Federal Housing Finance Agency
Office of Inspector General

An Overview of Enterprise Debt-to-Income Ratios

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Executive Summary

Debt-to-income (DTI) ratio is one of a number of risk factors a lender considers in assessing whether to offer a mortgage to a borrower. A DTI ratio is the percentage of a borrower's income that is devoted to debt. Generally, it is calculated by dividing the total monthly debt expense by the total monthly income at the time a mortgage is originated or modified.

Fannie Mae and Freddie Mac (the Enterprises) consider a borrower's DTI, along with other factors, to determine if a mortgage is eligible for purchase. According to both Enterprises, the DTI ratio has historically been a less reliable risk factor than other factors like a credit score or loan-to-value (LTV) ratio. According to an official with the Federal Housing Finance Agency (FHFA or Agency), FHFA does not consider DTI to be as predictive a risk factor as credit score or LTV. Mortgages can have more than one risk factor, such as a DTI greater than 45% and/or high LTV ratio and/or low credit score. The housing finance industry typically refers to a mortgage with more than one risk factor as having risk layers.

Prior to 2008, both Enterprises purchased mortgages with DTI ratios up to 65%. In 2008 through early 2010, following a significant downturn in the housing market, Fannie Mae and Freddie Mac each implemented a series of adjustments to DTI limits; by early 2010 each Enterprise reduced its DTI limit to 50%. Fannie Mae, in its automated underwriting system Desktop Underwriter (DU), imposed an additional requirement, called an overlay, for mortgages with a DTI ratio greater than 45% up to 50% (maximum allowable DTI).

In April 2017, in line with efforts to increase access to single-family mortgage credit for creditworthy borrowers, FHFA directed the Enterprises to eliminate any DTI-related overlays for mortgages up to 50% DTI. Fannie Mae implemented the directive by updating DU in July 2017. Freddie Mac had been in compliance with this directive when it was issued; in July 2017, it had expanded its purchase of low- and very low-income mortgages with maximum allowable DTIs in furtherance of its affordable housing goals.

Beginning in the latter part of 2017, FHFA data for both Enterprises show that they increased their acquisitions of mortgages with a maximum allowable DTI. Freddie Mac, as well as FHFA, attributed its increase, in large measure, to the updated eligibility assessments in Fannie Mae's DU because more than half of Freddie Mac's annual mortgage purchases are evaluated by DU. Enterprise reporting for 2018 reflects that the percentage of mortgages with a maximum allowable DTI continued to increase through the first half of 2018 for both Enterprises.

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FHFA internal reports also show that, after July 2017, the Enterprises acquired a greater volume of mortgages with risk layering.

In this white paper, we first summarize the evolution of the Enterprises' DTI limits, then explain FHFA's 2017 directive related to mortgages with maximum allowable DTI, and finally detail subsequent DTI developments to provide an understanding of the risks from the maximum allowable DTI directed by FHFA.

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ABBREVIATIONS

DTI	Debt-to-income
DU	Desktop Underwriter
Enterprises	Fannie Mae and Freddie Mac
FHFA or Agency	Federal Housing Finance Agency
LPA	Loan Product Advisor
LTV	Loan-to-value
OIG	Federal Housing Finance Agency Office of Inspector General
QM rule	Qualified Mortgage rule

BACKGROUND

Typically, a lender considers a number of risk factors in assessing whether to offer a mortgage to a borrower. Some of those risk factors include, but are not limited to: the credit history and employment; the loan-to-value (LTV) ratio of the property being mortgaged; liquid reserves; occupancy type; and debt-to-income (DTI) ratio. A DTI ratio is the percentage of a borrower's income that is devoted to debt. Generally, it is calculated by dividing the total monthly debt expense by the total monthly income at the time a mortgage is originated or modified.

Fannie Mae and Freddie Mac (the Enterprises) consider a borrower's DTI, along with other factors, to determine if a mortgage is eligible for purchase. Fannie Mae explains that, as the DTI increases, "the level of risk also tends to increase; and a high ratio," along with other high-risk factors, creates higher risks associated with the borrower. Freddie Mac states that a borrower with a higher DTI "increases the probability a borrower may be unable to meet all their obligations at some point in the future."

