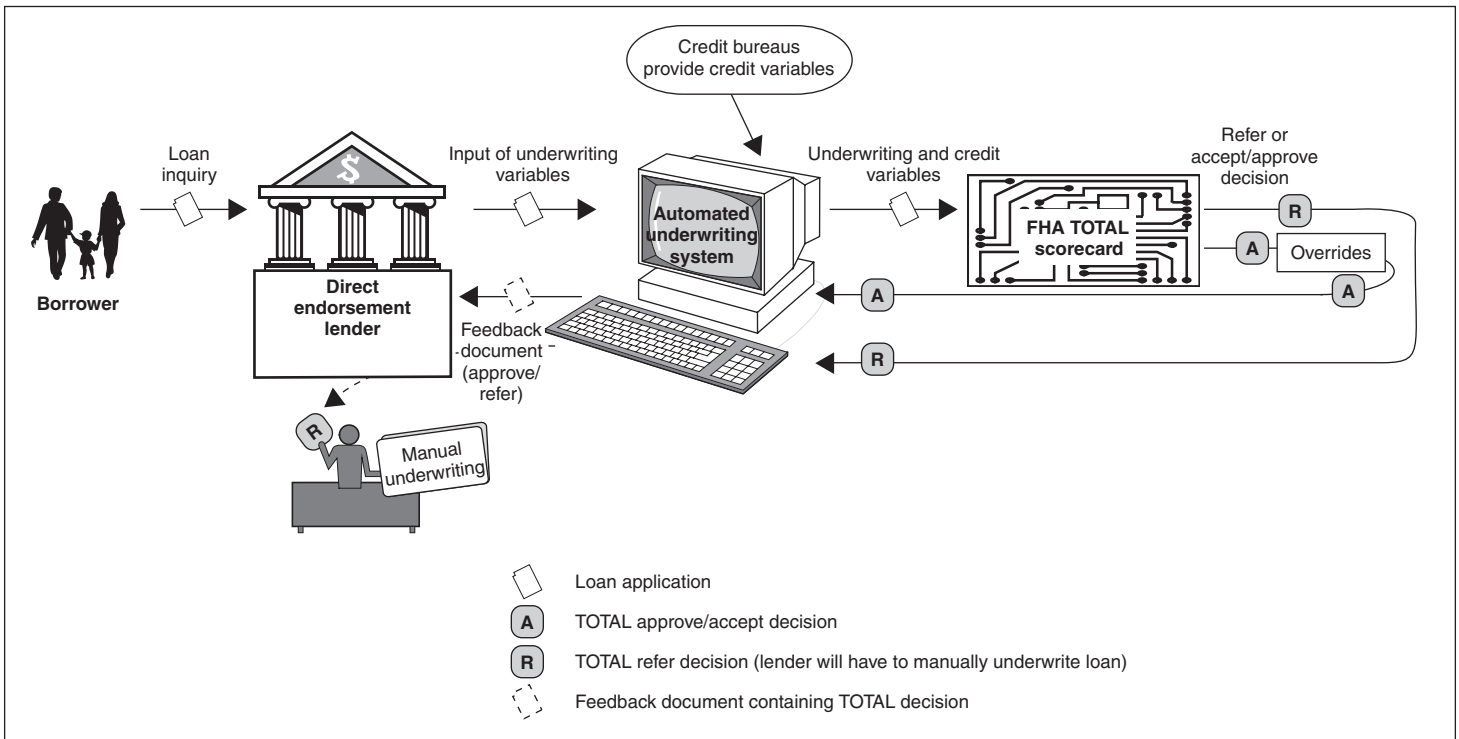
⁹CLUES is another automated underwriting system developed by Countrywide that lenders can use in conjunction with TOTAL to underwrite FHA-insured loans.

FHA's automated mortgage underwriting process starts at the time that the borrower meets with and submits information to the direct endorsement lender for loan prequalification (see fig.1). First, the direct endorsement lender enters the application variables, such as the applicant's loan-to-value ratio (LTV) and debt, into the automated underwriting system.¹⁰ Second, the automated underwriting system electronically "pulls" the additional credit data required to score the loan, which includes any bankruptcy and foreclosure information and credit scores. Third, the automated underwriting system transmits the data to TOTAL, which evaluates the information and recommends whether the loan should be "referred" or "accepted." A "refer" recommendation requires that the direct endorsement lender manually underwrite the loan.¹¹ An "accept" recommendation means that the loan does not have to be manually underwritten to determine the borrower's creditworthiness and, accordingly, that less documentation will be required to process it. For example, borrowers whose loans are accepted do not have to verify their employment history if they have already met certain conditions, such as providing confirmation of current employment. An accepted application must go through an additional series of credit checks, or overrides, to ensure that it meets all of FHA's underwriting standards. If the loan does not pass the series of additional credit checks, the application can still be downgraded to a "refer" for manual underwriting. Once the loan is processed through the credit checks, the automated underwriting system then sends the decision in a feedback document that the lender uses to continue processing the loan application.

¹⁰LTV is the relationship between the loan amount and the value of the property (the lower of the appraised value or sales price) expressed as a percentage of the property's value.

¹¹TOTAL may refer a loan that was initially accepted if certain conditions are found (e.g., the loan would represent an excessive debt burden to the borrower or the borrower has experienced bankruptcy or foreclosure) that trigger an override of the initial decision.

Figure 1: FHA's Automated Mortgage Underwriting Process



Sources: GAO and Nova Development (images).

FHA's Approach to Developing TOTAL Was Generally Reasonable, but Some of Its Choices Could Limit TOTAL's Effectiveness

FHA's approach to developing TOTAL was generally reasonable, but some of the decisions made during the development process could ultimately limit the scorecard's effectiveness. Like the private sector, FHA and its contractor followed an accepted process, using a variety of variables that took into account such items as credit history and economic conditions. As a result, TOTAL is similar to private sector scorecards. But TOTAL's effectiveness could be limited by some of the choices that were made during the development process, including the fact that (1) the data FHA and its contractor used were 12 years old by the time TOTAL was implemented, (2) FHA has not developed policies and procedures for updating TOTAL, and (3) the benchmark analysis for determining TOTAL's predictive capability may have been inadequate.

