HOUSING FINANCE POLICY CENTER

RESEARCH REPORT

Lower-Credit Mortgage Applicants Are Dropping Out of the Market

Evidence from the Latest Real Denial Rate Update

Bing Bai *Laurie Goodman* *Bhargavi Ganesh*

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Lower-Credit Mortgage Applicants Are Dropping Out of the Market

The traditional mortgage denial rate is often used to gauge mortgage credit tightness. When the mortgage denial rate is lower, mortgage credit is thought to be looser, and when the mortgage denial rate is higher, mortgage credit is thought to be tighter. But this denial rate, the *observed denial rate* (ODR), is flawed. It is calculated by dividing the number of denied applications by the total number of applications and fails to consider the variation in applicants' credit. This calculation can produce misleading conclusions on credit accessibility. For example, in 2006, a period of loose credit, the observed denial rate was higher than it was in today's tight credit period. To address this issue, the Urban Institute's Housing Finance Policy Center introduced a new measure of the mortgage application denial rate that controls for applicant quality (Li and Goodman 2014).

This improved measure, the *real denial rate* (RDR), excludes high-credit-profile (HCP) borrowers who will never be denied a mortgage and considers only those low-credit-profile (LCP) applicants who might be denied.[1] The RDR more accurately represents credit access for two reasons. First, it shows how willing lenders are to approve applicants who pose risk. Second, it controls for the large variations in applicant composition through the housing boom and bust, between conventional and government channels, and across racial and ethnic groups.

Our original RDR work was based on 2013 data. This report updates the RDR series using 2014 and 2015 owner-occupied, purchase mortgage application information obtained from the latest Home Mortgage Disclosure Act data.[2] The new analysis confirms that the original report's four key findings extend to the most recent period:

1. The ODR underestimates how hard it has been to get a mortgage. The RDR suggests that a little more than one in three borrowers with less-than-perfect credit were denied mortgages in 2015. The traditional ODR suggests that a little over 1 in 10 applicants were denied mortgages in 2015, a much rosier picture compared with the RDR's denial rate.
2. The RDR more accurately shows mortgage credit accessibility over time. Despite recent improvements, the RDR suggests mortgage accessibility is lower today than it was in the bubble years (2005–07). The ODR, however, inaccurately suggests that it is easier to get a mortgage today than it was during the bubble years.

3. Accounting for differences in shares of LCP applicants across racial and ethnic groups, the denial rate gap between whites and minorities has narrowed and declined.
4. The Federal Housing Administration (FHA) applicant pool includes more lower-credit applicants, who more easily qualify for an FHA loan than for a conventional loan.

In addition, the more recent data reveal a new development in credit accessibility:

5. Access to mortgage credit began to ease in 2014 as denial rates among lower-credit borrowers fell from 41 percent in 2013 to 34 percent in 2015. Access eased for both FHA and conventional loans in 2014 and 2015, though the drop began earlier for conventional loans. These results are consistent with the trends revealed by our Housing Credit Availability Index (HCAI).[3]

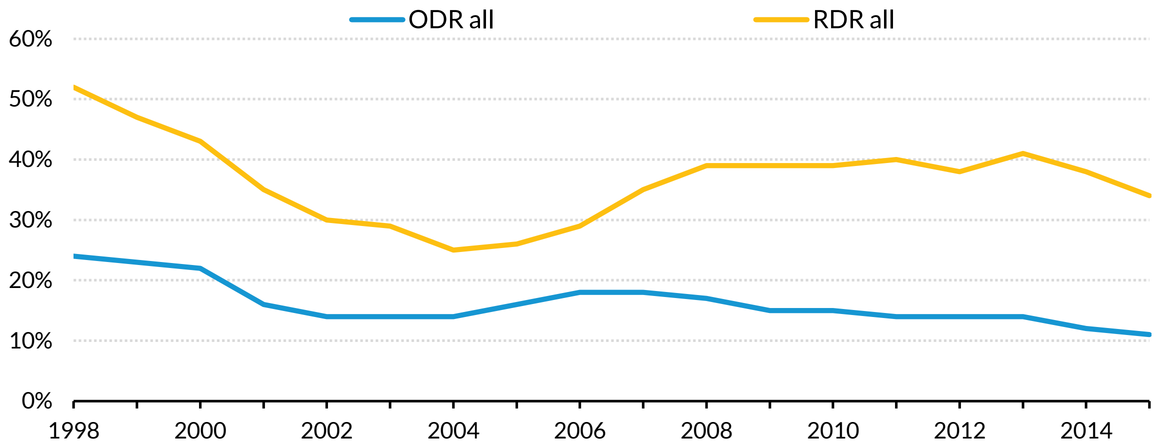
The RDR Consistently Shows the Reality of Credit Accessibility

As Li and Goodman (2014) noted, the RDR historically tracks reality more closely than does the ODR.

According to the ODR, denial rates were lower in the boom years and higher after the financial crisis, suggesting that it was harder to get a mortgage during the boom years. The ODR was 24 percent in 1998, 14 percent in 2002, 18 percent in 2006 (during the market boom), and 17 percent during the financial crisis. From 2011 to 2013, it stayed at 14 percent before falling to 11 percent in 2015 (figure 1 and table 1).

