

The Effect of Mortgage Broker Licensing On Loan Origination Standards and Defaults: Evidence from U.S. Mortgage Market

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The views in this paper are those of the authors and may not reflect those of the Office of the Comptroller of the Currency or the Department of Treasury.

Information asymmetry in the originate-to-distribute model

- The benefit of having secondary loan markets:
 - Allows **better risk-sharing by placing risk in hands of those most willing and able to bear it.**
 - Allows **specialization:** origination, servicing, etc.
- With better risk-sharing comes potentially worse incentives and adverse selection in the presence of information asymmetry
 - Lenders have less incentives to collect soft information on borrowers (Keys et al., 2010).
 - They exploit a discontinuity – loans with FICO score greater than 620 are more likely to be selected for securitization, to illustrate the effect of securitization on loan origination quality.
- This paper: What are the roles of mortgage loan brokers in the originate-to-distribute financing model?

Relation Between Lenders and Brokers

- Lenders use their own employees and independent brokers to originate loans. The latter originate **68%** of all residential loans in the U.S. leading up to the crisis (Wholesale Access Mortgage Research & Consulting, Inc.)
- Compared with lender employees, brokers
 - **are independent parties** and have access to several lenders.
 - have lower overhead costs.
 - brokers were paid origination fee and a **percentage of the loan amount**.
 - Lenders paid brokers based on the interest rate charged (Yield Spread Premium): the higher the interest rate, the greater the rebate (compensation) from lenders to brokers (Woodward & Hall, 2010).

Brokers' Incentives

- The pay to brokers is not based on long-term performance of the loans originated. Rather, pay varies with
 - Quantity and amount of loans closed.
 - Interest rates of the loan.
- Given the compensation structure, brokers have incentives to
 - generate fees by **originating as many loans as possible**.
 - Expand the loan origination to subprime borrowers, those with impaired credit history.
 - Borrowers often are not as sophisticated about mortgage terms as brokers.
 - steer borrowers into loans with higher interest rates.

State Regulation of Brokers: Prior to 2008

- Mortgage brokers are regulated by states. It takes the form of licensing and registration.
- Financial requirements (of the entity)
 - Minimum net worth
 - Surety bonds.
 - Usually between \$25,000 and \$50,000.
 - Some require the bond amount proportional to the number of mortgage applications, or number of loan originators, or the aggregate principal amount of loans.
- Registration/license requirement
- Specific competency requirements (for control persons/employees/both):
 - Work Experience
 - Education: degree or hours of classroom-training
 - Continuing Education: Courses; classroom instructions.
 - Exams on mortgage banking knowledge and federal and state laws and regulations.
- Having a physical office in the state

