Relational Contracts, Reputational Concerns, and Appraiser Behavior:
Evidence from the Housing Market

Sumit Agarwal, Georgetown University

Changcheng Song, National University of Singapore

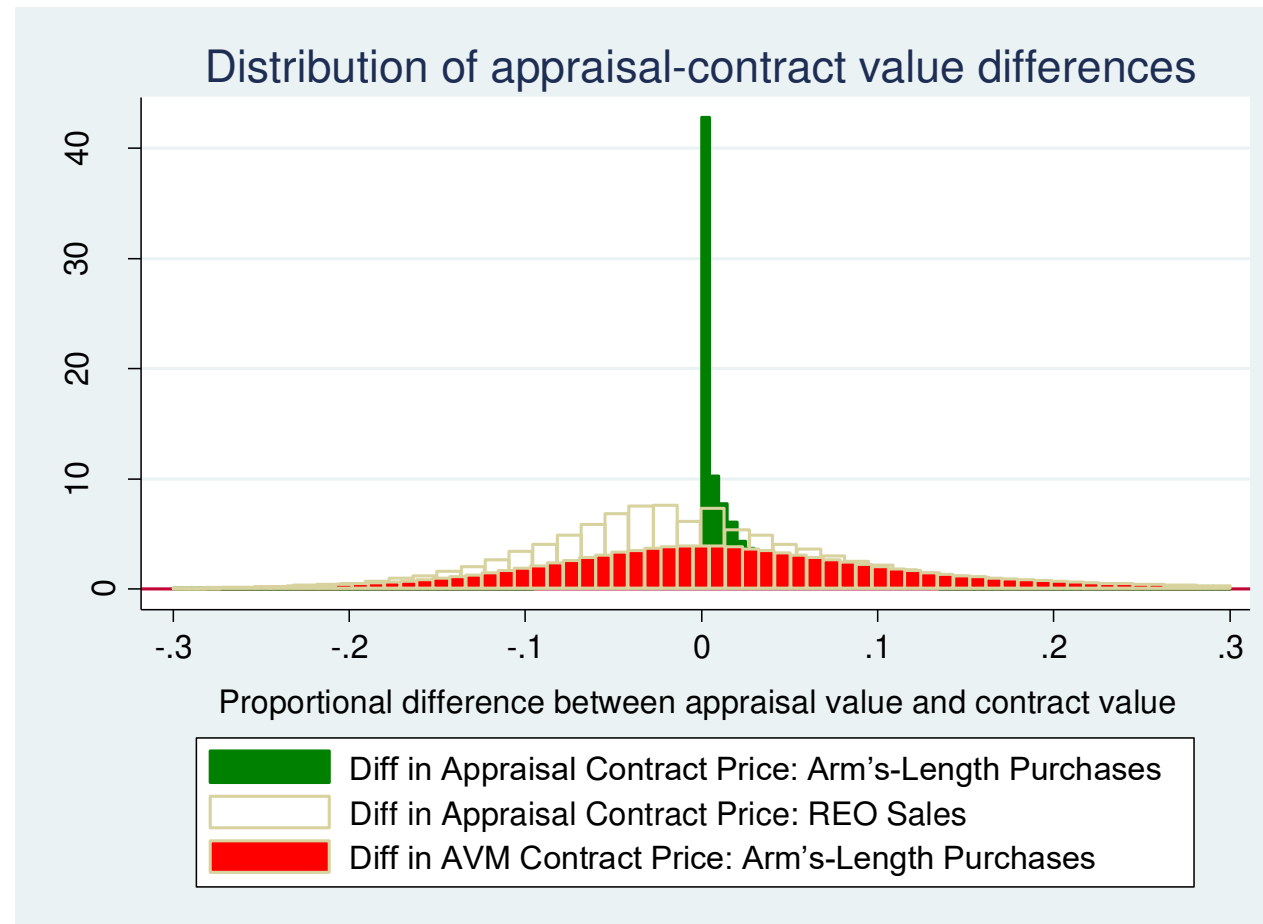Vincent Yao, Georgia State University

Motivation

- Independent examiners play an important role in financial markets
  - Banking regulators
  - Rating agencies
  - Real estate appraiser
  - Independent directors
- There are huge consequences if these independent examiners have conflict of interest and provide influenced suggestions.
- Proper institution design in these market can potentially help to achieve independent evaluation.
- We study the institution design and its consequences in the market of real estate appraisers.

Motivation

- American homeowners and financial institutions rely on real estate appraisers for estimating their home's market value.
  - At the height of home price run-up in 2006, nearly 100,000 licensed appraisers helped over 10 million homeowners to originate about $2.7 trillion mortgages to finance home purchases and refinancing.

- Appraisers play an important role in facilitating housing and mortgage transactions
  - Appraisal contingency clause in standard sale contracts
  - Lenders calculate the loan to value ratio (LTV) in mortgage underwriting based on the minimum of the appraised value and contract price

Motivation

- 31% of appraisals in the US bunch at the contract value, and 11% of appraisals in the US come in near the narrow vicinity of the contract

Distribution of appraisal-contract value differences

Proportional difference between appraisal value and contract value

Diff in Appraisal Contract Price: Arm's-Length Purchases
Diff in Appraisal Contract Price: REO Sales
Diff in AVM Contract Price: Arm's-Length Purchases

Research Questions and Design

- Why are appraisers bunching?
  - We assume smooth distribution of independent appraisals, why are there missing mass below contract price?
- What are the consequences of bunching?
- We construct a novel dataset containing appraisals collected by GSEs from 2013 to 2015

- We study
  - The bunching behavior of appraisers
  - the relationship between house characteristics and appraisal values
 - interaction between appraisers' behavior and lenders' behavior

Main results

- 31% of appraisals in the US bunch at the contract value
- Bunching is driven by reputational concern, but not moral hazard (bunching requires less effort) or altruism
- Lenders punish appraisers with below-contract price appraisals by reducing business volume and terminating of relationship
- Consequences:
  - Bunching helps constrained borrowers get their loans approved for GSE securitization, but not non-GSE securitization
  - Bunching is correlated with higher housing price growth