FIGURE 1

Observed versus Real Denial Rates, 1998–2015



Sources: Home Mortgage Disclosure Act, CoreLogic, eMBS, and the Urban Institute.
Notes: Based on owner-occupied purchase mortgage applications. ODR = observed denial rate. RDR = real denial rate.

TABLE 1

Observed versus Real Denial Rates and Share of Low-Credit-Profile Applicants and Borrowers, All Channels

	Denial Rates (%)		Low-Credit-Profile Shares (%)	
	ODR all	RDR all	Applicants	Borrowers
1998	24	52	47	30
1999	23	47	49	34
2000	22	43	50	37
2001	16	35	45	35
2002	14	30	46	37
2003	14	29	48	40
2004	14	25	55	48
2005	16	26	60	52
2006	18	29	62	53
2007	18	35	53	42
2008	17	39	43	31
2009	15	39	38	27
2010	15	39	37	26
2011	14	40	36	25
2012	14	38	36	26
2013	14	41	33	23
2014	12	38	33	23
2015	11	34	33	24
1998–2004	18	37	49	37
2005–2007	17	30	58	49
2008–2010	16	39	39	28
2011–2015	13	38	34	24

Sources: Home Mortgage Disclosure Act, CoreLogic, eMBS, and the Urban Institute.
Notes: Based on owner-occupied purchase mortgage applications. ODR = observed denial rate. RDR = real denial rate.

Table 1 reveals how the ODR masks reality. In the boom years, more lower-credit consumers were encouraged to submit applications; the likelihood of being rejected increased despite of loose lending standards. As the credit box tightened after the financial crisis, many lower-credit consumers were discouraged from applying, leading to a higher-credit applicant pool and a lower rejection rate. In 2006, 62 percent of loan applicants had low credit. Since 2009, the low credit share has been below 40 percent. From 2013 to 2015, only 33 percent of applicants had low credit, much lower than the 49 percent pre-bubble average (1998–2004).

By controlling for the variation in applicant mix through the boom and bust, the RDR shows that the RDRs are similar to what they were in the pre-bubble period. But the percentage of lower-credit applicants is lower. Marginal borrowers are not applying for mortgage loans.

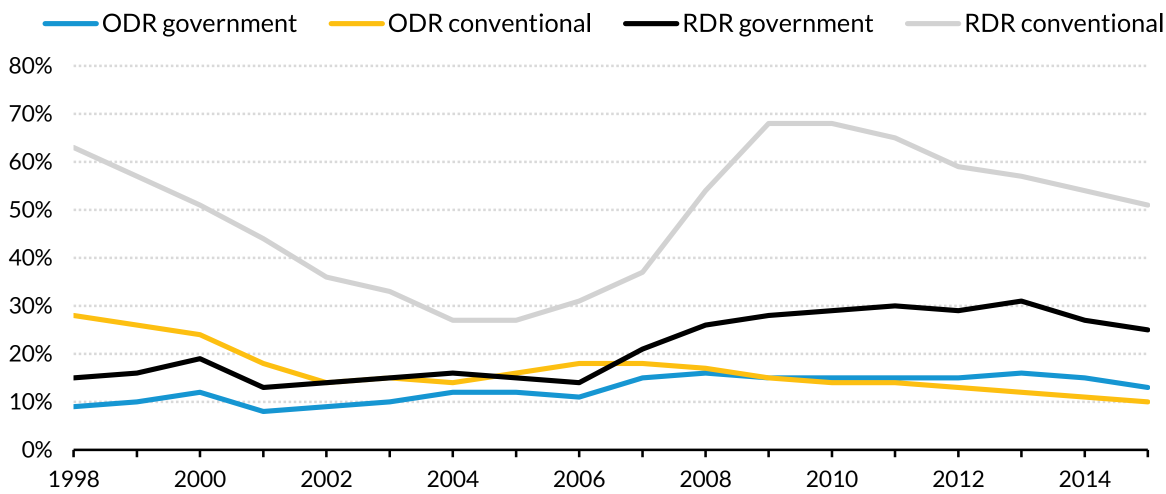
The RDR Consistently Shows Tighter Credit in the Conventional Channel than in the Government Channel

At loan origination, a borrower chooses whether to obtain a mortgage from one of two channels: government or conventional. The government channel includes loans insured by the FHA, the US Department of Veterans Affairs, or the US Department of Agriculture. The conventional channel includes executions by the government-sponsored enterprises (GSEs), bank portfolio, and private-label securities (PLS). In the post-bubble years, as the PLS market has all but disappeared, the GSEs (Fannie Mae and Freddie Mac) are the main issuers in the conventional market. The government channel has traditionally been used disproportionately by low-income, moderate-income, and minority consumers and has always been easier to qualify for than conventional loans. Therefore, loan denial rates in the government channel would be lower than in the conventional channel.

ODR results confirm that was the case before the financial crisis. But after the crisis, an ODR analysis suggests that the conventional channel had lower denial rates than the government channel (figure 2 and table 2).

FIGURE 2

Observed versus Real Denial Rates: Government and Conventional Channels



Sources: Home Mortgage Disclosure Act, CoreLogic, eMBS, and the Urban Institute.
Notes: Based on owner-occupied purchase mortgage applications. ODR = observed denial rate. RDR = real denial rate.