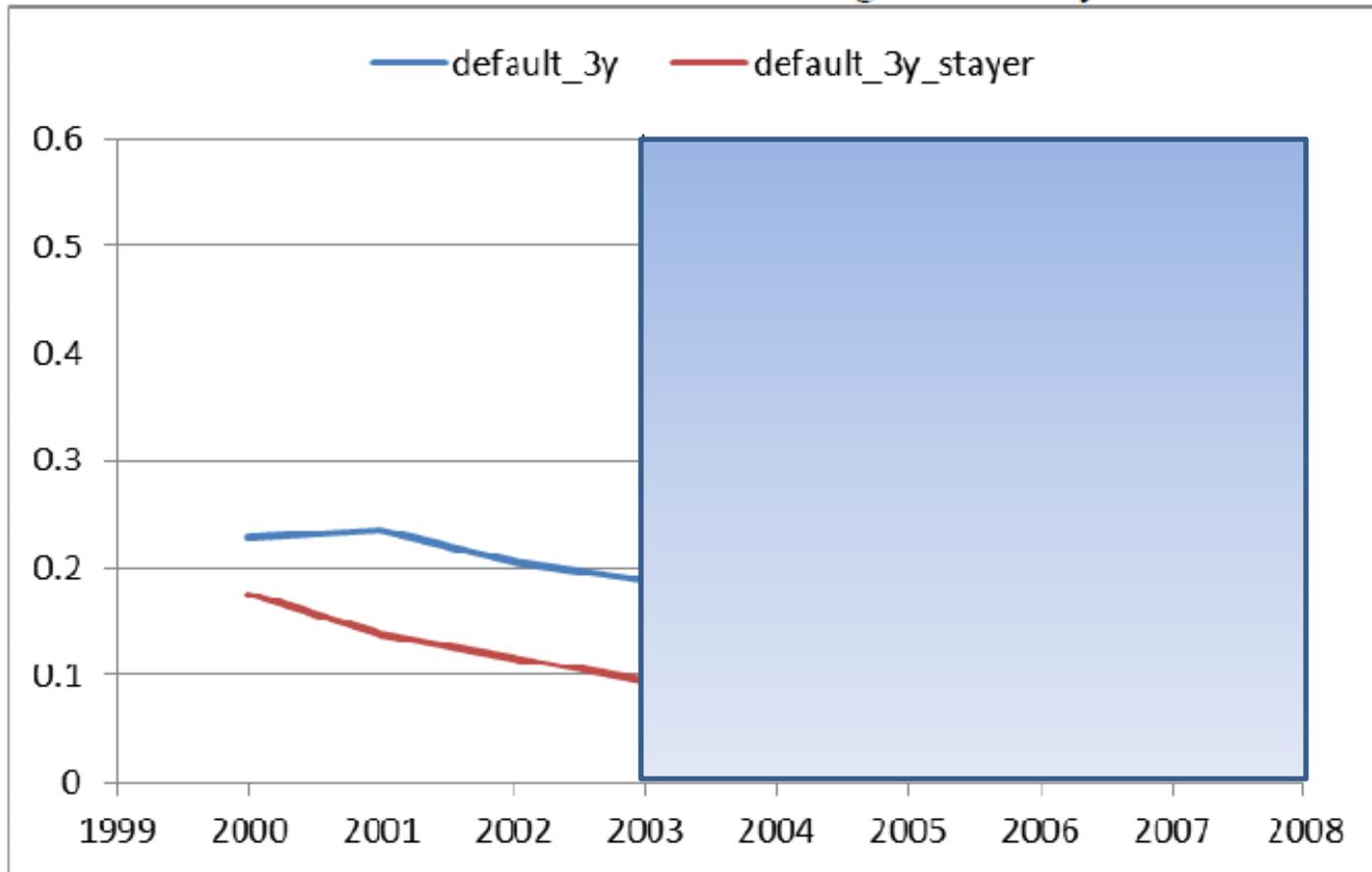
Hypothesis: Effect of Mortgage Broker Licensing on Loan Origination Quality

- Mechanism: licensing of brokers in the presence of info. asymmetry
 - Selection effect:
 - blocks entry of brokers who had criminal history.
 - admits brokers who have higher ability, who value their reputation with borrowers more, and are less likely to exploit borrowers.
 - Incentive effect:
 - raises the cost of becoming a broker, which gives them incentives to not squander their investments by way of license revocation as a result of wrongdoings: surety bond, in particular.
 - reduces the number of brokers and thus generates greater equilibrium profits, which raises the value of upholding reputation with borrowers (Kelley, 1990; Hellmann et al., 2000).
- Testable predictions:
 - States with more stringent broker licensing requirements will have higher origination standards and better loan performance.
 - Effect of licensing is greater when information asymmetry is greater.

Identification Strategies

- Focus on PLS loans originated during 2003-06.
- Large cross-state variation in licensing, yet it could be due to unobserved state heterogeneity that also affects the dependent variable.
- Strategy: within-state over-time variation in broker licensing.
 - Effectively exploiting over time changes to identify the effect of licensing on loan origination standards.
 - Rely on the assumption that states that change (changers) have similar over time trend than states that do not change (stayers), which we check.
 - Also use propensity score method.

Mean Default Rate for 2003 changers and Stayers



The y-axis is the mean default rate (three years after origination) for loans originated in 2000 to 2007. The two curves are for 2003 changers, which are states that had a change in the licensing of mortgage loan brokers in 2003, and for stayers, which are states that did not have any licensing changes 2003-2006.