The Process FHA and Its Contractors Used to Develop TOTAL Was Generally Reasonable

Scorecards are typically developed and maintained using data with specific characteristics and an accepted modeling process. The data—such as, variables that reflect credit histories and loan information—are typically several years old and are drawn from samples of borrowers whose characteristics resemble those of the borrowers whom the scorecard will assess. The process used in the private sector to develop the scorecard itself typically has four components:

- identifying the variables that best predict the likelihood of default,
- choosing a scorecard model by conducting various tests,
- validating the scorecard to ensure that it is stable (i.e., consistently produces reasonable results), and
- determining the appropriate cut point for separating loans that will be accepted from those that will be referred for manual underwriting.

Once the scorecard is complete, many private sector organizations plan for and conduct ongoing analyses and generate reports to monitor and update their scorecards. Analyses that help in updating scorecards include measuring changes in the population of borrowers, the quality of the portfolio, and the scorecard's effectiveness. Organizations may conduct these analyses on a monthly and quarterly basis, and they may also supplement these analyses with more in-depth reviews.

In developing TOTAL, FHA's contractor Unicon followed the four-step process. First, it identified variables using data primarily for loans that FHA had endorsed (i.e., approved for mortgage insurance) in 1992. In 1998, when Unicon began developing TOTAL, FHA chose to use 1992 loan data, which would reflect the characteristics of FHA borrowers and be "seasoned," or old enough, to provide a sufficient number of defaults that could be attributed to a borrower's poor creditworthiness. The 1992 sample of endorsed loans included 9,867 loans that did not result in a claim default and 4,818 that did. Unicon tested the variables' ability to predict claim default. Unicon determined that a number of variables, such as credit, LTV ratio, and cash reserves should be included in TOTAL. To determine the best type of credit variable for FHA's purposes to include in TOTAL, Unicon and its subcontractor Fair Isaac Corporation used 1994 and 1996 credit data to test various credit models and confirm the results. These models included those that measured borrowers' credit using only credit scores and more complex models that were based on individual credit

characteristics rather than on a credit score. Based on this analysis, FHA decided that the standard FICO credit score was a reasonable credit variable to include in the scorecard.

Second, Unicon tested various versions of statistical models suitable for developing scorecards. These were variations on two types of models, “logit” and “hazard.” Both models predict the probability of default based on predictive variables that are weighted according to their statistical importance, although the hazard model can predict default over multiple time periods. FHA officials stated that, based on Unicon’s analyses, both models’ predictive capability were about equal. FHA chose the logit model, claiming that it was easier to implement and that its estimates were easier to interpret.

Third, Unicon tested the stability of the model by estimating it against a sample of loans from 1992 that had not been included in the original 1992 data. In addition, Unicon tested the model’s stability over time by checking whether the determinants of defaults occurring within 2 years were similar for the 1992 and 1994 application years. Both stability tests, according to documents provided by FHA, suggested that the model did not materially change over the 2-year period. In addition, FHA performed a benchmark analysis by comparing the performance of TOTAL with previously used scorecards—the FHA versions of Freddie Mac’s Loan Prospector and Fannie Mae’s Desktop Underwriter—to determine the model’s precision. According to documents provided by FHA, TOTAL slightly outperformed the other scorecards.

Finally, FHA worked with Unicon, Freddie Mac, and Fannie Mae to determine a cut point for TOTAL that would enable the agency to quickly accept the majority of loan applications so that lenders could focus their manual underwriting on the marginal, potentially riskier borrowers. This cut point was based partly on a 1996 analysis that Freddie Mac, in consultation with FHA, conducted on the version of the Loan Prospector scorecard developed for FHA. According to HUD officials, it was also consistent with cut points that had previously been used before TOTAL was implemented. The current cut point allows the agency to accept 65 to 70 percent of the loan applications automatically and refer the remainder.

In a 2001 report, a consulting firm—KPMG LLP—that reviewed documents relating to the development of TOTAL concluded that FHA adequately supported most of its development decisions. The report focused on the

data used, the type of model selected, the determination of cut points, and FHA's benchmark analysis.

Some Development and Implementation Choices Could Limit TOTAL's Effectiveness

Although FHA and its contractor used a reasonable and generally accepted practice for developing TOTAL, some of the choices made during that process could affect FHA's ability to maximize its use of the scorecard.

Data Not Current

By the time TOTAL was implemented in 2004, the loans in the development sample were 12 years old. Best practices call for scorecards to be based on data that are representative of the current mortgage market—specifically, relevant data that are no more than several years old. FHA officials told us that the relationship between TOTAL's predictive variables and FHA borrowers' tendency to default had not changed significantly since 1992 and that they believed the data were still useful. However, since 1992, significant changes have occurred in the mortgage industry that have affected the characteristics of those applying for FHA-insured loans. These changes include generally lower credit scores, increased use of down payment assistance, and new mortgage products that have allowed borrowers who would previously have needed an FHA-insured loan to seek conventional mortgages. As a result, the relationships between borrower and loan characteristics and the likelihood of default may also have changed. For example, the statistical relationship between the LTV ratio and the likelihood of default may be different for borrowers who receive down payment assistance than for those who do not.