TABLE 2

Observed versus Real Denial Rate by Channel

	Observed Denial Rates (%)			Real Denial Rates (%)		
	Government	Conventional	All	Government	Conventional	All
1998	9	28	24	15	63	52
1999	10	26	23	16	57	47
2000	12	24	22	19	51	43
2001	8	18	16	13	44	35
2002	9	14	14	14	36	30
2003	10	15	14	15	33	29
2004	12	14	14	16	27	25
2005	12	16	16	15	27	26
2006	11	18	18	14	31	29
2007	15	18	18	21	37	35
2008	16	17	17	26	54	39
2009	15	15	15	28	68	39
2010	15	14	15	29	68	39
2011	15	14	14	30	65	40
2012	15	13	14	29	59	38
2013	16	12	14	31	57	41
2014	15	11	12	27	54	38
2015	13	10	11	25	51	34
1998–2004	10	20	18	15	44	37
2005–2007	13	17	17	17	32	30
2008–2010	15	15	16	28	63	39
2011–2015	15	12	13	28	57	38

Sources: Home Mortgage Disclosure Act, CoreLogic, eMBS, and the Urban Institute.
Notes: Based on owner-occupied purchase mortgage applications.

Again, credit profile changes in the loan applicant pool explain these counterintuitive results. The average share of lower-credit applicants in the conventional channel are 45, 56, 25, and 21 percent for the pre-bubble (1998–2004), bubble (2005–07), crisis (2008–10) and postcrisis (2011–15) periods, respectively (table 3). LCP shares in the government channel, however, are 65, 77, 55, and 53 percent, respectively. Following the crisis, the conventional channel likely discouraged more lower-credit consumers from applying for mortgages than the government channel, leading to fewer borrowers being rejected by the conventional channel than by the government channel.

TABLE 3

Share of Low-Credit-Profile Applicants and Borrowers by Channel

	Low-Credit-Profile Applicants (%)			Low-Credit-Profile Borrowers (%)		
	Government	Conventional	All	Government	Conventional	All
1998	57	44	47	53	23	30
1999	60	46	49	56	27	34
2000	62	47	50	57	30	37
2001	63	40	45	59	27	35
2002	67	41	46	64	31	37
2003	70	44	48	66	35	40
2004	76	53	55	73	45	48
2005	78	58	60	74	50	52
2006	79	60	62	76	51	53
2007	73	50	53	68	39	42
2008	62	32	43	54	17	31
2009	52	22	38	44	8	27
2010	51	21	37	43	8	26
2011	51	21	36	42	8	25
2012	54	21	36	45	10	26
2013	53	21	33	43	10	23
2014	54	20	33	46	10	23
2015	52	20	33	45	11	24
1998–2004	65	45	49	61	31	37
2005–2007	77	56	58	73	47	49
2008–2010	55	25	39	47	11	28
2011–2015	53	21	34	44	10	24

Sources: Home Mortgage Disclosure Act, CoreLogic, eMBS, and the Urban Institute.
Notes: Based on owner-occupied purchase mortgage applications.

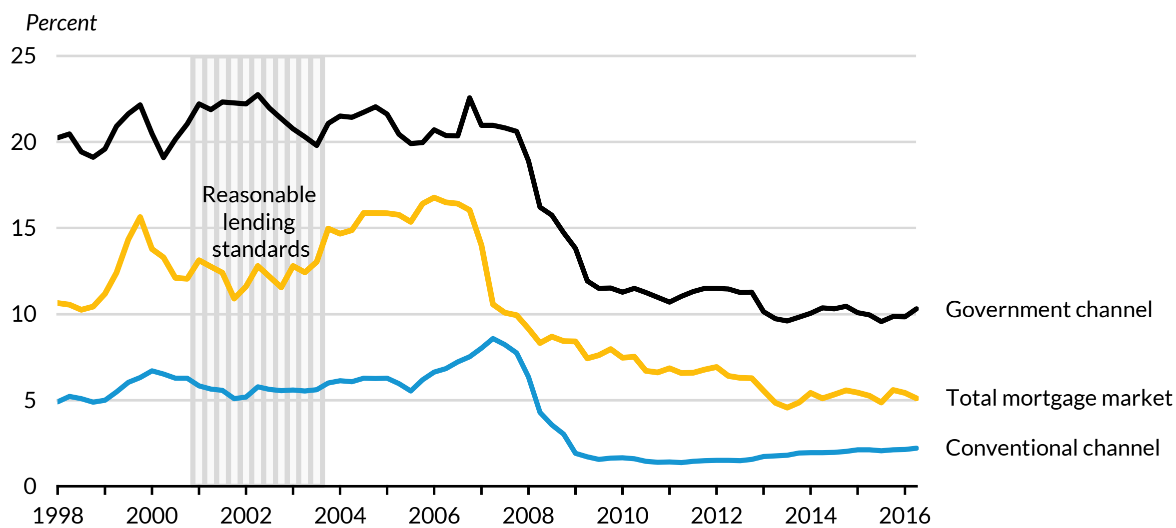
The RDR, however, masks nothing and consistently shows reality. The conventional channel consistently has a higher RDR than the government channel, but the two curves have the least difference in the bubble years (figure 2 and table 2). This makes sense, because during the bubble years, conventional underwriting standards declined as nontraditional products (e.g., interest-only mortgages, 40-year mortgages, mortgages with negative amortization, mortgages with an initial "teaser" payment and a reset period shorter than five years) were introduced into this market.