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Data

- Data on licensing requirements:
 - Pahl (2007) provides detailed coding of licensing requirements.
- Data on loan performance & terms: CoreLogic data on originated loans securitized by private label issuers (PLS)
 - Include ABS (subprime and Alt-A), MBS (jumbo loans)
 - Not portfolio loans nor GSE loans; will address possible selection issues.

Variable Definitions

- Dependent variables.
 - whether the loan has risky features
 - whether the originated loan is 60+ days delinquent, in foreclosure, or real estate owned (REO) 3 years after origination.
- Licensing variables.
 - Bond/networth requirement: bond over \$50,000=3; bond \$25,000-\$50,000=2; bond under \$25,000=1; None=0.
 - Registration/license (required=1; none=0).
 - competency requirement is the specific requirement for licensing/registration (required=1; none=0).
 - We group licensing requirements by types: specific req. for all parties -- the licensee (applicant; owner), managing directors, and employees.
 - Also group across all parties for each specific requirement.
- Control variables: loan and borrower characteristics; HPI & unemployment change.

Summary Statistics on Performance Var. and License Variables

Summary Statistics on PLS Loans (# obs: 15,492,446)

Variables	Mean	S.D.	Vintage 2003	2004	2005	2006
Default_3y	0.26	0.44	.12	.14	.25	.45
Default_2y	0.18	0.38	.09	.11	.16	.30
Networth_bond	1.45	1.50	1.35	1.43	1.47	1.51
Reg_lic	2.29	1.64	2.14	2.21	2.31	2.41
Experience	0.63	0.57	0.81	0.82	0.83	0.84
Edu	0.91	1.11	1.09	1.09	1.12	1.13
Exam	1.16	1.06	1.11	1.15	1.18	1.19
Exp or edu	0.39	0.75	0.38	.38	.39	.40
Exp or exam	0.02	0.17	0.01	.01	.01	.05
Contedu	1.35	1.19	1.26	1.33	1.35	1.43
Licensee req.	2.56	1.68	2.73	2.68	2.57	2.81
Employee req.	2.21	1.79	2.17	2.28	2.31	2.48
Mang principal req.	1.16	1.95	.94	1.04	1.21	1.33

Summary Statistics on Loan Characteristics

Table 1A: Summary Statistics (Continued)

Variables	Mean	S.D.	2003	2004	2005	2006
Fico	662.76	71.53	663.17	659.63	663.30	664.66
Subprm_alt-a	.91	.29	0.81	0.89	0.93	0.95
LTV	80.50	14.60	78.40	80.33	80.63	81.70
DTI	23.67	20.44	21.45	23.53	23.45	25.31
Doc_full	0.52	.50	0.59	0.57	0.51	0.43
Refi_cashout	0.41	.49	0.43	0.41	0.40	0.41
Purpose_refi_noco	0.12	.32	0.21	0.12	0.09	0.10
Interest only (IO)	0.23	.42	0.10	0.23	0.28	0.23
Negative amortization	0.06	.24	0.00	0.04	0.08	0.09
ARM	0.56	.50	0.51	0.65	0.61	0.46
Balloon	0.11	.31	0.04	0.05	0.08	0.22
PP_PEN	0.51	.50	0.47	0.51	0.53	0.52
Lien_1 st	0.85	.36	0.90	0.88	0.85	0.78
Occupancy_owner	0.87	.34	0.89	0.87	0.86	0.86
Unit_1	0.80	.40	0.80	0.77	0.79	0.84
Msa_hpi_11y_chg	25.01	18.66	13.75	24.82	32.56	22.95
Unemploy_11y_chg	-0.40	0.50	.16	-.52	-.51	-.48
Orig_year_2004	0.25	.43	0.00	1.00	0.00	0.00
Orig_year_2005	0.32	.47	0.00	0.00	1.00	0.00
Orig_year_2006	0.28	.45	0.00	0.00	0.00	1.00

Loan Characteristics as a Function of Broker Licensing

The specification:

$$X_{ist} = \beta_{lic_{ist}} + HPI_change_{st} + \alpha_s + \alpha_t + \varepsilon_{ist}$$

