Desktop Underwriter Version 10.1 – updates to the debt-to-income (DTI) ratio assessment

Fannie Mae recently announced the upcoming release of Desktop Underwriter® (DU®) version 10.1 which is planned for July 29, 2017 and will include updates to the debt-to-income ratio (DTI) assessment.

Desktop Underwriter is Fannie Mae's automated underwriting system. It is used by mortgage originators to complete a comprehensive assessment of a borrower's loan application and issues a recommendation with two components – *a risk assessment* and *an eligibility assessment*.

The DU **risk assessment** is a statistical evaluation of the borrower's willingness and ability to repay the mortgage by assigning points to a set of risk factors using loan application and credit report data – for example, down payment, reserves and debt-to-income ratio. The model sorts loan applications by delinquency risk and applies a risk tolerance threshold. Applications that fall within this risk tolerance threshold receive an *Approve* recommendation and loans falling outside of the threshold receive a *Refer with Caution* recommendation.

The DU **eligibility assessment** is a set of business rules that evaluate loan application and credit report data against Fannie Mae's *Selling Guide* to determine whether or not the loan will meet Fannie Mae's credit policies. For example, loans with a representative credit score below 620 are ineligible for delivery to Fannie Mae.

Loans receiving a DU *Approve/Eligible* recommendation are eligible for delivery to Fannie Mae, assuming all required conditions are satisfied. Loans that receive a DU *Approve/Ineligible* recommendation fall within DU's risk tolerance, but do not meet Fannie Mae's *Selling Guide* eligibility criteria and therefore are not eligible for delivery to Fannie Mae. Loans that receive a DU *Refer with Caution* recommendation do not meet Fannie Mae's credit risk standards and are not eligible for delivery as a DU loan[1].

Changes to the DTI assessment

The DU risk assessment is a model-based assessment of a borrower's willingness and ability to repay their monthly mortgage obligation. The model is estimated using millions of mortgages originated over the course of 15 years and through a variety of economic environments. The model is regularly reviewed to determine whether there are opportunities to improve its ability to evaluate the risk.

[1] Any loan casefile that receives a *Refer with Caution* recommendation from DU does not represent a level of risk that is acceptable to Fannie Mae for DU loans. If the data DU considered was an accurate representation of the borrower's income, assets, liabilities, and credit profile, the loan is not eligible for delivery to Fannie Mae as a DU loan.

In addition to the DU risk assessment model, DU includes eligibility overlays that can deem the loan ineligible for sale to Fannie Mae, regardless of the results from the statistical model. For example, in the current production version of DU (version 10.0), loans above 50% DTI that receive a DU *Approve* recommendation are always ineligible for delivery. Loans with a DTI between 45% and 50% that receive a DU *Approve* recommendation are only eligible with the additional requirements of 12 months of reserves and a loan-to-value ratio (LTV) of 80% or less.[2]

In the upcoming DU 10.1 release, the DTI eligibility overlay for loans between 45% and 50% will be lifted. Specifically, the minimum months of reserves and LTV restrictions will no longer be required and loans with DTIs up to 50% that receive a DU *Approve* recommendation will now be eligible for delivery. This change has been made possible by a re-estimation of the DU risk assessment that will deliver a more accurate evaluation of loans in this DTI range. Improvements in lender origination practices have produced more accurate DTI measurements, and our ability to correlate these higher DTI loans with subsequent observed loan performance have resulted in this more accurate risk assessment.

A higher DTI presents a higher degree of risk and therefore, the updated risk assessment (DU version 10.1) will require compensating risk factors to address this additional risk. However, for loans with up to 50% DTI, the assessment will now be made entirely within the DU risk assessment and without the use of a model overlay.