Contributions

- Misconduct of financial intermediaries
  - Zingales (2015) : professional scandals
  - Egan, Matvos and Seru (2016): financial advisors
  - Agarwal, Ben-David and Yao (2015): appraisers
- Incentive design for independent examiners
  - Jiang et al (2016): independent director
  - Agarwal et al (2014): federal vs state supervisor
  - Implications: independent examiners should have larger market power
- Relational Contracts and reputation concern
  - Brown et al (2004): Without third-party enforcement, long term relationship provide higher effort/quality
  - Agarwal et. al. (2017), show that relational contract help banks lower default and prepayment
  - Implications: independent examiners should be assigned anonymously or randomly to achieve one shot transaction

Institutional Background
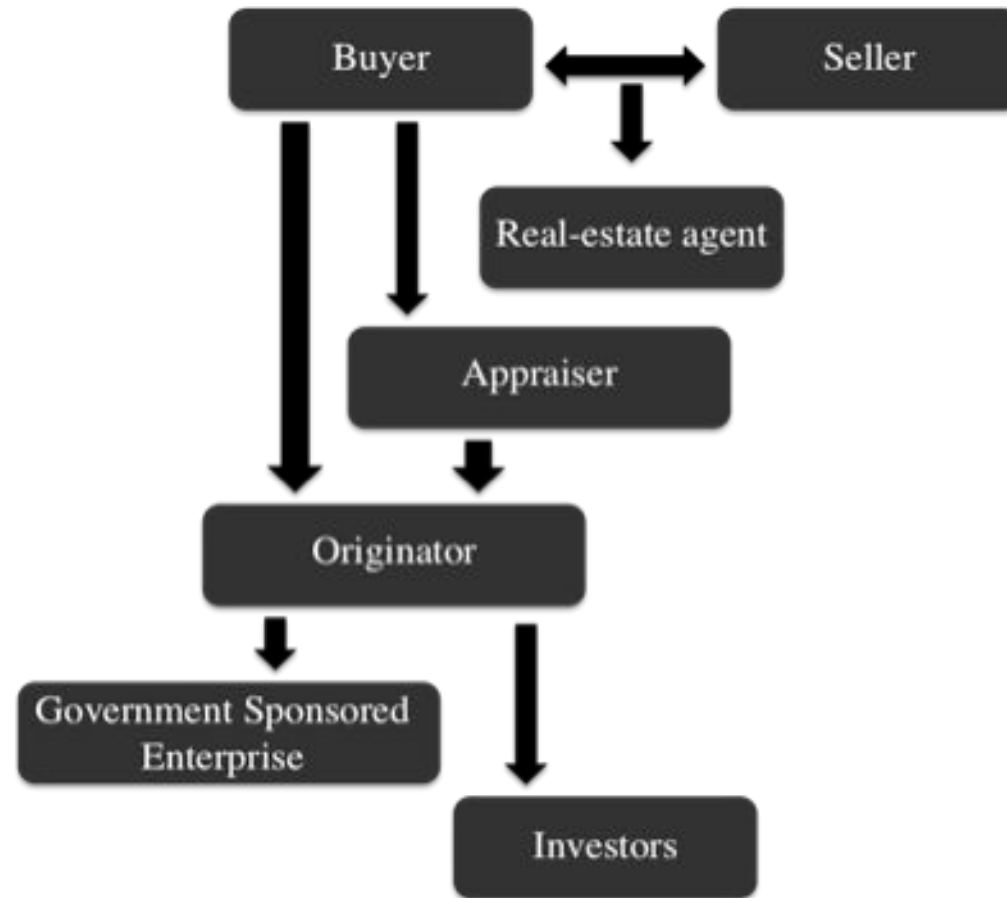
Institutional Background

- Appraisals are meant to provide an independent opinion of a property's market value
  - Help lenders to make sure houses are worth the money to lend borrowers.
  - Can be ordered prior to listing the house, prior to signing the contract, for loan application, or for refinancing transactions
- Appraisers are paid with fixed rate of each appraisal.
- Appraisal contingency clause: If appraisal value is less than contract value, buyer can declare the offer null and void
- If contract price is validated by an equal or higher appraisal value, the LTV used in loan underwriting is calculated based on the minimum of contract price and appraisal value as the denominator
 - Prevents buyer from gaining from higher appraisal value

Institutional Background

- Anecdotal evidence during the housing price run-up that led to the financial crisis suggests that inflated appraisals are associated with pressures from loan officers, lenders and homeowners

- The Home Valuation Code of Conduct(HVCC)
  - The two GSEs announced the adoption of HVCC after May 2009
  - Requires the use of appraiser management companies (AMCs) as a firewall between loan officers and appraisers

Data

- Appraisals collected by GSEs from 2013 to 2015
  - Sample represents a large universe of full appraisals by licensed or certified residential appraisers in all 50 states
  - Appraisal data is linked to loan application data, mortgage origination and performance data
- Mortgage dataset is a subset of loan application dataset
  - We define a loan to be in default if the borrower misses 2 or more payments
  - Borrowers can prepay the existing mortgage with refinancing
- To measure regional economic outcomes, we utilize data from Corelogic and Census
  - county and quarter-level data on home price, employment and income