No Plan for Regular Updates

As noted earlier, when TOTAL was implemented in 2004, FHA officials believed that the 1992 loan sample used to develop the scorecard still provided an adequate basis for assessing new loan applications. The agency's subsequent analyses of TOTAL using samples of FHA-insured loans throughout the 1990s indicate that, for years tested, the scorecard has performed consistently in separating loans that resulted in insurance claims from those that did not. As a result, HUD did not update TOTAL either before it was deployed or subsequently. However, best practices implemented by private entities and reflected in guidance from a bank regulator call for having formal policies to ensure that scorecards are routinely updated. Frequent updating of scorecards ensures that they reflect changes in consumer behaviors and thus continue to accurately predict the likelihood of default. In September 2004, FHA awarded another contract to Unicon to, among other things, update TOTAL by 2007. In

addition, HUD indicated that, through its contractors, it has the capacity to update TOTAL should the need arise and has contracts for acquiring credit data to support an update of the scorecard. However, FHA has not developed policies and procedures for updating TOTAL on a regular basis.

Limited Sample of Loans Used for Development and Testing

Another potential shortcoming that could affect TOTAL's effectiveness is the fact that FHA used only endorsed loans to develop TOTAL. Because the data did not cover all of the possible outcomes of applying for a loan (rejection, for example), the results could be biased. Therefore, TOTAL will likely assess a population of applications with generally poorer overall credit quality than the original population used to develop the scorecard and thus may not be as effective in evaluating applicants with poorer credit. In addition, because the sample of loans that was used to develop TOTAL differed from the total population of loan applications, the selection and weighting of the variables in the scorecard could be less than optimal. For the riskier applications, the predictive variables and associated weightings might differ from those TOTAL currently uses. FHA officials stated that, at the time TOTAL was being developed, they did not have another choice in the data used. However, updating TOTAL using information on marginal loans that were referred by the scorecard, but ultimately endorsed for FHA insurance, could help mitigate the bias problem.

Similarly, using cut points that were based only on endorsed loans at the time TOTAL was developed—in this case, loans that were originated using the Loan Prospector scorecard—could mean that a higher percentage of loans that are likely to default would be accepted rather than referred for manual underwriting. That is, a sample of endorsed loans does not include loans that have been rejected and thus does not represent the total population of loans. As previously noted, the current cut point allows FHA to accept 65 to 70 percent of the total population of loan applications and that percentage could include riskier loans—riskier loans that the sample did not represent because they were referred by Loan Prospector and ultimately rejected. Furthermore, because FHA's selection of cut points was not based on analysis of loans accepted by TOTAL, but rather on loans accepted by Loan Prospector, the cut points may prove to be less useful for FHA as it attempts to manage and understand its risk. KPMG LLP—the consulting firm that reviewed TOTAL's development in 2001—raised similar concerns.

We also found that, similar to the sample of loans used to develop TOTAL, the sample FHA used to perform the 1996 benchmark analysis of TOTAL

consisted only of endorsed loans, rather than a broader sample that included the riskiest loans. Partly because other loan data were not readily available, Unicon benchmarked TOTAL against a sample of loans originated using the Loan Prospector scorecard. This sample consisted primarily of loans that had been accepted by the scorecard and endorsed for FHA insurance. However, because all models perform slightly differently (i.e., each scorecard will mistakenly accept certain high-risk, or “bad” loans), using a prescreened sample of loans could limit the accuracy of the benchmark analysis.¹² The potential effect on the benchmark analysis was to suggest that TOTAL outperformed Loan Prospector. However, using a sample of loans that had not been prescreened by Loan Prospector might have yielded somewhat different results that would have more accurately represented TOTAL’s predictive capabilities.

Excluded Important Variables

While TOTAL includes many of the variables included in other mortgage scoring systems, it does not include a number of important variables included in other systems. For example, the systems used by Fannie Mae and Freddie Mac may assign higher risks to adjustable rate loans than to fixed-rate loans. ARMs are generally considered to be higher risk than otherwise comparable fixed-rate mortgages, because borrowers are subject to higher payments if interest rates rise. Further, other scoring systems often include indicators for property type (single-family detached, two- to four-unit, or condominiums, for example). FHA indicated that these variables were not included in TOTAL because the risk associated with them did not differ significantly in the 1992 data used to estimate the model. However, the 1992 data set was fairly small—fewer than 15,000 loans—and only about 16 percent of it consisted of ARMs.¹³ In addition, condominiums and multiunit properties are a small component of FHA’s business. The modeling effort may have failed to find significant effects for these variables simply because of the small numbers of loans with these characteristics in the development sample. Previous research by FHA contractors on larger samples of FHA loans found that ARMs from this

¹²Each institution may define a “bad” loan uniquely. FHA defines a bad loan as a loan resulting in an insurance claim that could be attributed to a borrower’s poor creditworthiness, rather than subsequent general economic reverses, location-based market effects, or other things unrelated to the individual borrower.

¹³By contrast, an official from a major lending organization said that they used about 200,000 loans to develop their scorecard.

period were riskier than comparable fixed-rate mortgages.¹⁴ The fact that FHA's scoring system does not consider the extra risk inherent in ARMs or distinguish between different types of properties, while competitors' systems do, could have important consequences. If marginal applications that are ARMs or multiunit properties are rejected by competitors' systems, but accepted by FHA's, then FHA's share of these riskier loans may increase. Finally, FHA does not include the source of the down payment in its scorecard.¹⁵ However, research by HUD contractors, HUD's Inspector General, and us have all identified the source of a down payment as an important indicator of risk, and the use of down payment assistance in the FHA program has grown rapidly over the last 5 years.¹⁶ For example, as we reported in November 2005, FHA-insured loans with down payment assistance have higher delinquency and insurance claim rates than do similar loans without such assistance.

Limited Logit Model

FHA chose a logit rather than a hazard model as a basis for TOTAL and, therefore, potentially limited the variety of uses to which the scorecard can be put. While a logit model predicts the probability of default for a specific point in time, a hazard model, as previously noted, predicts the probability of default over multiple time periods. Because a hazard model captures the dynamic between time and loan performance, HUD could use it to project cash flows over time and estimate profitability. In addition, a hazard model more readily accepts and analyzes recent data, and FHA could update a scorecard developed from this model with recent origination data as often as it needs. Moreover, with a relatively current scorecard, FHA could monitor market changes and TOTAL's effectiveness at predicting defaults in the current climate. Despite the added capabilities of a hazard model, FHA

¹⁴See Technical Analysis Center, Inc., *An Actuarial Review of the Federal Housing Administration Mutual Mortgage Insurance Fund for Fiscal Year 2004* (Fairfax, VA: Oct. 19, 2004).