Table 1 uses four illustrative example loans to demonstrate the effect of the combined changes to the DU risk assessment and eligibility rules. For purpose of comparison, all of the loans are for applicants with identical incomes, purchasing the same home with a 30-year fixed rate mortgage. Loans A through C are seen by the DU 10.1 model as having roughly equivalent risks and are similar to the average of recent Fannie Mae acquisitions. Loans B and C have DTI ratios below 45% and would receive an *Approve/Eligible* rating under both DU 10.0 and DU 10.1. Loan A has a DTI of 48% and an LTV of 80%, but because the borrower has only six months of reserves rather than 12 months of reserves, this loan would receive an *Approve/Ineligible* rating under DU 10.0, but would now be assigned *Approve/Eligible* with the DU 10.1 release.

The applicant for Loan A is carrying a higher level of total debt payments. However, this borrower also has a stronger credit history and more reserves than borrowers B and C. The DU model recognizes these factors as compensating for the higher debt payments.

By comparison, Loan D has a much higher default risk than Loans A through C. In comparison to Loan A which has a weakness in just one dimension (high DTI), this applicant has a smaller down payment, no reserves, and a significantly weaker credit history. As a result, even though the loan would now meet Fannie Mae's eligibility criteria because of the removal of the manual eligibility overlays in DU 10.1, the changes to the DU risk assessment model result in the loan receiving a *Refer with Caution* recommendation. Therefore, this loan would not be eligible for delivery to Fannie Mae as a DU loan.

Table 1. Illustrative Example Loans

	Loan A	Loan B	Loan C	Loan D
DTI ratio	48	40	30	48
Loan-to-Value Ratio	80	80	80	90
Months of Reserves	6	3	2	0
FICO Score	740	705	690	660
DU 10.0 Recommendation	Approve/Ineligible	Approve/Eligible	Approve/Eligible	Approve/Ineligible
DU 10.1 Recommendation	Approve/Eligible	Approve/Eligible	Approve/Eligible	Refer with Caution

All examples: single-borrower, purchase, 1-unit, Principal Residence, 30-yr Fixed Rate Mortgage

[2] HomeReady™ loans are eligible with 45% to 50% DTI if *either* there are significant sources of non-borrowers household income *or* the borrower is receiving HUD-approved counselling. More information about HomeReady can be found on our website.

Enablers of this change

Desktop Underwriter's current eligibility thresholds with respect to DTI ratio were established with the DU 8.0 release in December of 2009. The 620 FICO overlay and a number of restrictions related to foreclosures and bankruptcies were instituted at the same time. The purpose of the DTI overlay was to limit the risk of providing loans that would be unsustainable for the borrower – and in particular to compensate for economic and model uncertainty.

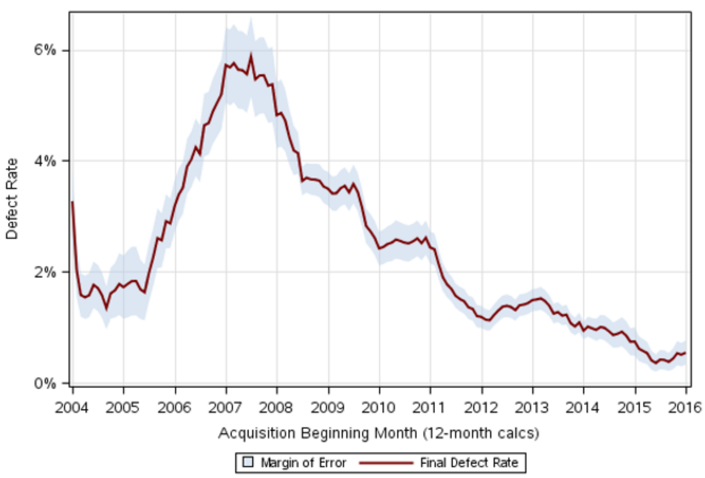
There are several reasons why it can make sense to apply a simple overlay to a statistical credit model such as the DU risk assessment. The accuracy of any model, no matter how sophisticated, is limited by its supporting data and assumptions.