According to both Enterprises, the DTI ratio has historically been a less reliable risk factor than other factors like credit score or LTV ratio. Fannie Mae noted that both under- and over-reporting of income regularly occurred in the period 2004-2008, when income was not well measured and many lenders poorly documented borrower credit assessments. Data quality has since improved. Over-reporting of income is currently less prevalent than it once was, according to the Federal Housing Finance Agency (FHFA or Agency). But under-reporting by borrowers continues to skew the accuracy of a DTI ratio, according to Fannie Mae. The DTI ratio could be lower if the borrower provided additional income documentation enabling another source of income to be included in the calculation, but often borrowers only disclose sufficient income information to obtain approval. An FHFA official advised us that, in the view of FHFA, DTI is not as predictive a risk factor as credit score or LTV because of how it is reported.

Enterprise DTI limits differ, based on whether the mortgage is underwritten by the lender through an automated or manual system.[1] This white paper focuses on DTI as a risk factor used in the Enterprises' automated underwriting systems: Fannie Mae's Desktop Underwriter (DU) and Freddie Mac's Loan Product Advisor (LPA).[2] Combined, the two automated underwriting systems account for over 90% of the mortgages purchased by the Enterprises.

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[1] DTI limits can vary also for specialty Enterprise programs such as proprietary refinances.

[2] Freddie Mac's automated underwriting system was originally called Loan Prospector. In 2016, as part of a rebranding effort, Freddie Mac renamed the system Loan Product Advisor.

An **overlay** describes the additional requirements placed on top of an automated underwriting system's model (risk assessment).

When an Enterprise determines that a loan has greater risk than is indicated by the automated underwriting tool, through use of an **overlay**, it may impose compensating factors on top of the existing risk assessment or it may override the risk assessment to indicate that the loan is not acceptable.

As with other risk factors, the Enterprises' assessment of DTI has evolved. In the following sections, we first summarize the evolution of the Enterprises' DTI limits, explain FHFA's 2017 directive related to mortgages with DTIs greater than 45% up to 50% (maximum allowable DTI), and detail subsequent DTI developments to provide an understanding of the risks from the maximum allowable DTI directed by FHFA.

THE EVOLUTION OF ENTERPRISE DTI LIMITS

2000-2008: Enterprises Allow up to 65% DTI

Prior to 2008, both Enterprises purchased mortgages with DTI ratios up to 65%.[3] (For purposes of this white paper, mortgages with DTI ratios between 50%-65% will be called high DTI mortgages.) In April 2002, Freddie Mac imposed a high DTI overlay for its mortgage purchases.

Officials from both Enterprises told us that both Enterprises purchased an increasing number of mortgages with 45%-65% DTI ratios between 2004 and 2008. According to a Fannie Mae official, Fannie Mae's purchases of 45%-65% DTI ratio single-family mortgages during this period peaked at 33% of its total single-family mortgages purchases in 2007. A Freddie Mac official advised that Freddie Mac's purchases of single-family mortgages with DTIs between 45%-65% peaked at 28% in 2008. A recent report from the Bureau of Consumer Financial Protection found that the rate of early delinquencies in mortgages purchased by the Enterprises between 2006 and 2008 generally increased as DTI increased, even when controlling for differences in other mortgage variables.

Risk layering refers to loans with multiple higher-risk factors, such as DTI greater than 45%, high LTV ratio, and low credit score. Information from the Enterprises indicates that they purchased an increasing number of mortgages with risk layering during 2004-2007.

[3] A Freddie Mac official told us that there were certain exceptions to this limit. For example, according to this official, Freddie Mac's "Accept Plus" product consisted of only high-quality loans and did not have a maximum DTI ratio. That product was eliminated in 2008.

2008-2010: Enterprise DTI Limits Drop Amidst Market Downturn

The housing market experienced a significant downturn in 2008, and the Enterprises adjusted various underwriting requirements, including DTI. In 2008 through early 2010, Fannie Mae and Freddie Mac each implemented a series of adjustments to DTI limits.

In May 2008, Fannie Mae introduced an overlay for mortgages with DTI ratios between 55%-65%. Soon after, in January 2009, Freddie Mac reduced the maximum DTI to 55% and discontinued its use of an overlay. Subsequently, each Enterprise reduced its DTI limit to 50% by early 2010. Fannie Mae maintained its use of an overlay to manage risk in mortgages with DTIs greater than 45% up to 50%. Freddie Mac however, continued to accept mortgages with DTIs greater than 45% up to 50% without the use of an overlay. Freddie Mac officials explained that Freddie Mac imposed tighter requirements within LPA's risk assessments for these mortgages. See Figure 1.