¹⁵Although private sector scorecards do not generally include this variable, other mortgage industry participants are generally more restrictive than FHA—for instance, they do not allow down payment assistance from sellers, even through nonprofit organizations.

¹⁶See Technical Analysis Center, Inc., *An Actuarial Review of the Federal Housing Administration Mutual Mortgage Insurance Fund for Fiscal Year 2004* (Fairfax, VA: Oct. 19, 2004); Concentrance Consulting Group, *An Examination of Down Payment Gift Programs Administered by Non-profit Organizations* (Washington, D.C.: Mar. 1, 2005); HUD IG, *Final Report of Nationwide Audit Down Payment Assistance Programs, 2000-SE-121-0001* (Washington, D.C.: Mar. 21, 2000); and GAO, *Mortgage Financing: Additional Action Needed to Manage Risks of FHA-Insured Loans with Down Payment Assistance*, [GAO-06-24](#) (Washington, D.C.: Nov. 9, 2005).

officials stated that the logit model was sufficient for TOTAL's intended purpose because TOTAL was only intended to be used to rank order applications for FHA-insured loans based on the likelihood of default.

HUD Could Benefit Significantly More from TOTAL

FHA uses TOTAL Scorecard in much the same way as its two earlier scorecards—to inform underwriting standards and assess loan applications against those standards. TOTAL has produced more consistent underwriting results and, for some lenders, has streamlined the approval process and reduced paperwork. Private sector organizations use their scorecards more broadly, relying on them to assess risk, help launch new products, and broaden their customer base, as well as updating them regularly. FHA could realize similar types of benefits from TOTAL to help the agency serve low- and moderate-income borrowers while ensuring its financial soundness. In addition, the credit data used by TOTAL could help to improve the transparency of the secondary market for FHA-insured loans.

FHA Could Realize Additional Benefits Using TOTAL

FHA used TOTAL to test variables and identify the most predictive ones, which the agency then used to inform its underwriting standards. Therefore, TOTAL enables FHA to adjust its underwriting standards, if needed, based on analyses of current market conditions—something that Desktop Underwriter and Loan Prospector did not readily allow because FHA did not have direct access to them. In addition, FHA directs lenders to use TOTAL to assess loan applications by entering information that corresponds to certain variables.¹⁷ As with the previous scorecards, the only lenders that can directly interface with TOTAL and input loan application data into the scorecard via automated underwriting systems are direct endorsement lenders. Direct endorsement lenders can assess most FHA loan products with TOTAL (see app. II).

As described in table 1, FHA's current use of TOTAL has provided additional benefits over previous scorecards, such as less paperwork for lenders and more consistent underwriting decisions. Loan Prospector and Desktop Underwriter had, among other things, helped speed up the application process and provided an opportunity to base approvals on

¹⁷Lenders are required to obtain the following application information: type of mortgage and terms of loan, property information, borrower information, and employment information.

objectively determined variables. TOTAL continues these benefits and, in addition, has generated two others. First, as noted earlier, the previous scorecards did not always provide consistent underwriting decisions—that is, at times the results of their assessments differed, which resulted in the same loan being accepted by one scorecard and referred by the other. As a result, certain loans had to be approved manually, through potentially subjective decision making. TOTAL limits the number of loans that need to be approved manually because it provides consistent automatic underwriting decisions. Second, lenders that use TOTAL do not have to provide as much documentation for the accepted loans they underwrite as lenders that do not use TOTAL. For example, these lenders do not have to obtain or submit verification of rent, and the requirements for proof of income employment and assets are less stringent.¹⁸

Table 1: TOTAL Has Generated Added Benefits

Scorecard benefits	Scorecards previously used by FHA	TOTAL scorecard
Ability to adjust underwriting standards	X	X
Majority of loans automatically underwritten	X	X
Faster decisions	X	X
Objective underwriting	X	X
Less paperwork for lenders		X
More consistent underwriting decisions		X

Source: GAO.

Private Sector Organizations Benefit from Using Scorecards in a Variety of Ways

As noted earlier, the key to successfully using a scorecard is ensuring that it is updated so that it can provide accurate and useful information. Updated scorecards can provide a number of benefits because of the variety of potential uses. Private sector organizations we spoke with said that their scorecards had produced the same benefits as TOTAL, including reducing loan origination times, and enhancing consistency and objectivity in the underwriting process. In addition, private sector organizations use their

¹⁸Because TOTAL obtains credit information to automatically assess applications for FHA-insured loans, FHA does not require as much verification as it does for applications that are manually underwritten.

scorecards to help inform general management decision making, set prices based on risk, and launch new products. To inform general management decision making, private sector organizations compare the scorecards' actual results with its predictions to, for example, set cut points and redirect underwriting resources from relatively low-risk cases to more marginal borrowers. To set risk-based prices, private sector organizations use scorecards to rank the relative risk of borrowers and price products according to that ranking. For instance, mortgage insurers may use FICO scores as a basis for reducing insurance premiums for low-risk borrowers. Finally, to help launch new products, these lenders may use scorecards to balance risk and compensating factors. For example, a product with a more flexible LTV could be offered to borrowers with characteristics such as a strong credit history.