Distribution of % of bunching, at appraiser level

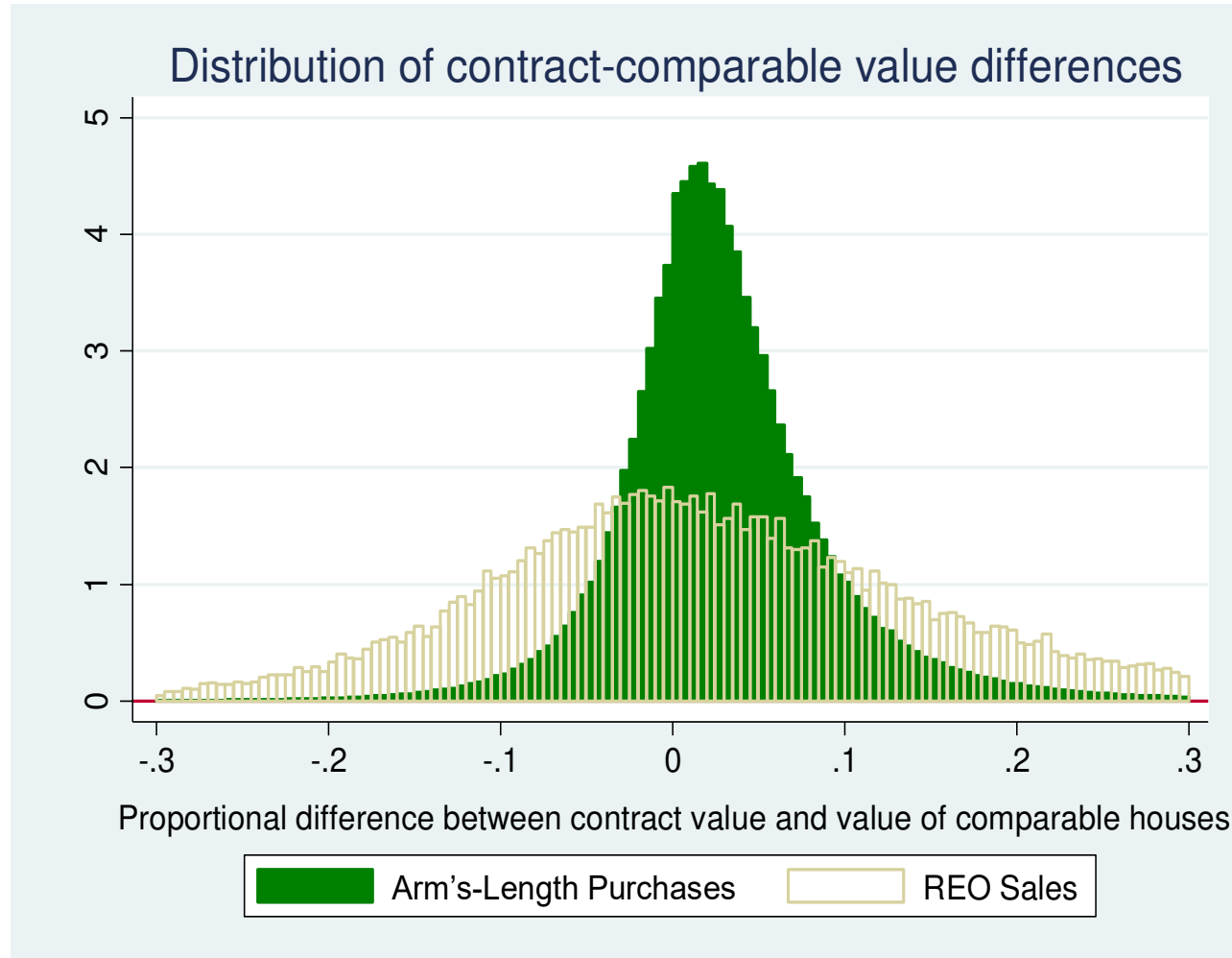Distribution of appraisers' proportion of bunching
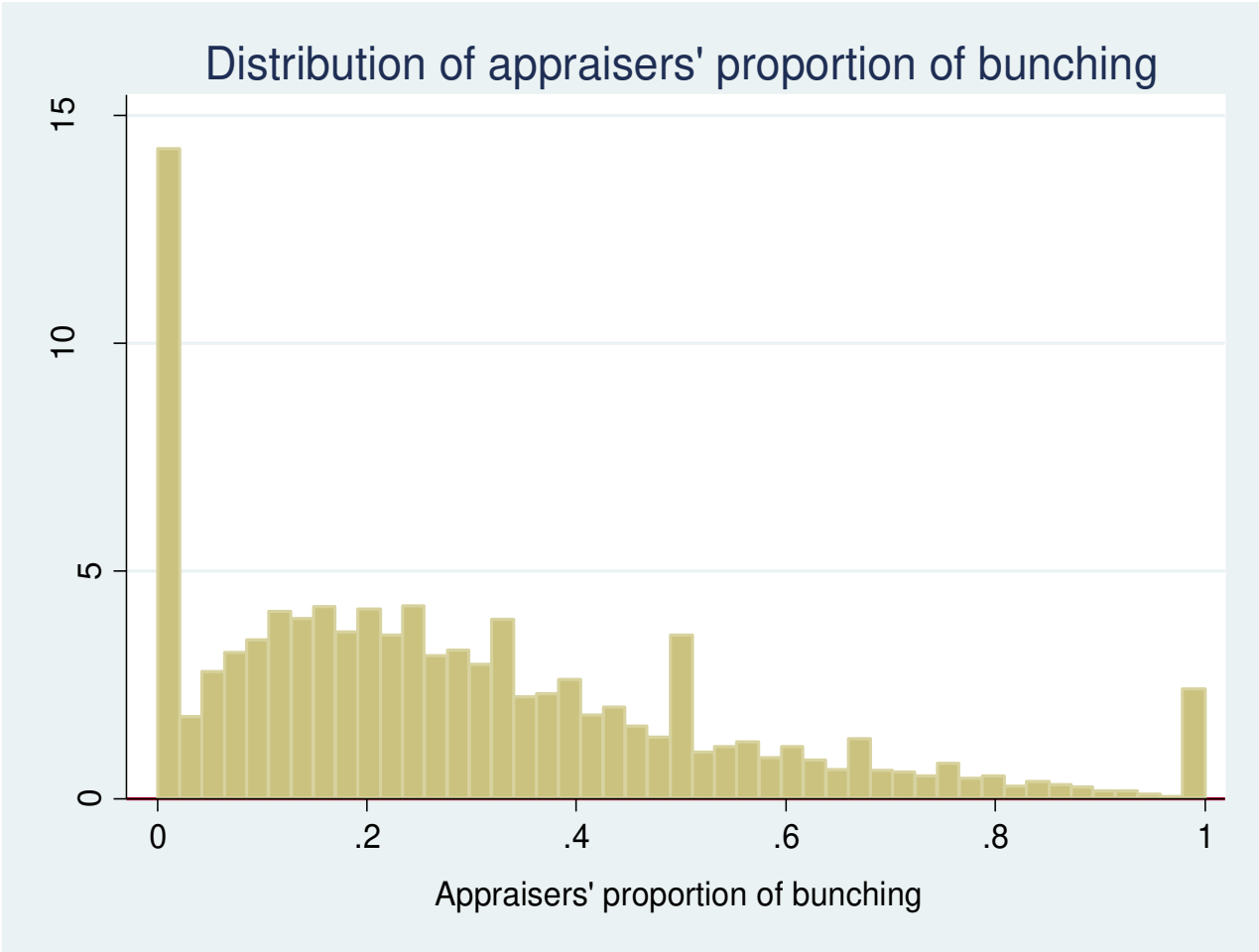
Only 14.5% of appraisers have never bunched before. 2.5% of appraisers bunch all their appraisals.