Loan Characteristics and Yearly Broker Licensing

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	FICO	Doc_low_no	Subprm_alta	IO	Negam	ARM
Networth_bond	0.327 [0.878]	0.001 [0.427]	0.000 [0.135]	-0.019*** [-13.47]	-0.018*** [-24.92]	0.004*** [2.784]
Registration_license	1.664*** [4.703]	-0.022*** [-12.83]	-0.011*** [-3.945]	0.001 [0.410]	-0.017*** [-12.36]	-0.010*** [-3.834]
Experience	0.748 [1.524]	-0.005* [-1.830]	-0.010*** [-3.832]	-0.024*** [-9.452]	-0.025*** [-17.72]	-0.027*** [-8.971]
Education	3.293*** [7.824]	-0.006** [-2.165]	-0.017*** [-5.853]	0.008*** [3.609]	0.000 [0.165]	-0.008*** [-3.028]
Exam	0.798 [1.240]	0.008*** [3.128]	-0.002 [-0.328]	-0.023*** [-8.100]	-0.023*** [-13.78]	-0.015*** [-5.222]
Exp_or_edu	2.214 [1.546]	-0.008 [-1.226]	0.010 [1.292]	-0.009 [-1.242]	-0.024*** [-7.906]	0.018*** [3.068]
Continuing edu	-2.133*** [-5.309]	0.004** [2.198]	-0.004 [-1.275]	-0.032*** [-8.210]	-0.008*** [-4.542]	-0.026*** [-7.272]
R-squared	0.042	0.062	0.050	0.070	0.048	0.041

This table reports the results from regressing specific loan characteristics on the various licensing variables. The sample is CoreLogic Loan Performance data for loans originated 2003-06. # obs is 15,492,446. HPI and unemployment changes (origination year changes over the last year), state and origination year fixed effects are included. Reported in brackets are t-value; standard errors are clustered at the zip-code level. *** denotes statistical significance at conventional 1 percent level, ** 5 percent, and * 10 percent.

Econometric Specification for Loan Performance Regressions

The specification:

$$Y_{ist} = \beta_l lic_{ist} + \beta_X X_{ist} + \alpha_s + \alpha_t + \varepsilon_{ist}$$

where

-- i : loan,

-- s : state,

-- t : year,

-- Y : 60+ days delinquent, in foreclosure, or real estate owned (REO) three years after origination.

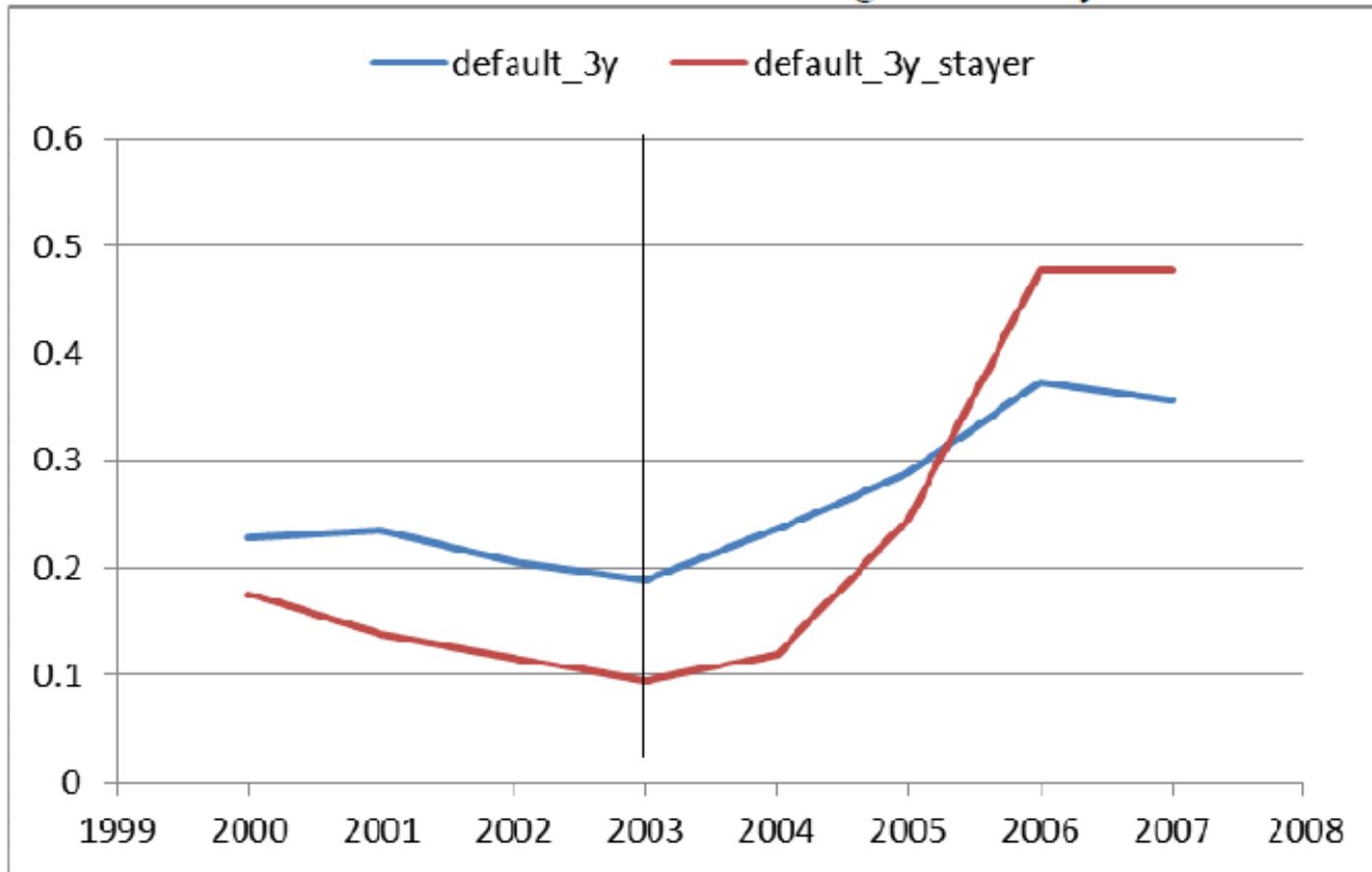
-- X : i) loan and borrower characteristics, ii) MSA quarterly HPI and state monthly unemployment change in the origination year over the last year.