As a result of these uses, private lenders have been able to broaden their customer base and improve their financial performance. Expanding their product offerings based on a greater understanding of risk allows lenders to broaden their customer base. Lenders told us that their scorecards had allowed them to underwrite some borrowers who would have been rejected using manual underwriting and to develop products to better serve borrowers who were at a greater risk of default. One official noted that the scorecard had provided a greater understanding of the individual borrower's risk and that, as a result, borrowers who would previously have been considered for subprime loans were now rated at a higher level of eligibility. In addition, lenders reported being able to reduce personnel costs because the organizations were writing fewer loans manually. Ultimately, these lenders said that they were able to maximize their profits because of the streamlining and cost reductions the scorecards provided.

Implementing Private Sector Scorecard Practices Could Provide Additional Benefits for FHA

FHA could see additional benefits from TOTAL if it implemented some private sector practices. By routinely monitoring and updating TOTAL, for instance, FHA could better anticipate, understand, and react to changes in the marketplace. FHA could also exercise more control over its financial condition by using the scorecard to help (1) project estimated insurance claims and adjust cut points and (2) institute its proposal for risk-based pricing of the agency's mortgage insurance products. FHA could also use TOTAL to aid its efforts to develop new products for underserved borrowers.

FHA could better anticipate, understand, and react to changes in the marketplace if, like the private sector, it routinely updated TOTAL.

Updating the scorecard as new data become available could help ensure that changes in consumer behavior are reflected in the model, which can be affected by changes in products and other trends. By routinely comparing the scorecard's actual results to its predictions, FHA could ascertain whether TOTAL was effectively predicting default risk and make any necessary changes to the variables. In addition, FHA could use TOTAL to more accurately determine the performance of new loans, which HUD currently monitors on an ad hoc basis, to inform policy discussions on the creation and revision of FHA products.

FHA could exercise more control over its financial condition, specifically its credit subsidy costs and financial soundness, by using the scorecard's default predictions to project estimated claims and adjust cut points if necessary.¹⁹ In order to project estimated insurance claims, FHA would need to combine the variables' weights estimated in the scorecard development process with projections of interest and house price appreciation rates, as is done in FHA's actuarial studies. Based on its projections, FHA could then determine how much risk it could or should tolerate and make adjustments, if necessary, to the cut points and thus to the numbers and types of loans it automatically accepted and referred for manual underwriting. For example, if FHA raised the cut point, TOTAL would accept fewer high-risk loans (i.e., loans more likely to result in an insurance claim), thereby lowering FHA's claim rate. Conversely, by lowering the cut point, TOTAL would accept more high-risk loans, and the agency would experience a higher claim rate.

TOTAL could also aid HUD's efforts to implement risk-based pricing of its mortgage insurance products. In its fiscal year 2007 budget submission, HUD proposed legislation that would allow the agency to replace its current insurance premium structure, where most borrowers pay the same premium regardless of their default risk, to a risk-based structure where borrowers would pay higher or lower premiums depending on their default risk. HUD believes that risk-based pricing would allow the agency to

¹⁹The credit subsidy cost is the net present value of the estimated long-term cost to the federal government of extending or guaranteeing credit (through FHA mortgage insurance), calculated over the life of the loan and excluding administrative costs. Federal agencies are required to estimate these costs as part of the annual budget process. FHA's main single-family mortgage insurance program is supported by the MMI Fund, which is financed through mortgage insurance premiums and currently operates at a profit. Since 1990, the financial condition of the fund has been assessed by measuring the economic value of the fund—its capital resources plus the net present value of future cash flows—and the related capital ratio—the economic value as a percent of the fund's insurance-in-force.

charge more competitive mortgage insurance premiums, attract and retain relatively low-risk borrowers, and exercise more control over its credit subsidy costs. HUD plans to set premiums based on an assessment of borrowers' credit histories, LTVs, and debt-to-income ratios. However, it has not fully explored the potential of using TOTAL—especially a version that includes additional variables, such as down payment assistance—which is capable of evaluating risk in a more comprehensive way, for this purpose.

In its budget submissions for fiscal years 2006 and 2007, HUD also proposed legislative changes that would allow FHA to develop new mortgage insurance products for low- and moderate-income borrowers (loans with lower down payment requirements, for example). HUD believes that its traditional customers would be better served by these new products than some of the high-cost, nonprime products offered in the conventional market. To the extent that FHA develops these products, it could use TOTAL to help identify alternatives that it previously may have believed posed too much risk, given the expected profit, when its lenders manually underwrote loans.

Providing Data Used by TOTAL Could Offer Additional Benefits to Ginnie Mae

HUD's Ginnie Mae—which guarantees the timely payment of principal and interest on securities issued by private institutions and backed by pools of federally insured or guaranteed mortgage loans—could benefit from the credit data used by TOTAL. As we reported in October 2005, Ginnie Mae has taken steps to disclose more information to investors about the FHA-insured loans that back the securities it guarantees.²⁰ However, unlike many conventional securitizers, Ginnie Mae does not disclose credit information—for example, summarized credit score data—for its loan pools. Disclosing such information is important because investors can use it to more accurately model prepayment rates. According to a Ginnie Mae official, prior to the implementation of TOTAL in 2004, the credit scores associated with FHA-insured loans were not available within HUD. Because borrowers' credit scores are used by TOTAL, Ginnie Mae has expressed interest in obtaining this information and summarizing it for investors.

²⁰See [GAO-06-9](#).

Conclusions

Although FHA has helped to provide financing for nearly 33 million properties, its share of the single-family market has steadily decreased over time. Many of these potential borrowers—typically, first-time homebuyers with minimal cash for down payments and lower than average credit scores—may have been lost to conventional lenders. These lenders have been, in part, able to provide conventional mortgages to these borrowers with the increased use of scorecards—the evaluative component of automated underwriting systems—that have enabled them to target the traditional FHA borrower that poses the least amount of risk. If that is the case, the effect on FHA is that it has started to serve more high-risk borrowers. To enhance its understanding of risk posed by its borrowers, FHA has adopted automated underwriting and developed its own scorecard.