Data quality improvements

In the case of income ratios, there were several factors operating in 2009 that raised the risk of relying solely on the model at high DTI levels. The adverse economic environment meant that the absolute risks for high DTI borrowers were magnified, as were the risks associated with any model inaccuracies in that range. Another concern was that the accuracy of many loan characteristics provided by lenders had deteriorated in the pre-crisis period. This included not only income and debt components, but also factors such as appraised home value, or liquid reserves, that could serve as compensating factors for high DTI levels.

DTI has historically been difficult to capture accurately. Several types of application defects that were prevalent in the 2006-2008 period resulted in under-reporting of DTI. These included borrower incomes that were incorrectly calculated or not supported by the underlying documentation and mortgage liabilities such as second liens that were not reported. Since 2008, the prevalence of these origination defects has declined substantially.

Figure 1: Fannie Mae Loan Manufacturing Defect Rates (12-month moving average)



A number of factors have driven the reduction in loan quality defects. Specifically, improvements to lender origination practices, processes and controls, as well as the adoption of new tools like Fannie Mae's *Collateral Underwriter*®. Most recently, Fannie Mae has introduced independent data verification capabilities as part of the Day 1 Certainty™ program. These changes will result in continuing improvements in the reliability and accuracy of our loan level data and our ability to effectively model credit risk.

Loan applications from 2012 forward reflect the substantial improvements in underwriting quality that our lenders have now been able to meet, with estimated defect rates from random post-purchase reviews of under one percent.

Return to normal

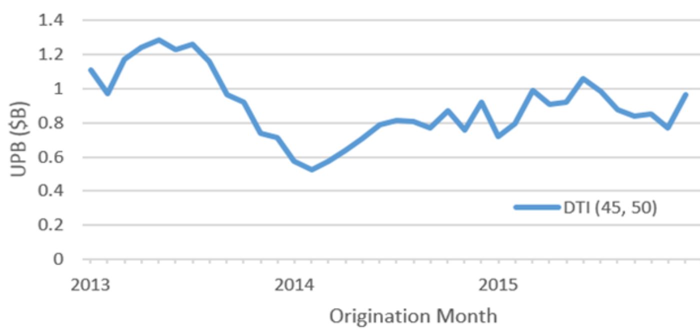
In 2013 we began to see a return to a more normally functioning housing market, with prices rising and foreclosure rates declining in most areas. So it is only in the past couple of years that we have been able to assess the performance of loans originated in a truly post-crisis world, which gives us a better through-the-cycle understanding and helps us to more clearly separate borrower risk factors from economic drivers. This means in particular that we can have more confidence in the efficacy of the DU 10.1 model for higher-risk applicants even in comparison to the DU 10.0 model that we released in 2016.

In the context of a more stable economic environment and more accurate data, we conducted a detailed study of the effect of reported DTI on loan performance to support the new model. Our analysis drew on observations of loans originated over a fifteen year period (2000 to 2014) and took into account both the selection effects associated with our eligibility rules and improvements over time in data quality. A key outcome of this research is that the DU 10.1 model actually penalizes high DTI applications more strongly than the DU 10.0 model.

Does Fannie Mae expect the average risk of loan acquisitions underwritten by DU 10.1 to increase?

Yes, we expect a small increase in the average risk of our monthly loan acquisitions. We have been acquiring loans over the past four years with DTIs up to 50%. While it is difficult to know exactly how many more 45% to 50% DTI loans will be delivered under DU 10.1, we are anticipating a slight increase in the share of these loans in monthly deliveries with this change. For instance, we know that three to four percent of recent applications were rated as *Approve/Ineligible* under DU 10.0, but would now be considered *Approve/Eligible* under DU 10.1 because of the DTI rule change. The average risk of these incremental loans will be higher than the average risk of our monthly acquisitions, which implies a small increase in the overall risk profile of our delivered loans.

Figure 2: Monthly Loan Acquisitions with DTIs > 45%, Loans Originated 2013-2015 excluding RefiPlus.