FIGURE 1. ADJUSTMENTS TO ENTERPRISE DTI LIMITS, 2008-2010

Date	Automated Underwriting System	DTI Limit	Conditioned on Overlay
May 2008	Fannie Mae DU	65%	Yes, provided that borrower met overlay requirements when DTI between 55-65%
January 2009	Freddie Mac LPA	55%	No
December 2009	Fannie Mae DU	50%	Yes, provided that borrower met overlay requirements when DTI between 45-50%
April 2010	Freddie Mac LPA	50%	No

Source: OIG analysis of information from FHFA, Fannie Mae, and Freddie Mac.

After implementing these changes, the Enterprises' acquisitions of mortgages with DTIs greater than 45% began to decline. By 2011, for example, 7% of Fannie Mae's acquisitions were mortgages with DTIs above 45% (and no higher than 50%), less than a quarter of its prior peak in 2007; all the mortgages with DTIs above 45% were required to meet DU overlay requirements.

2010-2017: Enterprise DTI Limits Stay Constant During Market Recovery

The Enterprises' DTI limits remained at 50% between 2010 and mid-2017. During 2012-2014, the percentage of each Enterprise's acquisitions of mortgages with a maximum allowable DTI remained flat, between 6%-7%. In the following years, 2015 and 2016, the percentage of mortgages purchased by Fannie Mae with a maximum allowable DTI, with an overlay in DU, dropped to 5% ($14.1 billion) for 2015 and increased to 6% ($27.1 billion) for

2016.[4] For those same years, the percentage of mortgages purchased by Freddie Mac with a maximum allowable DTI,[5] without an overlay in LPA, increased to 7.9% ($24.6 billion) for 2015 and 9.3% ($34.8 billion) for 2016.[6]

AFFIRMATIVE STATUTORY OBLIGATION IMPOSED ON THE ENTERPRISES TO FACILITATE THE FINANCING OF AFFORDABLE HOUSING FOR LOW- AND MODERATE-INCOME FAMILIES

Congress passed the Federal Housing Enterprises Financial Safety and Soundness Act of 1992, which President George H.W. Bush signed into law on October 28, 1992. In that statute, Congress defined the mission of the Enterprises and amended the Enterprise charters to impose "an affirmative obligation to facilitate the financing of affordable housing for low- and moderate-income families in a manner consistent with their overall public purposes, while maintaining a strong financial condition and a reasonable economic return."[7] In that statute, Congress directed the U.S. Department of Housing and Urban Development to set and enforce affordable housing goals for the Enterprises to ensure that they met these affirmative obligations.[8] The Housing and Economic Recovery Act of 2008, which amended the 1992 statute, shifted to FHFA the establishment and enforcement of annual affordable housing goals. FHFA also assesses the Enterprises' performance against these annual housing goals.[9]

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[4] We recently issued an audit that assessed compliance with Fannie Mae's Selling Guide and Master Agreements, all of which limited the maximum DTI ratio to 50%, for roughly 6.4 million mortgages with an unpaid principal balance of roughly $1.49 trillion, acquired by Fannie Mae during the years 2015-2017. We found an immaterial number of those mortgages, accounting for less than one-tenth of one percent of total mortgages purchased during the review period, had a DTI in excess of 50%. For more information, see OIG, *Fannie Mae Purchased Single-Family Mortgages, Including those Purchased through Master Agreements, in Accordance with Selected Credit Terms Set Forth in its Selling Guide for 2015-2017* (Mar. 27, 2019) (AUD-2019-006) (online at www.fhfaoig.gov/Content/Files/AUD-2019-006%20-%20Fannie%20Mae%20Master%20Agreements.pdf).

[5] A recent OIG audit of Fannie Mae single-family mortgages during this period found an immaterial number of mortgages had a DTI greater than 50%. We have not audited Freddie Mac mortgages for this period. However, we know that Freddie Mac selling criteria also limited the maximum DTI ratio to 50%.

[6] According to Enterprise internal reports and comments for 2011–2016 data, percentages and dollar volumes for Fannie Mae and Freddie Mac are based on total single-family acquisitions, excluding specialty refinance loans. Freddie Mac data also excludes Government Insured, LTSB, and T-Deals.

[7] 12 U.S.C. § 4501(7).

[8] Pub. L. 102-550 §§ 1331, 1336.