FHA followed an accepted process in developing TOTAL and has already seen significant benefits from the scorecard. Because TOTAL has the same types of capabilities as private sector scorecards, FHA has the option to use and benefit from TOTAL in many different ways as do private sector organizations. Specifically, FHA could use TOTAL to help compete in the marketplace, manage risk, and serve its mission for borrowers. TOTAL's capabilities are important to FHA, in part, because as it begins to insure more inherently risky loans, such as loans with down payment assistance, it needs to understand the risks they pose to the FHA insurance fund and manage those risks.

However, the potential benefits of TOTAL cannot be realized without ensuring that TOTAL is regularly updated and exploring additional uses of TOTAL. For example, by not developing and implementing policies and procedures for routinely updating TOTAL, it may become less reliable and, therefore, less effective at predicting defaults. In addition, as a result of not exploring additional uses of TOTAL, FHA will not receive all of the types of benefits seen by private sector organizations. These additional uses include applying TOTAL to proposed initiatives—such as risk-based pricing and the development of new products—which may help strengthen the FHA insurance fund and reach additional borrowers. Finally, FHA has not taken steps to share credit scores utilized by TOTAL with Ginnie Mae, which could use the information to help improve the transparency of the secondary mortgage market.

Recommendations for Executive Action

To improve how HUD uses and benefits from TOTAL, we recommend that the Secretary of HUD take the following two actions:

- develop policies and procedures for updating TOTAL on a regular basis, including using updated data, testing additional variables, exploring hazard model benefits, and testing other cut points; and
- explore additional uses of TOTAL and the credit data it utilizes, including to help adjust cut points, implement risk-based pricing, develop new products, and enable Ginnie Mae to disclose more information about securities backed by FHA-insured loans.

Agency Comments and Our Evaluation

We provided HUD with a draft of this report for review and comment. HUD provided comments in a letter from the Assistant Secretary for Housing-Federal Housing Commissioner (see app. III). HUD made two general observations about the report and provided specific comments on our recommendations. First, HUD said the report did not convey the fact that developing TOTAL was a HUD initiative to modernize its processes and improve its delivery to business partners. Our draft report did discuss HUD's rationale for implementing TOTAL and the scorecards that preceded it. It also discussed the benefits of these scorecards to FHA lenders, including less paperwork and quicker approval of mortgage insurance. However, in response to HUD's comments, we added language to the report that further describes HUD's motivation for developing TOTAL.

Second, HUD said that TOTAL was working exactly as envisioned (i.e., segregating loans requiring limited underwriting and documentation from those requiring a full review by an individual underwriter) and that the draft report presented no evidence that the scorecard had failed to perform as expected. HUD also indicated that the agency had provided us with information and analysis based on FHA loan data from the 1990s, showing that TOTAL performed well in separating loans that resulted in insurance claims from those that did not. Our draft report did not state or intend to suggest that TOTAL was not fulfilling its intended function or was not working as well as expected. In fact, the report pointed out that TOTAL had continued the benefits of previous scorecards while generating others. At the same time, our draft report identified opportunities for HUD to improve TOTAL so that it could become a more effective tool for assessing and managing risk. For example, HUD could improve TOTAL by updating it to reflect recent changes in the mortgage market, such as the substantial

growth in the percentage of FHA-insured loans with down payment assistance.

HUD did not explicitly agree or disagree with our recommendation that it should develop policies and procedures for updating TOTAL, including using updated data, testing additional variables, exploring hazard model benefits, and testing other cut points. HUD indicated that it was taking steps to address some aspects of our recommendation but not others, as follows:

- HUD said that it had a formal plan for updating TOTAL, access to TOTAL's development and implementation contractors to accommodate updates should the need arise, and contracts for acquiring credit data to support an update of the scorecard. As our draft report discussed, HUD had a contract to update TOTAL by 2007. However, best practices implemented by private entities and reflected in guidance from a bank regulator call for having formal policies to ensure that scorecards are routinely updated. HUD's current plan calls for one update to be completed by 2007 (7 years after HUD finalized the scorecard model) and has no provision for subsequent updates. Accordingly, we continue to believe that HUD should develop policies and procedures for updating TOTAL on a regular basis.
- HUD acknowledged that it had used 1992 data to develop TOTAL but stated that the data spanned a wide range of credit scores and application factors represented in greater or lesser numbers in later cohorts of loans. We disagree that the 1992 loan data sufficiently represents later cohorts of loans and thus continue to believe that HUD should use more current loan data to update TOTAL. As our draft report stated, significant changes have occurred in the mortgage industry since 1992 that have affected the characteristics of those applying for FHA-insured loans. These changes include generally lower credit scores, increased use of down payment assistance, and new mortgage products that have allowed borrowers who would have previously needed an FHA-insured loan to seek conventional mortgages.
- HUD said that in developing TOTAL, the agency and Unicon tested all the available variables and included those that were empirically important, consistent with Equal Credit Opportunity Act (ECOA) regulations (which, among other things, set forth rules for evaluating credit applications). HUD also said that it intends to re-analyze all available variables, including, as our draft report suggested, the source

and amount of down payment assistance. We agree that HUD should re-analyze all available variables and incorporate them into TOTAL, consistent with ECOA requirements. Our draft report stated that HUD's analysis of certain variables, such as loan and property type, may not have found significant effects simply because of the small numbers of loans in HUD's sample that were ARMs or were for condominiums or multiunit properties. HUD could conduct future analyses with greater statistical reliability if it were to use larger samples of loans, as major private lending organizations do.

- HUD stated that because TOTAL was designed to assess the creditworthiness of borrowers, the logit model was sufficient for that purpose. However, HUD also acknowledged that a hazard model could be used for the purposes enumerated in our draft report. Accordingly, we continue to believe that HUD should explore the benefits of a hazard model.
- HUD said that it did not rely solely on a 1992 sample of loans in setting a cut point for TOTAL and that it worked with Unicon, Fannie Mae, and Freddie Mac, using recent distributions of loans, to obtain a cut point that was consistent with the ones already in use for FHA lending. Our draft report did not state that HUD relied solely on a 1992 sample of loans. Rather, it indicated that the cut point was based partly on a 1996 analysis that Freddie Mac performed in consultation with FHA. However, in response to this comment, we added additional language to the report describing how HUD determined the cut point. HUD did not address the fundamental issue raised in our draft report—that the limitations of its original analysis suggest that the agency should test additional cut points. We continue to believe that HUD should test other cut points based on analysis of loans accepted by TOTAL.