RDR Results Closely Match Our Housing Credit Availability Index

When we looked at the RDR in conjunction with our HCAI, which monitors the amount of risk being taken by the market (the ex ante probability of default), we found that the two measures match closely. Both the HCAI (figure 3) and the RDR show loose credit during the precrisis period of 2005–07, a dramatic tightening until 2013, and a marginal loosening since. The HCAI shows that the market is taking less than half the risk it was taking in the precrisis period. The RDR exposes the problem: few lower-credit borrowers have been applying for mortgages since the bust, tight credit standards have discouraged applications, and the denial rate of lower-credit applicants is high, but not that different from the precrisis rate.

FIGURE 3

Default Risk Taken by the Mortgage Market, Q1 1998–Q2 2016



Sources: eMBS, CoreLogic, Home Mortgage Disclosure Act, Inside Mortgage Finance, and the Urban Institute.

The RDR Shows the GSEs' and FHA's Efforts to Loosen the Credit Box Have Had Some Success

Figure 2 shows that while the conventional channel continues to have higher denial rates than the government channel, the RDR has declined in both channels since 2013. Moreover, the RDR for conventional loans started to drop in 2011, while the RDR for government loans started to drop in 2014. The same pattern can be seen in our HCAI, which shows that credit availability for GSE loans steadily began rising in 2011, while government loans did not experience an increase until 2014 (figure 3).

Why Do the Data Show a Lag for the Government Channel When It Comes to Loosening the Credit Box?

For the past five years, the GSEs and their conservator, the Federal Housing Finance Agency, have clarified the standards for mortgage put-backs, including the introduction of reps and warrants sunsets in 2012, the relaxation of the sunset eligibility requirement and clarifications of life-of-loan exclusions in 2014, the defect taxonomy in 2015, and an independent dispute resolution process in 2016. The GSEs have also expanded their due diligence to evaluate lender underwriting quality shortly after loan purchase, often allowing lenders to correct mistakes. And recently, Fannie Mae announced Day 1 certainty, waiving certain reps and warrants at origination. Freddie Mac is expected to incorporate a similar program shortly. These policies have led to significant progress in lender clarity (Goodman, Parrott, and Zhu 2015).

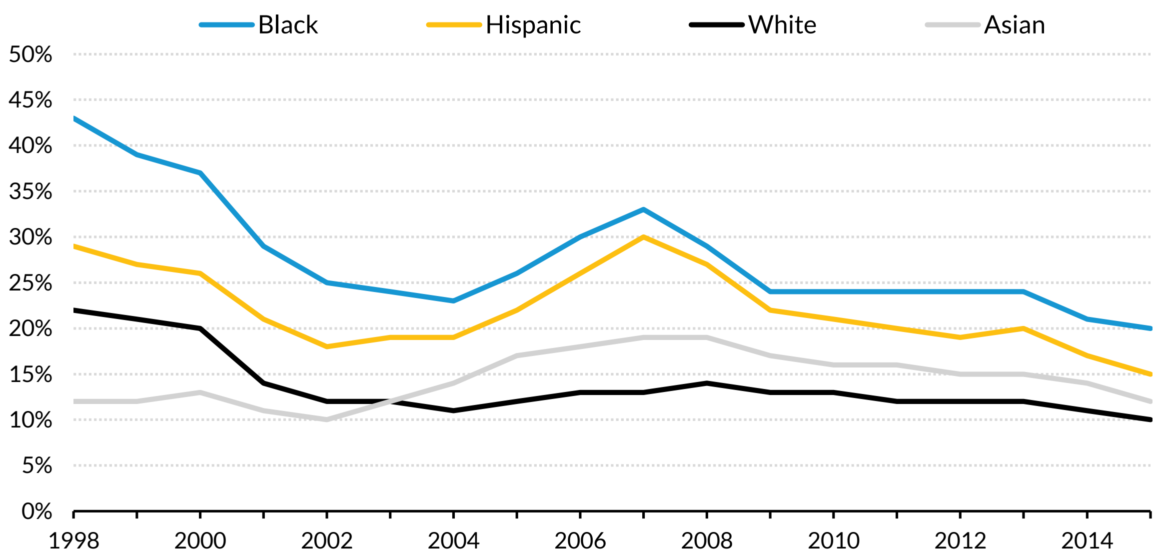
The FHA, however, has lagged behind the GSEs and the Federal Housing Finance Agency in its efforts to reduce lender uncertainty. The FHA published the FHA Single-Family Housing Policy Handbook in March 2015, the FHA defect taxonomy in June 2015, and the Supplemental Performance Metric in August 2015. The handbook puts together more than 900 issued mortgagee letters, and the Supplemental Performance Metric assures lenders will not be shut down if they have a more risky book of business than their peers. But these measures are not enough to counteract the False Claims Act, a powerful tool the US Department of Justice has used to pursue expensive claims against mortgage originators (Goodman 2015). FHA's most promising tool to reassure lenders is the defect taxonomy, which outlines the various errors at origination and grades their severity. But the taxonomy does not list remedies for each error type, providing no mechanism for the FHA to rely on the taxonomy or tie it to actions against mortgage lenders under the False Claims Act.