[9] Pub. L. 110-289 §§ 1228, 1230; codified at 12 U.S.C. §§ 4561, 4566.

Apart from the housing goals, FHFA, as conservator of the Enterprises, established three strategic goals in its 2014 Strategic Plan for the Conservatorships of Fannie Mae and Freddie Mac (2014 Conservatorship Strategic Plan). FHFA has set specific objectives in its annual conservatorship scorecards designed to achieve the three strategic goals.

The first strategic goal in FHFA's 2014 Conservatorship Strategic Plan is to maintain, in a safe and sound manner, foreclosure prevention activities and credit availability for new and refinanced mortgages to foster liquid, efficient, competitive, and resilient national housing finance markets. To further that goal, FHFA has established specific objectives in its annual scorecards for the Enterprises, including to work to support access to single-family mortgage credit for creditworthy borrowers, including underserved segments of the market.

FHFA, in its 2018 Annual Housing Report, explained that it has encouraged the Enterprises, over the last ten years, to "engage in a number of initiatives that help identify obstacles to accessing mortgage credit, analyze potential solutions, and develop appropriate strategies to improve and maintain availability of credit for housing in a safe and sound manner." According to FHFA, "the Enterprises refined and improved products targeted to borrowers with lower credit scores who have other compensating factors that reduce risk." For example, one initiative includes Enterprise purchases of eligible mortgages for borrowers without credit scores in accordance with Enterprise-approved policies.

In addition, FHFA also issues conservator directives to the Enterprises to further the goals in its 2014 Conservatorship Strategic Plan. For example, FHFA, in June 2014, directed the Enterprises to submit written proposals to offer 97% LTV ratio, first-time homebuyer programs, which included appropriate risk controls and risk management practices, guidelines to ensure approval of creditworthy borrowers, and mitigating factors that offset incremental risks to lower down payment. Each Enterprise submitted its proposal, which FHFA staff analyzed and the FHFA Director approved in December 2014.[10]

In April 2017, FHFA issued a directive to the Enterprises on DTI.

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[10] For a fuller explanation of this directive, see OIG, *Audit of FHFA's Oversight of Fannie Mae's Compliance with the Required Mitigants of Automated Underwriting, Mortgage Insurance, and Homeownership Education for its Purchases of Mortgages with a 97% LTV* (Mar. 8, 2018) (AUD-2018-003) (online at www.fhfaoig.gov/Content/Files/AUD-2018-003%20FHFA%27s%20Oversight%20of%20Fannie%20Mae%27s%2097%20LTV%20Programs%20%28Public%29.pdf) and OIG, *Audit of FHFA's Oversight of Freddie Mac's Compliance with the Required Mitigants of Automated Underwriting, Mortgage Insurance, and Homeownership Education for its Purchases of Mortgages with a 97% LTV* (Mar. 8, 2018) (AUD-2018-004) (online at www.fhfaoig.gov/Content/Files/AUD-2018-004%20FHFA%27s%20Oversight%20of%20Freddie%20Mac%27s%2097%20LTV%20Program%20%28public%29.pdf).

FHFA 2017 DTI DIRECTIVE

FHFA's April 2017 directive to the Enterprises required them to ensure that their automated underwriting systems operate so that DTI alone was not the reason for a mortgage with up to 50% DTI to be deemed ineligible. Additionally, the Enterprises had to eliminate any DTI related overlays for mortgages up to 50% DTI. This directive appears to further the "Maintain" goal in the 2014 Conservatorship Strategic Plan to increase access to single-family mortgage credit for creditworthy borrowers.

FHFA required the Enterprises to comply with its directive no later than August 1, 2017. As we now explain, Fannie Mae removed the overlay for mortgages with maximum allowable DTIs, which it had used since 2009. Freddie Mac had been in compliance with this directive since 2010, and made changes to expand its purchase of mortgages with maximum allowable DTIs in furtherance of its affordable housing goals.

Enterprise Implementation

Fannie Mae

On May 30, 2017, Fannie Mae publicly announced plans to update DU, with DU version 10.1. This update implemented the FHFA directive to accept mortgages with maximum allowable DTIs without any DTI overlays. Under DU 10.1, all mortgages with maximum allowable DTI that met other risk criteria would be deemed eligible for purchase. DU version 10.1 was implemented in July 2017.