How do appraisers conduct appraisals?

- Comparable sales approach is the most commonly-used approach in residential appraising

- At least 3 comparable transactions required

- Appraisers are to adjust comparables' prices based on differences with the subject

- Assign implicit weight to each comparable and take a weighted average

How do appraisers rationalize bunching?

Distribution of contract-comparable value differences

Proportional difference between contract value and value of comparable houses

Legend: Arm's-Length Purchases — REO Sales

When contract value is available for reference, appraisers select more comps whose prices best match the contract value

Why are appraisers bunching?

- Reputational concern
  - hope to receive future business

- Moral hazard
  - principle agent problem, bunching requires less effort

- Contract price reflects true value

- Altruism:
  - do lenders or homeowners a favor

Why are appraisers bunching?

To explore the past behavior of appraisers making bunched appraisals, we use the following regression specification based on appraiser-lender level data:

$$NumBunch_{a,l,t}$$
$$= \alpha_a + \lambda_l + \gamma_i + \mu_t + \beta_1 NumAppr_{a,l,t} + \beta_2 NumAppr_{a,l,t-1} + \beta_3 NumBunch_{a,l,t-1} + \varepsilon_{a,l,t}$$

- $NumBunch_{a,l,t}$ is the appraiser-lender pair's number of bunched appraisals in a month
- α_a are appraiser fixed effects
- λ_l are lender fixed effects
- γ_i are county fixed effects
- μ_t are month fixed effects
- $NumAppr_{a,l,t}$ is the appraiser-lender pair's number of appraisals in a month
- $NumAppr_{a,l,t-1}$ is the appraiser-lender pair's number of appraisals in the previous month
- $NumBunch_{a,l,t-1}$ is the appraiser-lender pair's number of bunched appraisals in the previous month

Why are appraisers bunching?

Dep. Var.	Monthly No of At-Contract Appraisals				
	Appraiser-Lender Pairs				
	(1)	(2)	(3)	(4)	(5)
No of Appraisals in Prev. Month	0.0955***	0.0957***	-0.0369***	0.0786***	0.0970***
	(0.0020)	(0.0020)	(0.0043)	(0.0017)	(0.0021)
x Exiting Appraisers		-0.1081***			
		(0.0106)			
x Top Performers			0.1862***		
			(0.0050)		
x Near Capacity				0.0489***	
				(0.0041)	
x Captive Appraisers w/ majority lender					-0.0251*
					(0.0128)
x Captive Appraisers w/ minority lender					-0.1540***
					(0.0546)
Exiting Appraisers		0.1466***			
		(0.0155)			
Top Performers			-0.3096***		
			(0.0122)		
Near Capacity				-0.2780***	
				(0.0148)	
Captive Appraisers w/ majority lender					0.2553***
					(0.0326)
Captive Appraisers w/ minority lender					-0.1892***
					(0.0711)
No of At-Conrtact Appraisals in Prev. Month	0.0777***	0.0778***	0.2495***	0.0797***	0.0776***
	(0.0052)	(0.0052)	(0.0080)	(0.0052)	(0.0052)
No of Appraisals in Curr. Month	0.0441***	0.0441***	0.0305***	0.0466***	0.0445***
	(0.0019)	(0.0019)	(0.0021)	(0.0020)	(0.0019)
Appraiser FE	Yes	Yes	No	Yes	No
Lender FE	Yes	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes	Yes
YYMM FE	Yes	Yes	Yes	Yes	Yes
Observations	1572655	1572655	1575366	1454401	1534106
Adjusted R-squared	0.315	0.315	0.629	0.320	0.318

Why are appraisers bunching?

- Appraisers are making more bunched appraisals to increase their business volume or keep their reputation from the previous month

- Heterogeneous effects support reputation concern
  - Before quitting their jobs, appraisers' bunching behaviour do not respond to the number of appraisals from previous month.
  - For top performers and near capacity appraisers, the relationship between bunching and previous business volume is stronger.

Why are appraisers bunching?

Future business

Dep. Var.	Monthly No of Appraisals	
	Appraiser-Lender Pairs	
	(1)	(2)
No of At-Contract Appraisals in Prev. Month	0.0044	
	(0.0063)	
No of Below-Contract Appraisals in Prev. Month	-0.0363***	
	(0.0061)	
Pct of At-Contract Appraisals in Prev. Month		0.0000
		(0.0023)
Pct of Below-Contract Appraisals in Prev. Month		-0.0192***
		(0.0047)
No of Appraisals in Prev. Month	0.4145***	0.4134***
	(0.0064)	(0.0058)
Appraiser FE	Yes	Yes
Lender FE	Yes	Yes
County FE	Yes	Yes
YYMM FE	Yes	Yes
Observations	1572651	1572651
Adjusted R-squared	0.404	0.404

Why are appraisers bunching?