Source: Single-Family Loan Performance Database

However, the risk on these incremental DU *Approve* applications is still within the same risk tolerance threshold used in DU 10.0. Our risk appetite, as defined by the DU risk tolerance threshold, is unchanged with the DU 10.1 release. Also, our 50% maximum DTI limit is not changing for loans underwritten in DU.

Eligibility criteria vs the DU risk assessment

To be eligible for sale to Fannie Mae, a DU loan must receive an *Approve/Eligible* recommendation, which means that it passes two gates: both the eligibility criteria *and* the risk assessment. With DU 10.1, *both* the eligibility criteria and the risk assessment have been updated.

About three to four percent of recent DU applications were approved by the risk assessment; however, were ineligible because they had DTI of 45% to 50%, but either had LTV above 80% *or* reserves less than 12 months of mortgage payments. The majority of these loans satisfied the LTV condition but not the reserves test. These loans would now receive an *Eligible* recommendation.

At the same time, we have updated the DU risk assessment based on a population that includes more recent acquisitions than were used for the DU 10.0 model. In addition, the model was refined to reflect our most up-to-date research on the risks of loans with high DTI so that we could have confidence that the newly eligible loans could be accurately assessed by the model.

Fannie Mae's risk appetite, as reflected in the risk tolerance threshold, is unchanged in DU version 10.1. Thus, if we exclude the effect of the eligibility changes and just consider the impact of the new model, then the proportion of applications that receive a *DU Approve* as opposed to a *Refer with Caution* is essentially unchanged.

Furthermore, a primary effect of the new model is that reported DTI is considered to be a stronger predictor of default than it had been previously. This is driven, in part, by our analysis showing more accurate reporting of DTI in more recent application cohorts. The effect of this change in the model is that loans with DTIs over 42% are now more likely to get a Refer with Caution recommendation than before, while loans with DTIs under 42% are more likely to get an Approve. Loan D in Table 1 is an example of a high DTI loan with additional risk factors that would have been approved by the DU 10.0 model, but is given a Refer with Caution by DU 10.1. Loans with a Refer with Caution recommendation are not eligible for sale to Fannie Mae as DU loans.

Summary

The way loans with 45% to 50% DTI are underwritten in DU will change with the July 29th release of DU version 10.1. Previously, borrowers in this DTI range were required to have significant reserves and equity in addition to an *Approve* recommendation from the DU risk assessment. Under version 10.1, these additional requirements will be removed and the borrower will be assessed by an updated DU risk assessment that can more accurately evaluate the risk of these higher DTI borrowers without the need for additional requirements.

Additional Resources

- Fannie Mae's comprehensive single-family credit risk management presentation
- Desktop Underwriter Resources:
  - Desktop Underwriter Demo
  - Desktop Underwriter Risk Factors
  - Desktop Underwriter DTI Calculation
  - Desktop Underwriter Resources Page
  - Desktop Underwriter/Desktop Originator Release Notes DU Version 10.1
- Collateral Underwriter Demo
- HomeReady Fact Sheet

Investors may contact Fannie Mae's Investor Help line at 1-800-2FANNIE, Option 3 or via e-mail with any questions.

Appendix

Excerpt from Fannie Mae's Selling Guide

	DU Recommendation		
	Approve/Eligible	**Approve/Ineligible**	**Refer with Caution**
Satisfies DU risk assessment?	Yes	Yes, assuming that there is no additional credit risk associated with the eligibility criteria that are not satisfied.	No
Satisfies Fannie Mae's mortgage eligibility criteria?	Yes	No	N/A
Eligible for delivery to Fannie Mae?	Yes, if all approval conditions have been met.	No, unless the lender either resolves the issue that resulted in the ineligibility, or has a negotiated contract that specifically permits delivery of the mortgage (also stated as a negotiated variance in its Master Agreement that covers the ineligible condition specific to the loan transaction).	No, however, the lender may choose to manually underwrite the loan in accordance with this *Selling Guide* (if the loan product or transaction otherwise allows for delivery of manually underwritten loans), and deliver the loan as a manually underwritten loan.

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