-- α_s : state fixed effects,

-- α_t : year fixed effects.

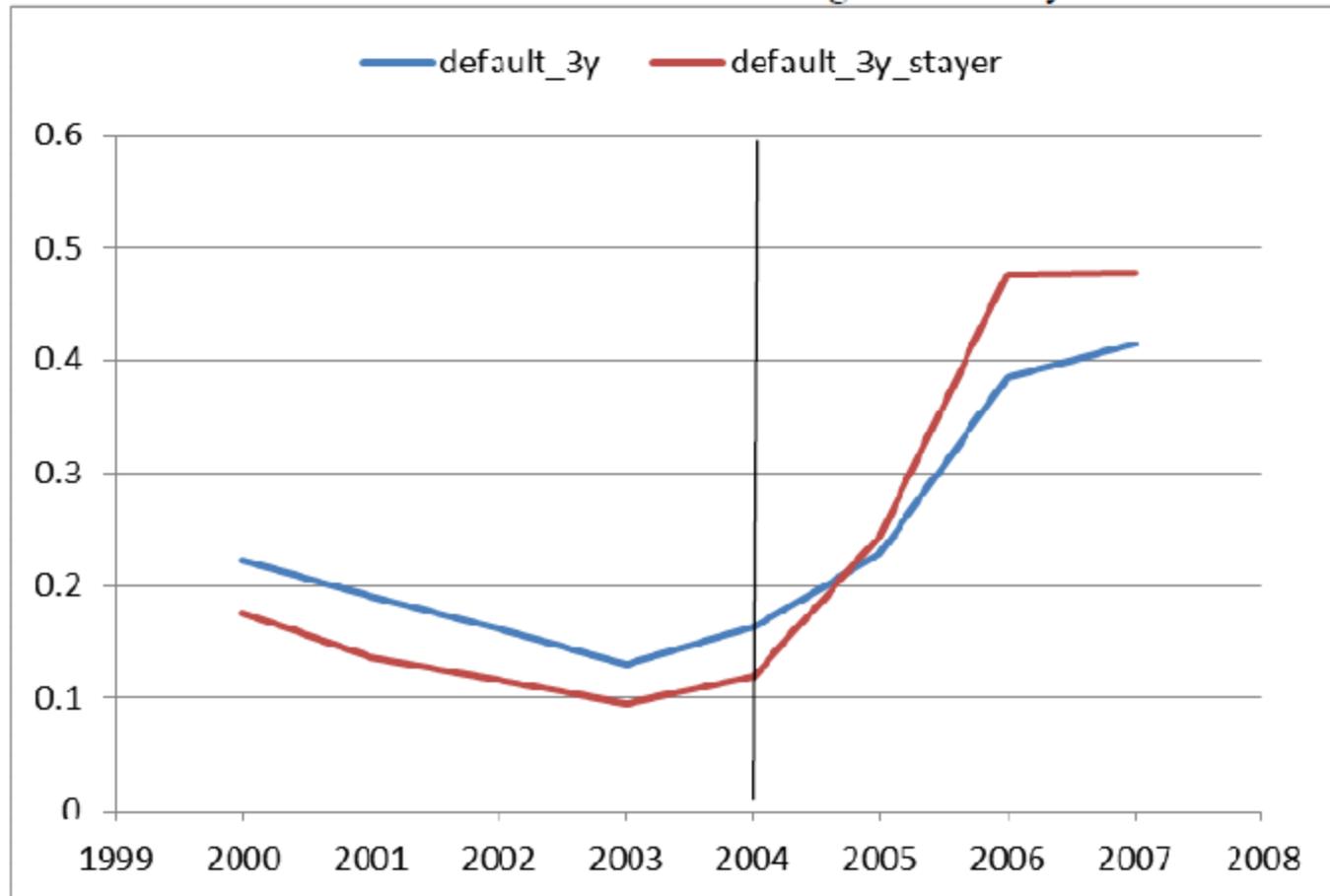
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Loan-level Analysis of Performance and Yearly Licensing