In addition to removal of the overlay, DU 10.1 also included an update to the DU risk assessment. In a July 2017 commentary, Fannie Mae reported publicly that its updated risk assessment would more "accurately assess[]" mortgages to align with its then-current research. While Fannie Mae did not disclose any projection of the number of new mortgages with a maximum allowable DTI that would be eligible for purchase under DU 10.1, the July 2017 commentary indicated that 3%-4% of recent applications, between late 2016 and mid-2017, were found ineligible because of the DTI overlay.

Freddie Mac

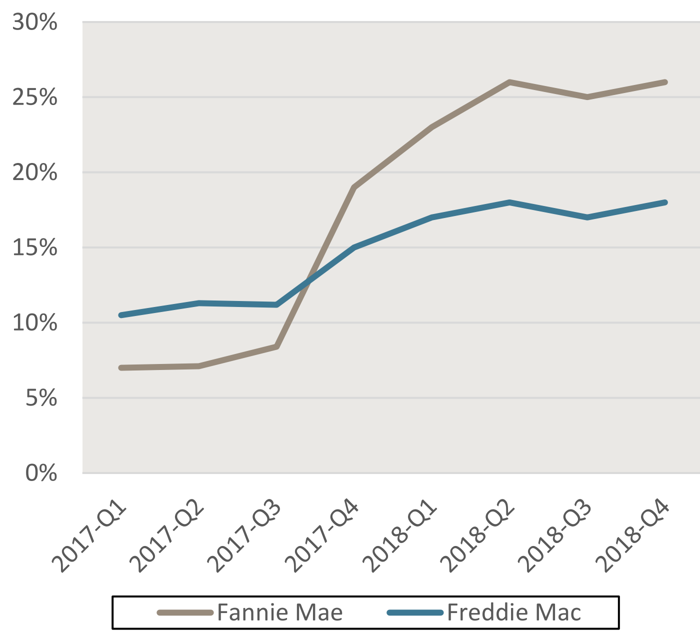
As discussed earlier, Freddie Mac discontinued its use of an overlay in 2009 when it reduced the DTI limit from 65% to 55%, and further reduced the maximum DTI to 50% in April 2010. FHFA confirmed to us that Freddie Mac was in compliance with the FHFA directive when it issued.

In furtherance of its affordable housing goals and consistent with improving access to mortgage credit for creditworthy borrowers, Freddie Mac adjusted LPA to allow standard cutoffs for low- and very low-income qualifying mortgages with maximum allowable DTI, including 97% LTV. These criteria were designed to increase Freddie Mac's purchases of mortgages from borrowers with low-income and very low-income. These criteria, which were less restrictive than the criteria previously used by Freddie Mac, went into effect in July 2017, roughly the same time that Fannie Mae implemented DU 10.1.

Early Outcomes of Enterprise Implementation

Beginning in the latter part of 2017, acquisition data for both Enterprises show that they increased their acquisitions of mortgages with a maximum allowable DTI.[11] We explained previously that, for 2016, the percentage of mortgages purchased by Fannie Mae with maximum allowable DTI, with an overlay in DU, totaled 6% ($27.1 billion), and the percentage of mortgages purchased by Freddie Mac with maximum allowable DTI, without an overlay in LPA, totaled 9.3% ($34.8 billion) for 2016.

FIGURE 2. PERCENTAGE OF ENTERPRISE ACQUISITIONS WITH DTI RATIOS GREATER THAN 45%



Source: OIG analysis of data from FHFA; and public disclosures from Fannie Mae and Freddie Mac.

The percentage of mortgages with maximum allowable DTIs for both Enterprises increased during the first three quarters of 2017 from 2016 levels. In the fourth quarter of 2017, the first full quarter after Fannie Mae implemented the FHFA directive in July 2017, the percentage of Fannie Mae's acquisitions with a maximum allowable DTI totaled about 19% ($24.3 billion).

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[11] As explained previously, our audit of roughly 6.4 million single family mortgages acquired by Fannie Mae during the years 2015-2017 found less than one-tenth of one percent of total mortgages (excluding Refi Plus) purchased during this period, had a DTI in excess of 50%. Because of the immateriality of that volume, such mortgages are not included in this discussion. We have not performed a similar audit of the single-family mortgages acquired by Freddie Mac during this period. Because Freddie Mac had capped the maximum allowable DTI ratio at 50% since 2010, we assume, for purposes of this white paper, that the volume of mortgages purchased by Freddie Mac during this period with a DTI in excess of 50% are immaterial and they are not included in this discussion.