HUD did not explicitly agree with our recommendation that it should explore additional uses of TOTAL, such as using it to help adjust cut points, implement risk-based pricing, develop new products, and enable Ginnie Mae to disclose more information about securities backed by FHA-insured loans. However, the actions HUD said it plans to take are consistent with our recommendation. Specifically,

- HUD said that while TOTAL was not intended for risk-based pricing, the agency planned to explore how TOTAL might be used for that purpose.

-
- HUD stated that it planned to determine the benefits that TOTAL could present in developing new products, if given the authority from Congress.
 - HUD said that it was exploring the legal ramifications of giving Ginnie Mae the credit scores obtained using TOTAL. HUD also provided a technical correction, which we addressed in our final report, concerning how it stores these credit scores.

Finally, HUD stated that the draft report contained several errors and that these errors had been previously pointed out in meetings with us. Where appropriate, we made technical corrections and clarifications in response to HUD's written comments and comments provided by a HUD official at a March 2006 meeting to discuss our findings. However, we found that many of these comments, rather than correcting any errors, merely provided additional levels of detail that were unnecessary for the purpose of this report.

As agreed with your office, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from the date of this letter. At that time, we will send copies to the Chairman and Ranking Member of the Senate Committee on Banking, Housing, and Urban Affairs; the Chairman and Ranking Member of the House Committee on Financial Services; and the Ranking Member of the Subcommittee on Housing and Community Opportunity. We also will send copies to the Secretary of Housing and Urban Development and other interested parties and make copies available to others upon request. In addition, this report will be available at no charge on the GAO Web site at <http://www.gao.gov>.

If you or your staff have any questions about this report, please contact me at (202) 512-8678 or shearw@gao.gov. Contact points for our Office of Congressional Relations and Public Affairs may be found on the last page of this report. Key contributors to this report are listed in appendix IV.

Sincerely yours,

A handwritten signature in black ink that reads "William B. Shear". The signature is written in a cursive style with a large initial 'W'.

William B. Shear
Director, Financial Markets and
Community Investment

Scope and Methodology

To assess the reasonableness of the Federal Housing Administration's (FHA) approach to developing Technology Open to Approved Lenders (TOTAL), we reviewed agency documents and interviewed the Department of Housing and Urban Development (HUD) and contractor officials to determine (1) the process and data used to develop TOTAL, including how FHA identified and evaluated scorecard variables; (2) the reliability of the analysis used to evaluate TOTAL's effectiveness in predicting defaults; and (3) how FHA established policies on cut points and overrides. In addition, we reviewed industry literature and interviewed private sector officials from large (based on volume) lending and private mortgage insurance organizations to determine the extent to which FHA's development of TOTAL is consistent with private sector practices.

To assess the benefits to FHA of expanding its use of TOTAL, we reviewed existing research on the uses and benefits of scorecards and interviewed private sector companies, academics, and HUD officials about these issues. We also determined how FHA and lenders use TOTAL by reviewing relevant agency guidance and reports and interviewing FHA officials and private lenders. In doing this work, we looked for any ways that FHA and lenders are using TOTAL differently than the scorecards TOTAL replaced. We compared FHA's use of TOTAL with the private sector's use of scorecards and determined whether FHA could benefit from any private sector practices that it has not already adopted. We also identified any opportunities that may exist for FHA to share information with other HUD offices that could benefit from TOTAL.

We conducted our work in Washington, D.C., between April 2005 and February 2006 in accordance with generally accepted government auditing standards.

Products That Lenders Can Underwrite with TOTAL

Loan purpose	Purchase money mortgage Construction-to-permanent mortgage Regular refinance with credit qualifying Cash-out refinances up to 85 percent of the appraised value Streamline refinance Credit qualifying assumptions
FHA insurance products	Section 203(b)—Mortgage insurance for one- to four-family homes Section 203(h)—Single-family mortgage insurance for disaster victims Section 234(c)—Mortgage insurance for condominium units Section 203(k)—Rehabilitation mortgage insurance Section 251—Insurance for adjustable-rate mortgages Energy efficient mortgages Section 247—Hawaiian Home Lands
Types of properties covered	Single-family dwellings of one- to four-family living units Manufactured homes meeting FHA's property requirements for Title II mortgage insurance Units in low- and high-rise condominium projects
Types of mortgages covered	Fixed-rate mortgages Adjustable-rate mortgages

Source: FHA.

Comments from the Department of Housing and Urban Development



U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
WASHINGTON, DC 20410-8000

ASSISTANT SECRETARY FOR HOUSING-
FEDERAL HOUSING COMMISSIONER

MAR 31 2006

Mr. William B. Shear
Director
Financial Markets and Community Investments
United States Government Accountability Office
441 G Street, NW
Washington, DC 20548

Dear Mr. Shear:

Thank you for providing the Federal Housing Administration (FHA) the opportunity to respond to the report entitled "HUD Could Realize Additional Benefits from Its Mortgage Scorecard" (GAO-06-435).

Before addressing the recommendations for executive action, I must point out that your report does not convey that developing the TOTAL Mortgage Scorecard was an initiative by HUD to modernize its processes and improve its delivery to its business partners. To our knowledge, neither of the other Federal agencies involved in the mortgage industry has undertaken similar efforts to develop loan-level automated risk assessment processes. Rural Housing Services in fact sought FHA's advice on scorecard building and has adopted TOTAL as its scoring engine in its own automated underwriting environment.