The RDR Shows Much Smaller Racial and Ethnic Group Gaps in Denial Rates

The ODR indicates that denial rates are consistently highest for blacks and Hispanics (figure 4a). Meanwhile, white and Asian applicants tend to have lower denial rates. The ODR indicates that in 2015, black applicants had twice the denial rate of white applicants, Hispanic applicants had 1.5 times the denial rate, and Asian applicants had 1.2 times the denial rate.

FIGURE 4A

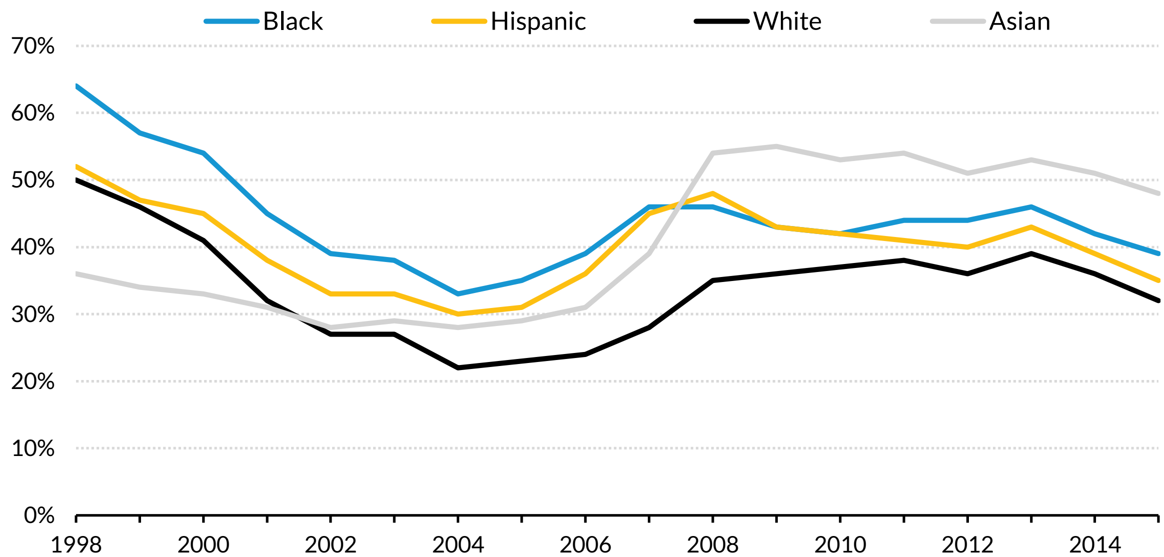
Observed Denial Rates by Race/Ethnicity: All Channels



Sources: Home Mortgage Disclosure Act, CoreLogic, eMBS, and the Urban Institute.
Notes: Based on owner-occupied purchase mortgage applications. Blacks and whites are non-Hispanic.

FIGURE 4B

Real Denial Rates by Race/Ethnicity: All Channels



Sources: Home Mortgage Disclosure Act, CoreLogic, eMBS, and the Urban Institute.
Notes: Based on owner-occupied purchase mortgage applications. Blacks and whites are non-Hispanic.

The RDR, however, shows smaller racial and ethnic gaps (figure 4b). In 2015, black applicants had 1.2 times the denial rate of white applicants, Hispanic applicants had 1.1 times the denial rate, and Asian applicants had 1.5 times the denial rate.

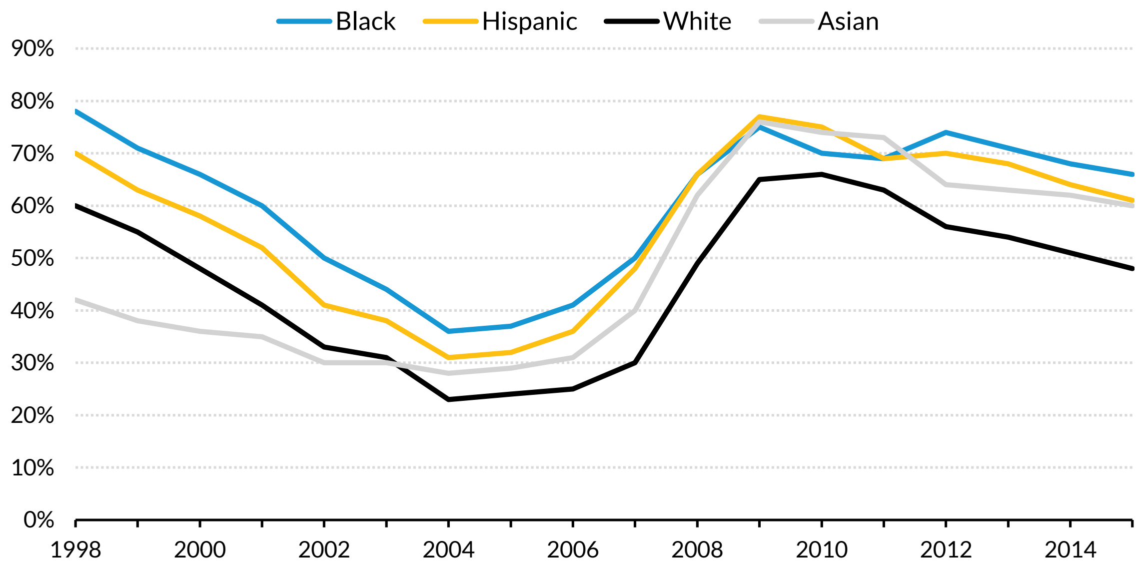
The differences between the ODR and RDR results are because of credit profile differences across groups. In 2015, the average share of lower-credit applicants was 63 percent for black applicants, 56 percent for Hispanic applicants, 41 percent for white applicants, and 37 percent for Asian applicants. Once we control for these credit profiles, the racial differences in denial rates do not go away, but they are smaller.