Dep var: default_3y	(1)	(2)	(3)	(4)	(5)	(6)
Networth_bond	-0.019*** [-10.50]	-0.030*** [-14.88]	-0.021*** [-11.68]	-0.033*** [-16.49]	-0.022*** [-11.90]	-0.032*** [-16.52]
Registration_license	-0.039*** [-10.41]		-0.035*** [-9.137]		-0.035*** [-9.441]	
Experience	-0.052*** [-9.559]		-0.049*** [-9.261]		-0.050*** [-10.33]	
Education	-0.036*** [-9.996]		-0.031*** [-8.850]		-0.025*** [-7.253]	
Exam	-0.049*** [-9.625]		-0.044*** [-8.655]		-0.047*** [-9.696]	
Exp_or_edu	-0.067*** [-9.390]		-0.058*** [-8.370]		-0.055*** [-8.138]	
Exp_or_exam	-0.026*** [-3.642]		-0.030*** [-3.854]		-0.024*** [-3.313]	
Continuing edu	-0.020*** [-4.736]		-0.023*** [-5.166]		-0.015*** [-3.630]	
Licensee_req		-0.063*** [-17.75]		-0.068*** [-19.23]		-0.060*** [-18.99]
Employee_req		-0.041*** [-29.49]		-0.037*** [-26.09]		-0.037*** [-26.07]
Mang_principal		-0.053*** [-19.73]		-0.052*** [-19.30]		-0.046*** [-17.94]
Orig year and state FE	Y	Y	Y	Y	Y	Y
Borrower & loan char.	N	N	Y	Y	Y	Y
HPI & unemployment rate	N	N	N	N	Y	Y
R-squared	0.102	0.102	0.186	0.186	0.187	0.187

Economic Magnitude

- The significance of the licensing variables in a loan performance regression with loan characteristics included suggests that there are factors not captured by loan characteristics that are affected by broker licensing
 - Their effort in screening the loan
 - Some loan characteristics might be noisy: home appraisal value might be inflated (resulting in lower LTV than the true value), income might be inflated (resulting in lower DTI than the true value), etc.
- A one standard deviation in the following variables is associated with economically large reduction from the mean default rate:
 - Networth/surety bond: 13 percent
 - Experience: 11 percent
 - Education: 11 percent
 - Experience or education: 16 percent
 - Exam: 19 percent
 - Continuing education: 7 percent

 - Licensee requirement: 39 percent
 - Employee requirement: 26 percent.