TOTAL is working exactly as it was envisioned: it segregates those loans where limited underwriting and documentation are required from those needing a full review by a qualified individual underwriter. Like any recent initiative, and this is only two years old, it takes time to determine what changes are warranted. However, the fundamental test of a mortgage scorecard's effectiveness is how well it performs in terms of distinguishing future claims from non-claims and GAO presents no evidence that the scorecard has failed to perform as expected.

Indeed, HUD provided GAO with benchmark information showing that TOTAL performed extremely well at sorting future claims from non-claims throughout the 1990s using nationally representative random samples of FHA loans made in 1992, 1996, and 1997, as well as identifying delinquencies for the large universe of 1998 and 1999 (accept and refer) FHA loans processed through Freddie Mac's LP for FHA scorecard. HUD also provided GAO with results from the ongoing scorecard update analyses that confirmed the power of the original TOTAL scorecard to separate claims from non-claim defaults when compared to re-estimated versions of TOTAL using later nationally representative random samples of FHA loans made from 1992 through 1999—the latest year for which HUD has information on defaults that occur before the end of the fourth year and subsequently claim.

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FHA's responses to the individual recommendations are as follows:

GAO Recommendation #1: Develop policies and procedures for the updating of TOTAL, including using updated data, testing additional variables, exploring hazard model benefits, and test other cut points.

FHA Response:

- Develop Policies and Procedures: FHA does indeed have a formal plan for updating TOTAL. FHA has had continuing access to TOTAL's developer, Unicon, and implementation contractor, ATS, to accommodate updates should the need arise and also has, through HUD's Office of Policy Development and Research (PD&R), established formal contracts with credit repositories to acquire archive credit data for building analysis files for later origination cohorts of FHA loans that are to be used in estimating updated models. While the procurement of the contracts with the repositories proved to be a protracted effort, it was completed and loan cohorts with credit data have been secured in support of the scorecard update.
- Updated data: While data from 1992 that included four-year defaults that ultimately went to claim within the subsequent 18 months were used in estimating the relationship between default and borrower credit and loan application factors, that data spanned a wide range of credit scores and application factors represented in greater or lesser numbers in later cohorts of loans. Benchmarking analyses using later data outlined above confirmed the consistent performance of the TOTAL scorecard through the years.
- Testing additional variables: Unicon and HUD did test all the available variables and included all those that proved empirically important for explaining default performance consistent with fair lending and ECOA regulation B, which requires the scorecard to be empirically derived using statistically sound procedures and does not allow for the modification of scorecard coefficients to meet *a priori* expectations. The variables that GAO maintains should have been in TOTAL did not survive as empirically important indicators in relation to other included variables. FHA is revisiting everything anew as required by regulation in the process of re-estimation of TOTAL including if the source and amount of gifts for the downpayment should be added to the algorithm.
- Exploring hazard model benefits: HUD's selection of a logit model for the TOTAL scorecard did not limit HUD with respect to other uses of scoring technology. The object of TOTAL was to assess credit worthiness of borrowers at application and the logit model was sufficient to that purpose and easier to implement. Nothing precludes the use of a hazard model for the other purposes enumerated in GAO's report.
- Testing other cut points: While HUD did analysis of cut points and their fair lending implications in the context of the 1992 development sample, it did not rely solely on the 1992 distribution of loans in setting the cut point for TOTAL when it replaced the Freddie Mac and Fannie Mae scorecards in 2004. HUD worked with Unicon, Fannie Mae, and Freddie Mac

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using recent and current distributions of loans to obtain a cut point score (with an implied maximum default probability) consistent with cutpoints already aligned and in use on FHA lending in the Fannie Mae and Freddie Mac scorecards. The cut point score does not change with shifting distributions of FHA loans. More applications will be referred to manual underwriting with distributional shifts toward higher risk loans and more applications will be rated accepts with shifts to lower risk applications.

GAO Recommendation #2: Explore additional uses of TOTAL and the data in it, such as using it to help adjust cut points, implement risk-based pricing, develop new products, and enable Ginnie Mae to disclose more information about securities backed by FHA-insured loans.

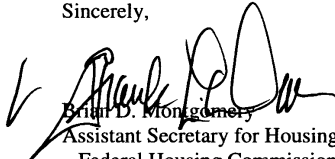
FHA Response:

- Implement risk-based pricing: TOTAL was not intended for risk-based pricing. However, FHA is exploring how it might be used for that purpose. This could prove a lengthy exercise with an unknown outcome as TOTAL now operates as an external scorecard component to differing automated underwriting systems rather than as an internal component to a single integrated system where risk-based pricing could be considerably easier to develop and implement.
- Develop new products: If FHA is given authority by Congress to offer an array of modern products designed to enhance homeownership opportunities, it will certainly explore the benefits that TOTAL may present in developing such products.
- Ginnie Mae: TOTAL is not where the universe of credit bureau scores on FHA-insured mortgages reside (although most are originally obtained via lenders choosing to score the mortgage). However, FHA is exploring the legal ramifications of providing Ginnie Mae with credit bureau scores from its system of records consistent with credit law.

Finally, I would note that the report contains several errors despite our previous meetings, in which we provided clarification. The enclosed appendix to this letter provides additional information to address these errors.

In closing, I would like to reiterate that FHA will continue to examine the performance of its scorecard, and take whatever steps are necessary to make it a better tool for assessing risk and reducing the cost to lenders that originate mortgages insured by FHA.

Sincerely,



Brian D. Montgomery
Assistant Secretary for Housing-
Federal Housing Commissioner

Enclosure

GAO Contact and Staff Acknowledgments

GAO Contact

William B. Shear (202) 512-8678

Staff Acknowledgments

In addition to the individual named above, Steve Westley, Assistant Director; Triana Bash; Austin Kelly; Mamesho MacCaulay; John McGrail; Mitch Rachlis; Rachel Seid; and Grant Turner made key contributions to this report.

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