Our results indicate that in recent years, Asians have the highest RDRs—higher than white, black, or Hispanic applicants—because Asian applicants use the conventional channel more frequently than the other groups.

Figure 5, which shows the RDR by channel and race/ethnicity, demonstrates that Asian applicants have real denial rates in each channel just above but close to those for white applicants. The discrepancy between RDRs for white and Asian applicants is because about 80 percent of LCP Asian applicants use the conventional channel versus about 62.5 percent of white applicants. We believe this is because Asian borrowers tend to live on the high-cost coasts, areas that rely more heavily on conventional financing. Because the denial rate is higher for conventional loans than for government loans, higher Asian denial rates make sense.

FIGURE 5A

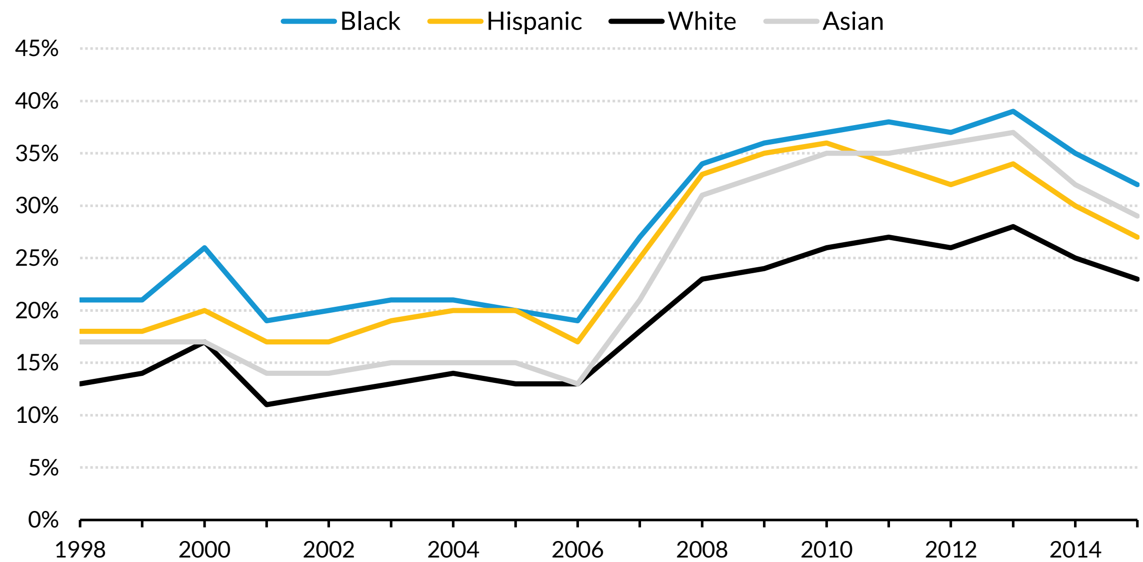
Real Denial Rate by Race/Ethnicity: Conventional Channel



Sources: Home Mortgage Disclosure Act, CoreLogic, eMBS, and the Urban Institute.
Notes: Based on owner-occupied purchase mortgage applications. Blacks and whites are non-Hispanic.

FIGURE 5B

Real Denial Rate by Race/Ethnicity: Government Channel



Sources: Home Mortgage Disclosure Act, CoreLogic, eMBS and the Urban Institute.
Notes: Based on owner-occupied purchase mortgage applications. Blacks and whites are non-Hispanic.

The appendix contains detailed tables for ODR, RDR, percentage of LCP applicants, and percentage of LCP borrowers, sorted by channel and race/ethnicity. These appendix results are consistent with the conclusions above.

Conclusion

Our updated analysis of the 2014 and 2015 Home Mortgage Disclosure Act data show a higher real denial rate than traditional denial rate, providing a more accurate picture of mortgage credit access. By considering only borrowers with lower-credit profiles, the real denial rate reduces the distortion varying credit profiles have on the more traditionally used denial rate.

The real denial rate peaked in 2013 and has been dropping since. Government loans have continued to have lower denial rates than conventional loans, but denial rates for conventional loans started to decrease before denial rates for FHA loans. These finding are consistent with our Housing Credit Availability Index. The updated results also show that racial discrepancies in denial rates exist because of differences in credit composition among these groups, including credit scores, loan-to-value ratios, and debt-to-income ratios.

The recent findings show a small improvement in access to credit in the mortgage market. This success is likely because of the strides the GSEs and the FHA have made in expanding credit, as well as the increases in the market share of nonbank lenders, which have shallower pockets and are less sensitive to rep and warrant and False Claims Act risk. But while the denial rate among lower-credit applicants has moved closer to precrisis levels, lower-credit applicants account for a lower share of total applicants in 2015 than they did before the crisis (33 versus 49 percent). The tight credit conditions have discouraged more consumers with less-than-perfect credit from applying for a loan, and many of these consumers were likely filtered out in the preapproval process prevalent in today's market.