For the same quarter, the percentage of Freddie Mac's acquisitions with a maximum allowable DTI and no overlay totaled 15% ($14.7 billion). See Figure 2.

Freddie Mac, as well as FHFA, attributed the increase in its acquisition of maximum allowable DTI mortgages, in large measure, to the updated assessments in Fannie Mae's DU 10.1, because more than half of Freddie Mac's annual mortgage purchases are evaluated by DU. In its Form 10-Q for the second quarter of 2017, Freddie Mac reported that Fannie Mae's July 2017 updates to DU "led to an increase in eligibility for purchase of new [mortgages] with [maximum allowable DTI ratios]." (Some of the increase in acquisitions of maximum allowable DTI mortgages was driven by the changes made by Freddie Mac to LPA.)

Enterprise reporting for 2018 reflects that the percentage of mortgages with a maximum allowable DTI continued to increase through the first half of 2018 for both Enterprises and remained relatively flat for the rest of 2018. Fannie Mae's acquisitions of mortgages with a maximum allowable DTI peaked at 26% ($28.7 billion) for the second quarter of 2018, decreased slightly to 25% ($30.6 billion) for the third quarter, and rose back to 26% ($26.3 billion) for the fourth quarter. Freddie Mac's acquisition of mortgages with a maximum allowable DTI peaked at 18% ($15.1 billion) for the second quarter of 2018, dropped slightly to 17% ($13.8 billion) for the third quarter, and rose back to 18% ($13.9 billion) for the fourth quarter.

FHFA internal reports also show that the Enterprise mortgages acquired with maximum allowable DTI with either an LTV ratio greater than 95% or a credit score less than 680 increased after implementation of the FHFA directive.[12] See Figure 3. We reviewed FHFA internal reports for mortgage purchases by the Enterprises during the first quarter of 2017, before the FHFA directive, to establish a baseline: the percentage of Fannie Mae's maximum allowable DTI mortgage purchases (and an overlay in DU) with a credit score less than 680 totaled 8.5% ($682 million); the percentage of Freddie Mac maximum allowable DTI mortgage purchases with

FIGURE 3. LTV AND CREDIT SCORE CHARACTERISTICS OF ENTERPRISE ACQUISITIONS WITH A MAXIMUM ALLOWABLE DTI

Acquisition Quarter	LTV > 95 (% of Maximum Allowable DTI)		Credit Score < 680 (% of Maximum Allowable DTI)	
	Fannie Mae	Freddie Mac	Fannie Mae	Freddie Mac
2017-Q1	0.5%	0.0%	8.5%	4.1%
2017-Q2	0.8%	0.0%	8.6%	4.3%
2017-Q3	1.8%	0.4%	10.1%	5.0%
2017-Q4	5.1%	1.7%	13.6%	8.6%
2018-Q1	5.7%	2.0%	13.8%	9.5%
2018-Q2	7.9%	2.3%	13.3%	7.3%
2018-Q3	7.2%	3.2%	12.8%	6.3%

Source: OIG analysis of information from FHFA.

12 These credit score and LTV breakpoints are consistent with FHFA and Enterprise monitoring of risk layers.

a credit score less than 680 totaled 4.1% ($350 million).

According to FHFA, by the first quarter of 2018, Fannie Mae's percentage of maximum allowable DTI acquisitions with a credit score less than 680 had increased to 13.8% ($3.6 billion) and Freddie Mac's percentage had increased to 9.5% ($1.0 billion).[13]

According to FHFA, mortgage insurers are typically the first industry counterparties to observe risk layering.[14] During the first two months of 2018, five of the six private mortgage insurance companies announced that, beginning in March 2018, they would no longer insure mortgages with DTI ratios above 45% and credit scores of less than 700. In addition, one of these five also announced that it would not insure mortgages with DTI ratios above 45% and LTV ratios above 95%.