- No significant relationship between number/percentage of bunched appraisals in previous month and current business
- Negatively significant relationship between number/percentage of below-contract appraisals in previous month and current business
  - Appraisers are punished for hindering deals, but not rewarded for bunching
- Support reputation concern

Long term relationship: new appraiser-lender pairs
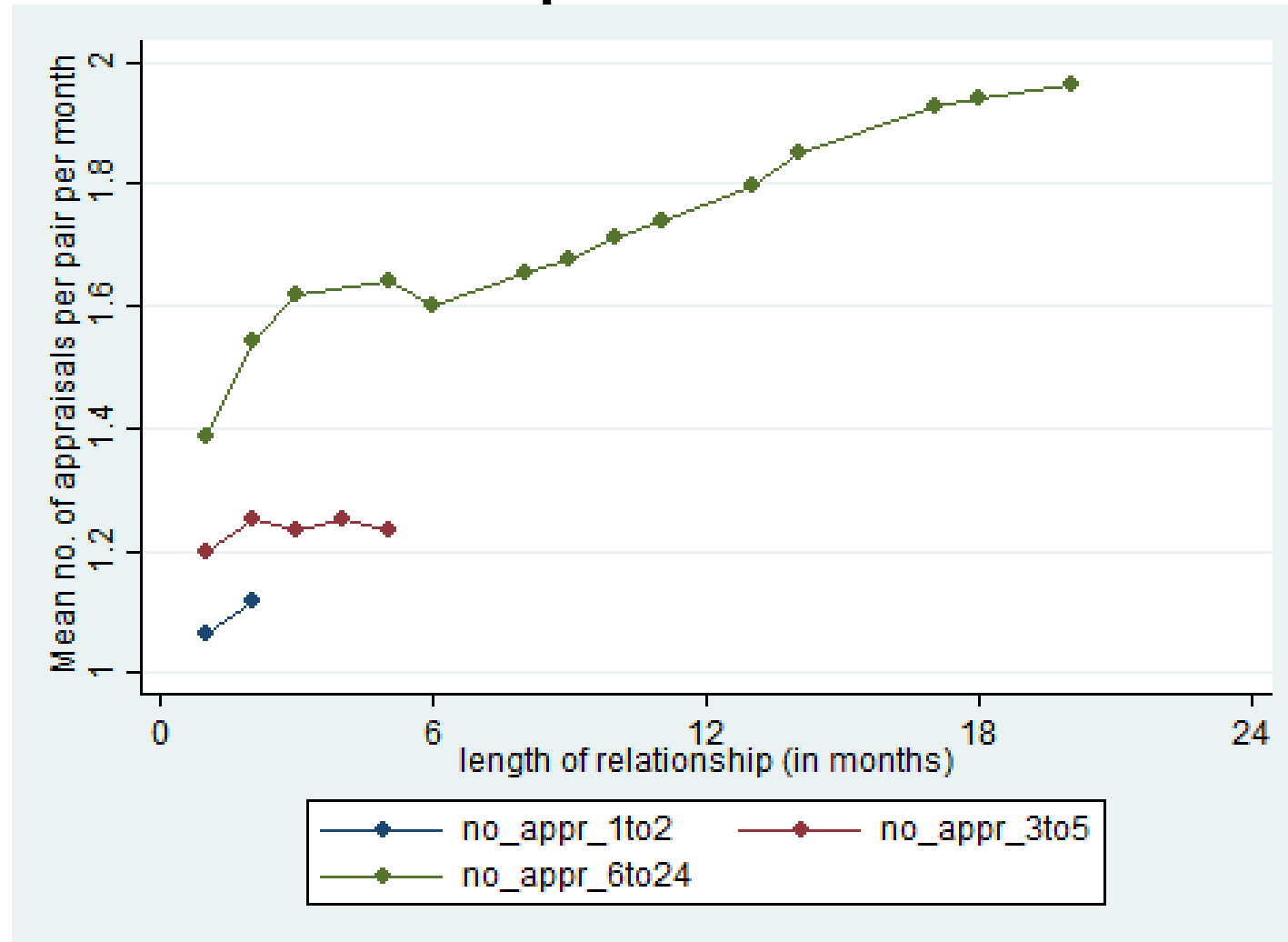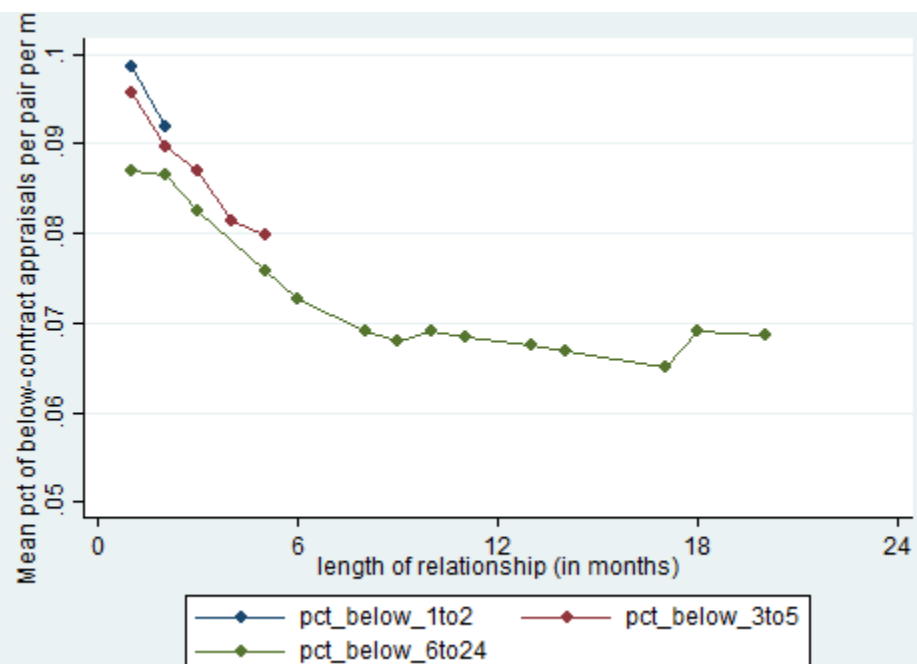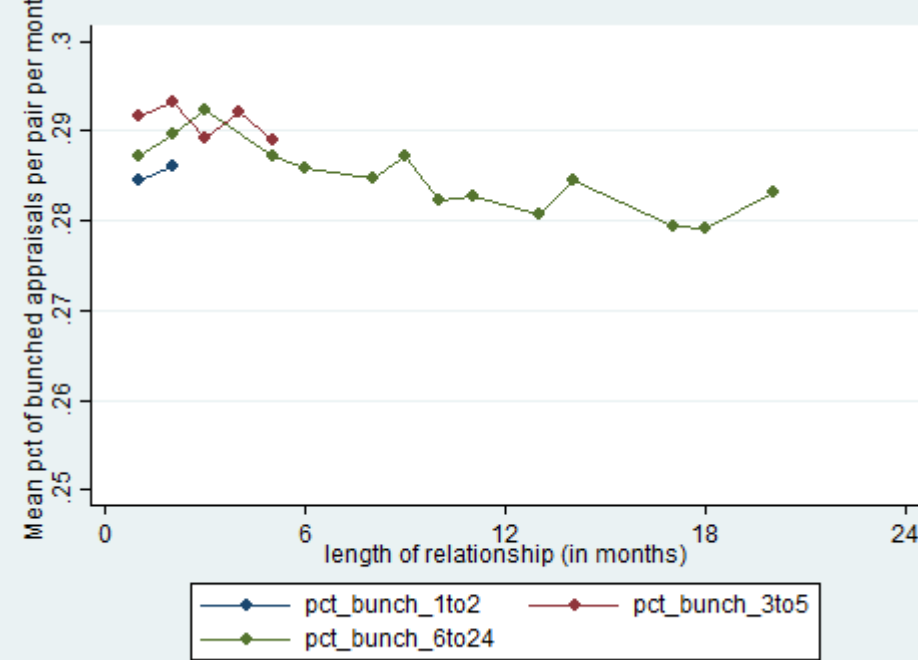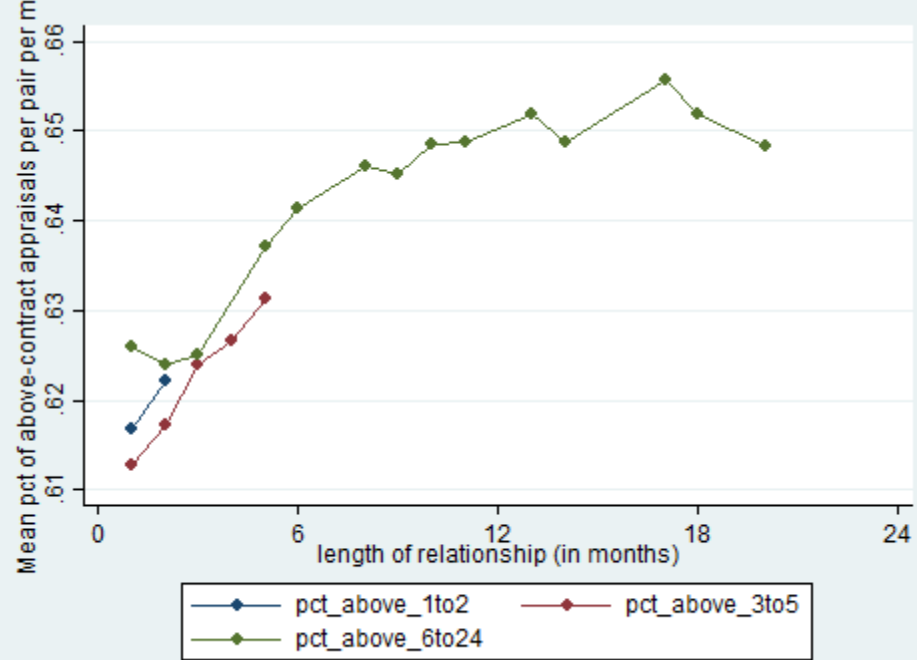
Lender punishment
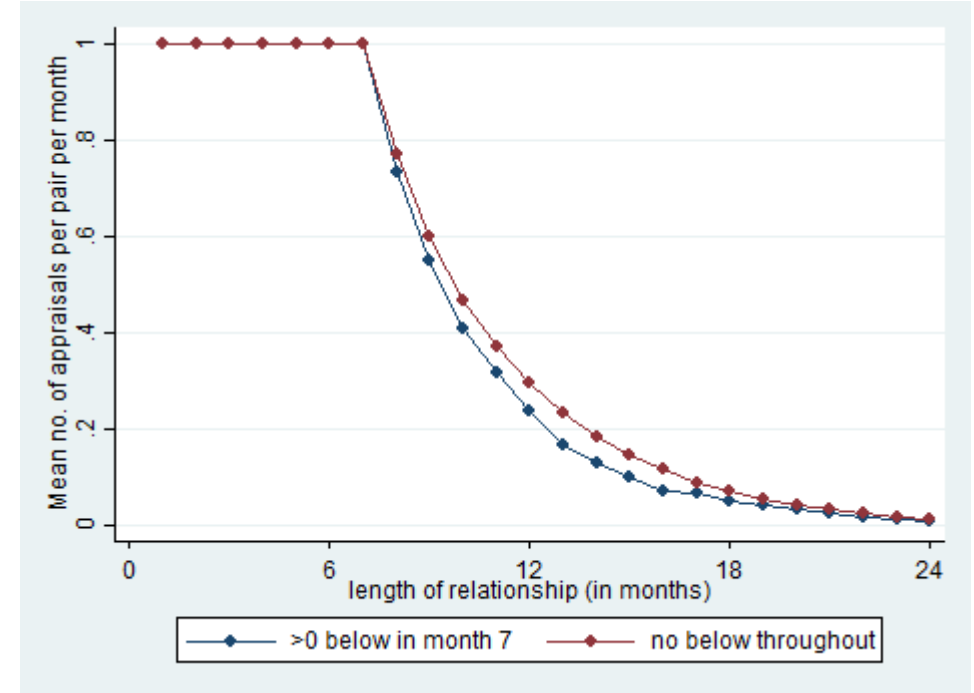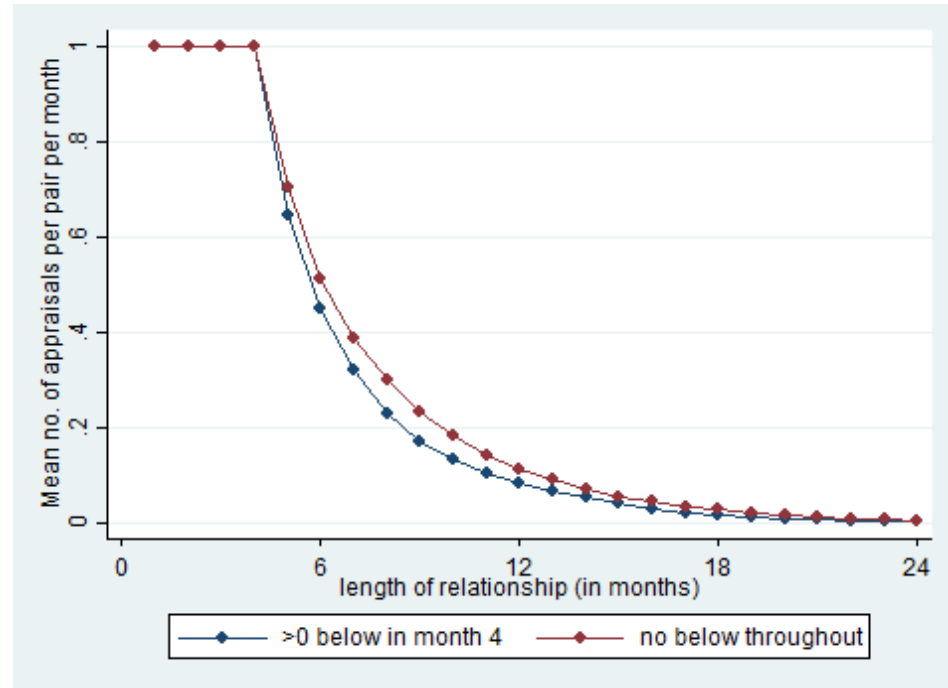
Long term relationship