Effect of Licensing Varies with Being Subprime or not

Dep var: default_3y	Prime		Subprime	
Networth_bond	-0.009*** [-9.989]	-0.008*** [-10.08]	-0.024*** [-12.56]	-0.036*** [-17.76]
Registration_license	0.005 [1.470]		-0.041*** [-10.19]	
Experience	-0.020*** [-4.076]		-0.054*** [-10.58]	
Education	0.007*** [2.772]		-0.027*** [-7.400]	
Exam	-0.019*** [-5.615]		-0.054*** [-10.38]	
Exp_or_edu	-0.009* [-1.654]		-0.063*** [-8.365]	
Exp_or_exam	-0.024*** [-4.554]		-0.022*** [-3.019]	
Continuing edu	-0.012*** [-3.882]		-0.016*** [-3.439]	
Licensee_req		-0.034*** [-8.852]		-0.067*** [-20.33]
Employee_req		-0.007*** [-9.829]		-0.042*** [-28.00]
Mang_principal		-0.005*** [-4.851]		-0.052*** [-18.43]
Observations	1396792	1396792	1.41e+07	1.41e+07
R-squared	0.058	0.058	0.172	0.172

Effect of Licensing on Loan Performance by Documentation

Dep var: default_3y	Full doc		Low doc	
Networth_bond	-0.016*** [-11.07]	-0.024*** [-15.96]	-0.026*** [-11.69]	-0.035*** [-15.16]
Registration_license	-0.023*** [-8.200]		-0.035*** [-7.360]	
Experience	-0.032*** [-7.816]		-0.060*** [-9.658]	
Education	-0.029*** [-9.693]		-0.025*** [-5.803]	
Exam	-0.037*** [-9.368]		-0.057*** [-8.893]	
Exp_or_edu	-0.046*** [-7.804]		-0.064*** [-7.358]	
Exp_or_exam	-0.030*** [-5.302]		-0.007 [-0.743]	
Continuing edu	-0.016*** [-4.690]		-0.012** [-2.524]	
Licensee_req		-0.046*** [-16.42]		-0.066*** [-16.32]
Employee_req		-0.028*** [-23.05]		-0.042*** [-22.07]
Mang_principal		-0.039*** [-20.70]		-0.048*** [-14.71]
Observations	7952085	7952085	7496697	7496697
R-squared	0.169	0.169	0.212	0.212

Effect of Licensing on Loan Performance by Percent of Minority

Dep var: default_3y	Minority lt 50 pct		Minority ge 50 pct	
Networth_bond	-0.019*** [-10.89]	-0.028*** [-15.23]	-0.028*** [-8.892]	-0.030*** [-8.332]
Registration_license	-0.030*** [-9.347]		-0.066*** [-5.563]	
Experience	-0.039*** [-8.271]		0.025 [0.898]	
Education	-0.025*** [-7.810]		-0.011 [-0.543]	
Exam	-0.043*** [-10.42]		-0.061*** [-3.738]	
Exp_or_edu	-0.049*** [-7.907]		0.009 [0.494]	
Exp_or_exam	-0.022*** [-2.752]		-0.046*** [-4.067]	
Continuing edu	-0.003 [-0.826]		-0.123*** [-15.51]	
Licensee_req		-0.046*** [-13.85]		-0.116*** [-11.25]
Employee_req		-0.032*** [-24.60]		-0.052*** [-11.51]
Mang_principal		-0.036*** [-16.34]		-0.131*** [-6.091]
Observations	1.13e+07	1.13e+07	4152372	4152372
R-squared	0.177	0.177	0.221	0.221

Selection Issue?