Appendix

TABLE A1

Observed and Real Denial Rates, All Channels

	Observed Denial Rate (%)				Real Denial Rate (%)			
	Black	Hispanic	White	Asian	Black	Hispanic	White	Asian
1998	43	29	22	12	64	52	50	36
1999	39	27	21	12	57	47	46	34
2000	37	26	20	13	54	45	41	33
2001	29	21	14	11	45	38	32	31
2002	25	18	12	10	39	33	27	28
2003	24	19	12	12	38	33	27	29
2004	23	19	11	14	33	30	22	28
2005	26	22	12	17	35	31	23	29
2006	30	26	13	18	39	36	24	31
2007	33	30	13	19	46	45	28	39
2008	29	27	14	19	46	48	35	54
2009	24	22	13	17	43	43	36	55
2010	24	21	13	16	42	42	37	53
2011	24	20	12	16	44	41	38	54
2012	24	19	12	15	44	40	36	51
2013	24	20	12	15	46	43	39	53
2014	21	17	11	14	42	39	36	51
2015	20	15	10	12	39	35	32	48

Sources: Home Mortgage Disclosure Act, CoreLogic, eMBS, and the Urban Institute.
Notes: Based on owner-occupied purchase mortgage applications. Blacks and whites are non-Hispanic.

TABLE A2

Share of Low-Credit-Profile Applicants and Borrowers, All Channels

	Applicants (%)				Borrowers (%)			
	Black	Hispanic	White	Asian	Black	Hispanic	White	Asian
1998	68	57	44	33	43	39	28	24
1999	68	58	47	36	48	42	32	27
2000	68	58	48	39	50	44	35	30
2001	64	55	42	36	49	43	33	28
2002	63	56	43	37	51	46	35	30
2003	65	59	45	42	53	49	38	34
2004	70	64	51	51	61	56	45	43
2005	72	69	55	57	63	60	49	49
2006	76	73	56	58	65	63	49	49
2007	71	66	47	48	56	52	39	36
2008	63	56	39	35	48	40	29	20
2009	57	51	35	30	43	38	26	17
2010	56	50	34	29	43	37	24	16
2011	55	48	33	29	41	36	23	16
2012	56	49	33	30	41	36	24	17
2013	52	46	31	28	37	32	21	15
2014	51	44	30	27	37	33	21	15
2015	50	44	30	26	38	33	22	15

Sources: Home Mortgage Disclosure Act, CoreLogic, eMBS, and the Urban Institute.
Notes: Based on owner-occupied purchase mortgage applications. Blacks and whites are non-Hispanic.

TABLE A3

Observed and Real Denial Rates, Conventional Channel

	Observed Denial Rate (%)				Real Denial Rate (%)			
	Black	Hispanic	White	Asian	Black	Hispanic	White	Asian
1998	54	38	25	12	78	70	60	42
1999	49	35	24	13	71	63	55	38
2000	46	33	22	13	66	58	48	36
2001	37	25	15	11	60	52	41	35
2002	30	21	13	10	50	41	33	30
2003	27	21	13	12	44	38	31	30
2004	24	19	11	14	36	31	23	28
2005	26	22	13	17	37	32	24	29
2006	31	26	14	18	41	36	25	31
2007	35	31	13	19	50	48	30	40
2008	35	31	14	19	66	66	49	62
2009	33	27	13	16	75	77	65	76
2010	30	24	12	15	70	75	66	74
2011	29	23	12	15	69	69	63	73
2012	28	21	11	14	74	70	56	64
2013	26	20	11	14	71	68	54	63
2014	22	17	10	13	68	64	51	62
2015	21	16	9	12	66	61	48	60

Sources: Home Mortgage Disclosure Act, CoreLogic, eMBS, and the Urban Institute.
Notes: Based on owner-occupied purchase mortgage applications. Blacks and whites are non-Hispanic.

TABLE A4

Share of Low-Credit-Profile Applicants and Borrowers, Conventional Channel

	Applicants (%)				Borrowers (%)			
	Black	Hispanic	White	Asian	Black	Hispanic	White	Asian
1998	69	55	41	30	32	26	22	20
1999	68	55	44	33	39	31	26	23
2000	69	56	45	37	42	35	29	27
2001	61	49	38	33	39	32	26	24
2002	59	50	38	34	42	37	29	27
2003	61	55	41	40	47	43	33	32
2004	68	62	49	51	57	54	42	42
2005	71	68	54	57	61	59	47	49
2006	75	73	54	58	64	63	47	49
2007	69	65	45	47	52	49	36	35
2008	53	47	28	30	28	23	17	14
2009	44	35	20	22	16	11	8	6
2010	43	32	19	20	19	11	7	6
2011	43	33	19	21	19	13	8	7
2012	38	30	20	22	14	11	10	9
2013	36	29	20	21	14	12	10	9
2014	33	27	19	21	13	12	10	9
2015	31	26	18	19	14	12	11	9

Sources: Home Mortgage Disclosure Act, CoreLogic, eMBS, and the Urban Institute.
Notes: Based on owner-occupied purchase mortgage applications. Blacks and whites are non-Hispanic.