- The percent of above-contract appraisals is increasing with the length of relationship.
  - Above-contract appraisals can help to gain long term relationship
  - Long relationship reinforce the reputation effects.
- The percent of below-contract appraisals is decreasing with the length of relationship
  - Below-contract appraisals might destroy long term relationship
  - Long relationship reduce the incidence of non cooperation
- Lenders punish appraisers with below-contract price appraisals with less appraisals and lower probability of continuing business

Why are appraisers bunching?

Market competition

Dep. Var.	D(At-Contract Appraisals)		
	(1)	(2)	(3)
HHI (county level)	-0.0284***		
	(0.0072)		
HHI (zip code level)		-0.1119***	
		(0.0234)	
HHI (lender level)			-0.0116***
			(0.0038)
Property Attributes	Yes	Yes	Yes
Appraiser FE	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes
County FE	Yes	Yes	Yes
YYMM FE	Yes	Yes	Yes
Observations	3625058	3625058	3625146
Adjusted R-squared	0.164	0.164	0.164

- Increased market competition increases the incidence of bunching
- Implication: increase market power for appraisers increase appraisal quality
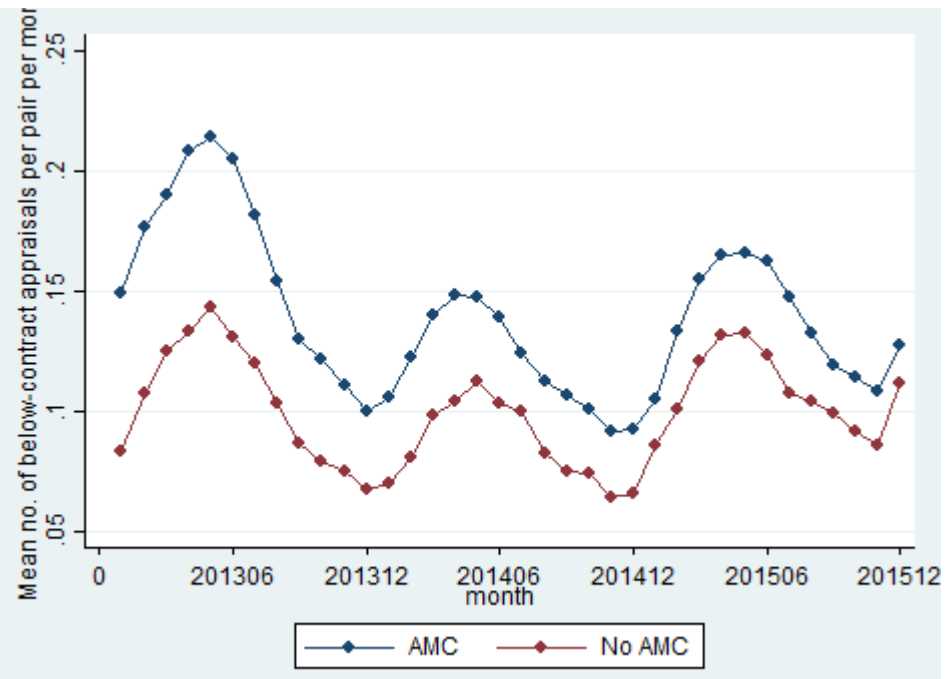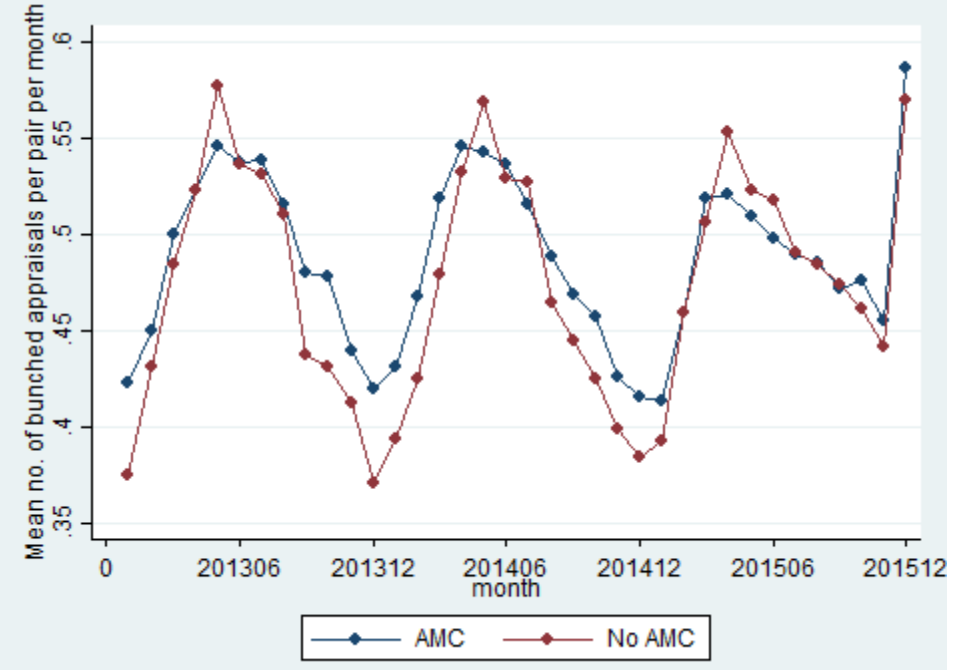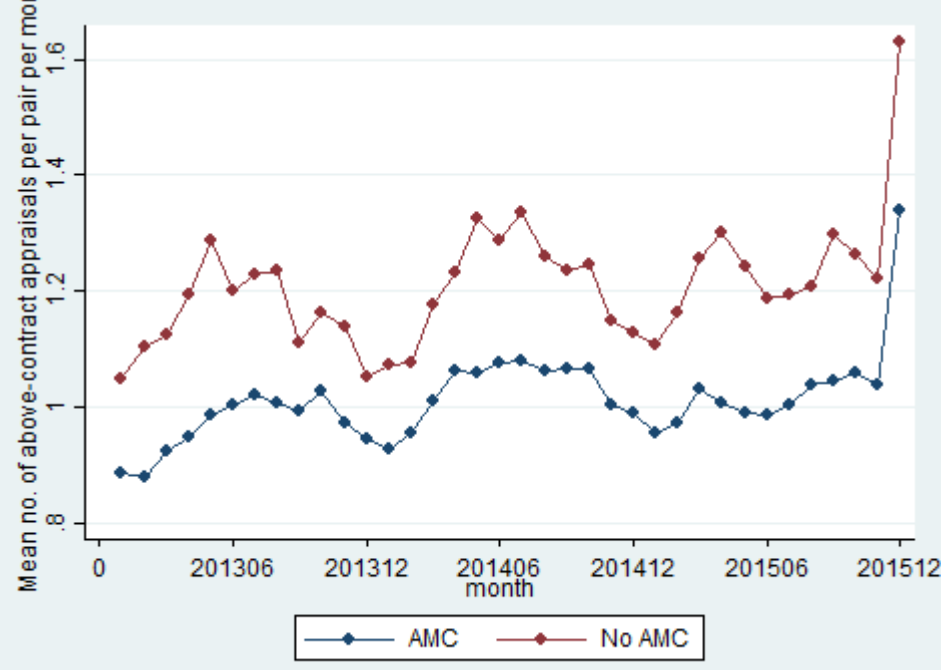
Why are appraisers bunching?