During 2018, both Enterprises took a number of steps to reduce the volume of mortgages with maximum allowable DTIs and risk layering eligible for purchase. Fannie Mae implemented two updates to DU, the first in March 2018 (DU 10.2) and the second in December 2018 (DU 10.3). Fannie Mae disclosed in its Form 10-Q for the third quarter of 2018 that the purpose of the DU 10.3 update was to limit risk layering, particularly for mortgages with a maximum allowable DTI. Interestingly, Fannie Mae reintroduced an overlay in DU 10.3 for refinancings, requiring cash-out refinances with a maximum allowable DTI to have at least six months of reserves. While this overlay in DU 10.3 is less restrictive than the one in place prior to FHFA's 2017 directive, it appeared to us to run counter to that directive. However, this overlay was reviewed and approved by the Agency. According to Fannie Mae, the updates in DU 10.2 and 10.3 have caused a drop in the number of eligible mortgages with maximum allowable DTI and risk layering.

According to a Freddie Mac official, Freddie Mac's July 2017 update to LPA to allow standard cutoffs for low- and very low-income purchase mortgages with maximum allowable DTI and 97% LTV led it to acquire a greater volume of higher risk mortgages than anticipated. As a result, Freddie Mac decided, in July 2018, to restrict the LTV ratio criteria to 90% and tighten the credit score criteria. The July 2018 tightening, however, still maintained relatively expanded criteria compared to criteria in place prior to July 2017.

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[13] We assume, for purposes of this white paper, that the Enterprises acquired mortgages during 2018 that met their criteria. The criteria for the DTI ratio was capped at 50%.

[14] Mortgage insurance transfers the risk arising from default of a mortgage to an insurer for the portion of a mortgage in excess of 80% of the value of the mortgage. The particular level of mortgage insurance required by the Enterprises depends upon the LTV of the loan, among other factors. For more information on mortgage insurance and the private mortgage insurance companies, see OIG, *Enterprise Counterparties: Mortgage Insurers* (Feb. 16, 2018) (WPR-2018-002) (online at www.fhfaoig.gov/Content/Files/WPR-2018-002.pdf).

A Freddie Mac official reported to us that Freddie Mac assessed its purchases of mortgages that were evaluated by DU, as part of its routine monitoring of its portfolio. It determined that many of the higher risk mortgages delivered with maximum allowable DTIs found eligible for purchase by DU would not have been found eligible had they been evaluated by LPA. Freddie Mac officials explained to us that those loans would not have fit Freddie Mac's risk appetite as the loans had higher risk layering, with higher LTV ratios and lower credit scores. Beginning in the second quarter of 2018, Freddie Mac offered tools to certain lenders to assess whether mortgages found eligible for purchase under DU would have also been found eligible for purchase when assessed by LPA, particularly those mortgages with a maximum allowable DTI. During that quarter, the percentage of mortgage acquisitions with a maximum allowable DTI and a credit score less than 680 began to decrease for both Enterprises. Freddie Mac's decline was larger than Fannie Mae's. FHFA and Fannie Mae observed that Freddie Mac's offering, in effect, shifted certain mortgages with a maximum allowable DTI and other higher risk factors to Fannie Mae.

Market Forces

The effect of FHFA's 2017 DTI directive was magnified by market forces during 2017 and 2018. FHFA explained to us that, during the period 2017-2018, rising interest rates slowed the demand for refinancings and, as a result, home purchase mortgages dominated Enterprise acquisitions.[15] (An Agency official advised that home purchase mortgages generally have higher DTIs than refinances.) According to the same official, rising interest rates and home prices increased the cost of homeownership, and in turn debt burden, which caused an increase in DTI during these years. Data analyzed by the Urban Institute demonstrated that the increase in home prices outpaced the increase in wage growth, causing borrowers to take out larger mortgage debt relative to income, which also acted to increase DTI. According to FHFA and Fannie Mae, these market forces precipitated the unexpected increase in the number of mortgages with a DTI exceeding 45% that were eligible for purchase during 2017 and 2018.

However, the Qualified Mortgage rule (QM rule) adopted by the Bureau of Consumer Financial Protection in 2014 may constrain the future impact of FHFA's DTI directive. The QM rule requires lenders to make "a reasonable, good faith determination" of a borrower's ability to repay the mortgage, using certain mortgage underwriting criteria. One of those criteria is a maximum 43% DTI. While mortgages eligible for purchase by the Enterprises were exempted from the QM rule upon its adoption, that exemption is set to expire in January

[15] The shift from a refinance to a purchase mortgage origination market also affected other mortgage risk factors. According to Fannie Mae, mortgage originations for home purchases tend to have higher LTVs and lower credit scores than refinances.

2021 or when the Enterprises exit conservatorship, whichever comes first. Without an extension or other action, Enterprise purchases will become subject to the 43% DTI cap.