TABLE A5

Observed and Real Denial Rates, Government Channel

	Observed Denial Rate (%)				Real Denial Rate (%)			
	Black	Hispanic	White	Asian	Black	Hispanic	White	Asian
1998	13	11	7	9	21	18	13	17
1999	14	11	8	10	21	18	14	17
2000	17	12	11	10	26	20	17	17
2001	12	11	7	9	19	17	11	14
2002	14	12	8	9	20	17	12	14
2003	15	14	9	10	21	19	13	15
2004	17	16	10	12	21	20	14	15
2005	17	16	10	11	20	20	13	15
2006	16	14	10	10	19	17	13	13
2007	22	19	13	15	27	25	18	21
2008	24	22	13	19	34	33	23	31
2009	22	20	12	17	36	35	24	33
2010	22	20	13	18	37	36	26	35
2011	22	19	13	18	38	34	27	35
2012	23	19	13	19	37	32	26	36
2013	23	19	14	20	39	34	28	37
2014	21	17	13	17	35	30	25	32
2015	19	15	11	15	32	27	23	29

Sources: Home Mortgage Disclosure Act, CoreLogic, eMBS, and the Urban Institute.
Notes: Based on owner-occupied purchase mortgage applications. Blacks and whites are non-Hispanic.

TABLE A6

Share of Low-Credit-Profile Applicants and Borrowers, Government Channel

	Applicants (%)				Borrowers (%)			
	Black	Hispanic	White	Asian	Black	Hispanic	White	Asian
1998	62	58	56	57	56	53	53	52
1999	65	61	59	60	59	56	56	55
2000	66	62	61	60	59	57	57	56
2001	66	64	62	62	62	59	59	59
2002	70	69	66	67	66	65	63	64
2003	73	72	68	70	68	67	65	66
2004	80	78	75	76	76	74	72	73
2005	82	80	76	76	78	77	73	73
2006	83	81	78	77	80	78	75	75
2007	79	77	71	71	74	71	67	66
2008	70	66	59	61	61	57	53	52
2009	60	58	50	52	49	47	43	42
2010	60	57	49	51	48	46	41	41
2011	59	55	48	51	47	44	41	41
2012	62	58	51	54	50	48	44	43
2013	60	57	51	54	47	46	42	43
2014	60	57	52	55	50	49	44	45
2015	59	56	50	53	49	48	44	44

Sources: Home Mortgage Disclosure Act, CoreLogic, eMBS, and the Urban Institute.

Notes: Based on owner-occupied purchase mortgage applications. Blacks and whites are non-Hispanic.

Notes

1. See Li and Goodman (2014) for more details on how these applicants are defined and how RDR is calculated. We use loan-to-value ratio, FICO credit score, and debt-to-income ratio to measure a borrower's ex ante default risk. Borrowers with higher risk are more likely LCP than those with lower credit risk. We assign zero probability of being LCP to consumers who apply for nonrisky products and have near-perfect credit characteristics (FICO score above 700, loan-to-value ratio less than 78, and debt-to-income ratio less than 30).
2. Home Mortgage Disclosure Act data are released nine months after a calendar year ends. The 2015 data were released in September 2016.
3. "Housing Credit Availability Index," Urban Institute, Housing Finance Policy Center, last updated January 12, 2017, http://www.urban.org/policy-centers/housing-finance-policy-center/projects/housing-credit-availability-index.

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About the Authors

Bing Bai is a research associate with the Housing Finance Policy Center at the Urban Institute, where he helps build, manage, and explore data to analyze housing finance trends and related policy issues. Formerly an economic modeling senior at Freddie Mac, Bai conducted research on housing and mortgage markets and developed models to evaluate foreclosure alternatives for nonperforming mortgage loans. He holds a PhD in economics from Clemson University.

Laurie Goodman is codirector of the Housing Finance Policy Center. The center is dedicated to providing policymakers data-driven analyses of housing finance policy issues that they can depend on for relevance, accuracy, and independence. Before joining the Urban Institute in 2013, Goodman spent 30 years as an analyst and research department manager at several Wall Street firms. From 2008 to 2013, she was a senior managing director at Amherst Securities Group, LP, a boutique broker/dealer specializing in securitized products, where her strategy effort became known for its analysis of housing policy issues. From 1993 to 2008, Goodman was head of global fixed income research and manager of US securitized products research at UBS and predecessor firms, which were ranked first by *Institutional Investor* for 11 straight years. Before that, she was a senior fixed income analyst, a mortgage portfolio manager, and a senior economist at the Federal Reserve Bank of New York. Goodman was inducted into the Fixed Income Analysts Hall of Fame in 2009. She serves on the board of directors of MFA Financial and is a member of the Bipartisan Policy Center's Housing Commission, the Federal Reserve Bank of New York's Financial Advisory Roundtable, and the New York State Mortgage Relief Incentive Fund Advisory Committee. She has published more than 200 journal articles and has coauthored and coedited five books. Goodman has a BA in mathematics from the University of Pennsylvania and an MA and PhD in economics from Stanford University.

Bhargavi Ganesh is a research assistant in the Housing Finance Policy Center. Before joining the Urban Institute, she interned in finance and worked on research, underwriting, and surveillance of housing finance investments. She received a BA with honors in economics and a minor in math and environmental studies from New York University. While there, Ganesh was a staff writer and online codirector for news and policy-related student publications. For her senior thesis, she received an undergraduate research grant to study catastrophe risk perception and flood insurance reform along the East Coast.

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