Dep var: default_3y	Depository institutions		Ind. Mortgage companies	
Networth_bond	-0.023*** [-11.56]	-0.033*** [-16.23]	-0.022*** [-13.04]	-0.031*** [-17.18]
Registration_license	-0.035*** [-9.900]		-0.034*** [-7.381]	
Experience	-0.050*** [-10.41]		-0.048*** [-7.906]	
Education	-0.022*** [-6.830]		-0.034*** [-7.144]	
Exam	-0.043*** [-8.884]		-0.060*** [-11.20]	
Exp_or_edu	-0.045*** [-7.302]		-0.079*** [-7.583]	
Exp_or_exam	-0.023*** [-3.065]		-0.033*** [-4.529]	
Continuing edu	-0.010*** [-2.595]		-0.033*** [-5.326]	
Licensee_req		-0.050*** [-15.39]		-0.092*** [-20.72]
Employee_req		-0.034*** [-24.04]		-0.045*** [-27.16]
Mang_principal		-0.042*** [-17.73]		-0.061*** [-17.31]
Observations	1.11e+07	1.11e+07	4347228	4347228
R-squared	0.195	0.195	0.162	0.163

State Anti-predatory Lending Laws (APL)

- With the exception of high-cost mortgages covered under Home Ownership and Equity Protection Act of 1994 (HOEPA), before the subprime crisis there were no federal statutes that expressly prohibit making a loan that a borrower will likely be unable to repay (GAO- 04-280).
- In response to the lack of protection of consumers in mortgage lending, many states adopted anti-predatory lending laws.
 - In 1999, North Carolina passed the first comprehensive state law that was modeled after the federal HOEPA (mini-HOEPA law). Prompted by growing concerns over the explosion in subprime lending, many other states also enacted anti-predatory lending laws.
 - As of 2007, 29 states and the District of Columbia had mini-HOEPA laws in effect and another 14 states had some types of older anti-predatory lending laws that were still in effect which were adopted prior to 2000
- APLs restricted prepayment penalties, balloon payments, or negative amortization for all mortgages (Bostic et al., 2008a).
 - Federal pre-emption of APLs.
 - OTS: since 1996
 - OCC: since 2004

Alternative Explanation I: Effect of APL?

Dep var: default_3y	Include APL	
Anti-predatory Lending Laws	-0.037*** [-11.60]	-0.038*** [-13.48]
Networth_bond	-0.019*** [-10.54]	-0.031*** [-16.26]
Registration_license	-0.033*** [-8.819]	
Experience	-0.050*** [-10.20]	
Education	-0.031*** [-8.874]	
Exam	-0.026*** [-4.656]	
Exp_or_edu	-0.055*** [-7.860]	
Exp_or_exam	-0.026*** [-3.511]	
Continuing edu	-0.020*** [-4.648]	
Licensee_req		-0.063*** [-19.71]
Employee_req		-0.030*** [-21.01]
Mang_principal		-0.050*** [-19.13]
Observations	1.54e+07	1.54e+07
R-squared	0.187	0.187

Further Analyses and discussion

- Sensitivity analyses:
 - Robust to inclusion of originator FE
 - Robust to inclusion of servicer FE
 - Robust to use of lagged license variables
 - Robust to use of 2-yr default after origination
 - Robust to inclusion of fingerprint as a way of broker licensing
- The risky features were not priced in the interest rate.
- The effect of licensing is also stronger for ARM, IO, Negam, and loans with investment purpose.
- Standard economic theory predict that restriction on entry reduces efficiency
 - But this is only true in an environment with full information.
 - There are empirical work documenting that occupational license increases price (Kleiner, 2000)
 - There is also literature showing that deregulation leads to excessive risk-taking by banks (Keeley, 1990), entry of a third credit-rating agency reduces rating quality (Becker and Milbourn, 2011).

Conclusion

- We argue that in the originate-to-distribute model, the broker licensing raises loan underwriting standards because it
 - raises the quality of mortgage brokers, who value their reputation more,
 - raises the stake of being a licensed broker,
 - reduces the number of brokers who feed the lending frenzy.
- We find evidence that in the originate-and-distribute mortgage financing model, states that toughened mortgage brokers licensing requirements
 - had a lower proportion of loans with risky features and thus
 - had better loan performance.
 - The magnitude is 11-19 percent reduction from the mean for a one sd increase in various licensing requirements.
 - The effect is larger where information asymmetry and the role of broker is larger.
- Recent federal regulatory moves (SAFE Act, Dodd-Frank Act on ability-to-repay, risk retention, and broker pay) are attempts to raise efficiency in mortgage origination and securitization market.