Performance of Mortgages with Maximum Allowable DTIs

Fannie Mae

A Fannie Mae official advised us in January 2019 that Fannie Mae tracks performance of mortgages with maximum allowable DTI on a monthly basis. Data from this tracking exercise showed that mortgages with maximum allowable DTI were performing at, or slightly better than, expectations for performance in terms of two early delinquency metrics.

Freddie Mac

As discussed, Freddie Mac has acquired mortgages with maximum allowable DTIs, without an overlay, since 2010. A Freddie Mac official observed to us that Freddie Mac's experience as of January 2019 is that, on average, mortgages from 2017-2018 with a maximum allowable DTI perform worse than mortgages with lower DTIs. Two Freddie Mac officials explained that Freddie Mac has managed the risks of mortgages with maximum allowable DTI from LPA, but that it remains concerned by the risks from mortgages with maximum allowable DTI found eligible by DU, based on recent experience. One of these officials noted that the December 2018 DU changes may reduce these concerns.

CONCLUSION

The Enterprises consider a borrower's DTI, along with other factors, to determine if a mortgage is eligible for purchase. In April 2017, FHFA issued a directive to the Enterprises that required them to ensure that their automated underwriting systems operate so that DTI alone was not the reason for a mortgage with up to 50% DTI to be deemed ineligible. Additionally, the Enterprises had to eliminate any DTI related overlays for mortgages up to 50% DTI.

Beginning in the latter part of 2017, both Enterprises experienced an increase in their acquisitions of mortgages with a maximum allowable DTI. FHFA internal reports also show that the Enterprise mortgages acquired with maximum allowable DTI with either an LTV ratio greater than 95% or a credit score less than 680 increased after implementation of the FHFA directive. During 2018, both Enterprises took a number of steps to reduce the volume of mortgages with maximum allowable DTIs and risk layering eligible for purchase. As of January 2019, according to Fannie Mae, mortgages with maximum allowable DTI were performing at, or slightly better than expectations for performance in terms of two early delinquency metrics, while Freddie Mac observed that, on average, acquisitions from 2017-2018 with a maximum allowable DTI perform worse than mortgages with lower DTIs.

OBJECTIVE, SCOPE, AND METHODOLOGY ....

The objective of this white paper was to provide background information on Fannie Mae and Freddie Mac's DTI ratio requirements and trends for single-family acquisitions evaluated by their automated underwriting systems, Desktop Underwriter and Loan Product Advisor. To achieve this objective, we: reviewed internal and publicly available documents from FHFA and the Enterprises; reviewed publicly available documents from other institutions; met with FHFA and Enterprise officials; and reviewed and analyzed Enterprise data reporting provided by FHFA. We did not independently test the reliability of the data.

For purposes of this white paper, mortgages with a DTI ratio between 50%-65% are called high DTI mortgages and a DTI ratio greater than 45% up to 50% are called maximum allowable DTI. Unless specified otherwise, when we refer in this white paper to a particular DTI cap permitted as of a given time period, we mean that the cap was what was specified in the Enterprises' automated underwriting systems, and do not mean to imply that no Master Agreement or other program may have permitted or resulted in acquisition of loans with higher DTIs. As indicated in the report, OIG recently issued an audit that assessed compliance with Fannie Mae's Selling Guide and Master Agreements, all of which limited the maximum DTI ratio to 50%, for roughly 6.4 million mortgages with an unpaid principal balance of roughly $1.49 trillion, acquired by Fannie Mae during the years 2015-2017. We found an immaterial number of those mortgages, accounting for less than one-tenth of one percent of total mortgages purchased during the review period, had a DTI in excess of 50%. We have not audited Freddie Mac mortgages for this period. However, we know that Freddie Mac limited the maximum DTI ratio to 50% since 2010. Because of the de minimis number of mortgages with a DTI in excess of 50%, as identified in the audit, we conclude, for the purposes of this white paper, that information provided by FHFA and the Enterprises on mortgages with a DTI greater than 45%, during the period when the Enterprises allowed a maximum DTI of 50%, is materially the same as that for mortgages with a DTI ratio greater than 45% up to 50% (maximum allowable DTI).

We provided FHFA with the opportunity to respond to a draft of this white paper. We appreciate the cooperation of FHFA staff, as well as the assistance of all those who contributed to the preparation of this white paper.

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