Role of AMCs

Dep. Var.	D(At-Contract Appraisals)		D(Above-Contract Appraisals)		No. of At-Contract Appraisals	
Sample	At-Contract vs Below-Contract		Above-contract vs Below-contract		All	
	Appraisal Level				Appraiser-Lender Pairs	
	(1)	(2)	(3)	(4)	(5)	(6)
AMC	-0.0113***		-0.0068***		-0.0618***	
	(0.0020)		(0.0010)		(0.0037)	
Non-Captive AMC		-0.0065***		-0.0037***		-0.0383***
		(0.0016)		(0.0008)		(0.0094)
Captive AMCs w/ Majority Lender		-0.0017		-0.0050***		-0.0039
		(0.0029)		(0.0018)		(0.0154)
Captive AMCs w/ Minority Lender		-0.0184**		-0.0112**		-0.0243
		(0.0090)		(0.0050)		(0.0220)
No of Appraisals in Prev. Month						0.0896***
						(0.0041)
x Non-Captive AMC						0.0077
						(0.0051)
x Captive AMCs w/ Majority Lender						0.0186**
						(0.0091)
x Captive AMCs w/ Minority Lender						-0.0350**
						(0.0140)
No of At-Conrtact Appraisals in Prev. Month						0.0773***
						(0.0056)
No of Appraisals in Curr. Month						0.0441***
						(0.0019)
Appraiser FE	Yes	Yes	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes	Yes	Yes
YYMM FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1179745	1291677	2290648	2521971	1934186	1572648
Adjusted R-squared	0.194	0.193	0.157	0.156	0.237	0.316

Why are appraisers bunching?

- Engagement of AMCs reduces bunching
  - AMCs have quality controls in place
  - Implication: breakdown of long term relationship improve appraisals quality
- Captive AMCs bunch more for their most-important clients, and also bunch more than non-captive AMCs
- Engagement of AMCs reduces incidence of above-contract appraisals
- AMCs diminish the relation between business volume in the prior month and this month's number of at-contract appraisals

Why are appraisers bunching?

- For new appraiser-lender pairs:
- Engagement of AMCs decreases above-contract price appraisals
- Engagement of AMCs increases below-contract price appraisals

- Implication: breakdown of long term relationship improve appraisals quality

Moral Hazard

- Negative relationship between number of comps used and bunching

- Appraisers spend less time completing at-contract appraisals compared to below-contract appraisals

- Supports moral hazard

Dep. Var.	D(At-Contract Appraisals)		D(Above-Contract Appraisals)	
Sample	At-Contract vs Below-Contract		Above-Contract vs Below-Contract	
	(1)	(2)	(3)	(4)
No of Comps	-0.0449***		-0.0391***	
	(0.0009)		(0.0009)	
Difference in Time (in Quarters)	-0.0103***		-0.0082***	
	(0.0008)		(0.0005)	
Ln(Proximity)	-0.0003		0.0025***	
	(0.0007)		(0.0007)	
Difference in Ln(GLA)	-0.0041*		-0.0335***	
	(0.0024)		(0.0032)	
Difference in Ln(Lot)	-0.0120***		-0.0074***	
	(0.0009)		(0.0009)	
Difference in Age	-0.0003***		-0.0003***	
	(0.0000)		(0.0000)	
Difference in Condition	0.0353***		0.0288***	
	(0.0021)		(0.0021)	
Ln(Time from Contract to Appraisal)		-0.0109***		0.0032***
		(0.0010)		(0.0008)
Ln(Lender Size)		0.0058***		0.0023***
		(0.0012)		(0.0008)
Appraiser FE	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes
YYMM FE	Yes	Yes	Yes	Yes
Observations	1290505	1244540	2517407	2459538

Contract price reflects true value?
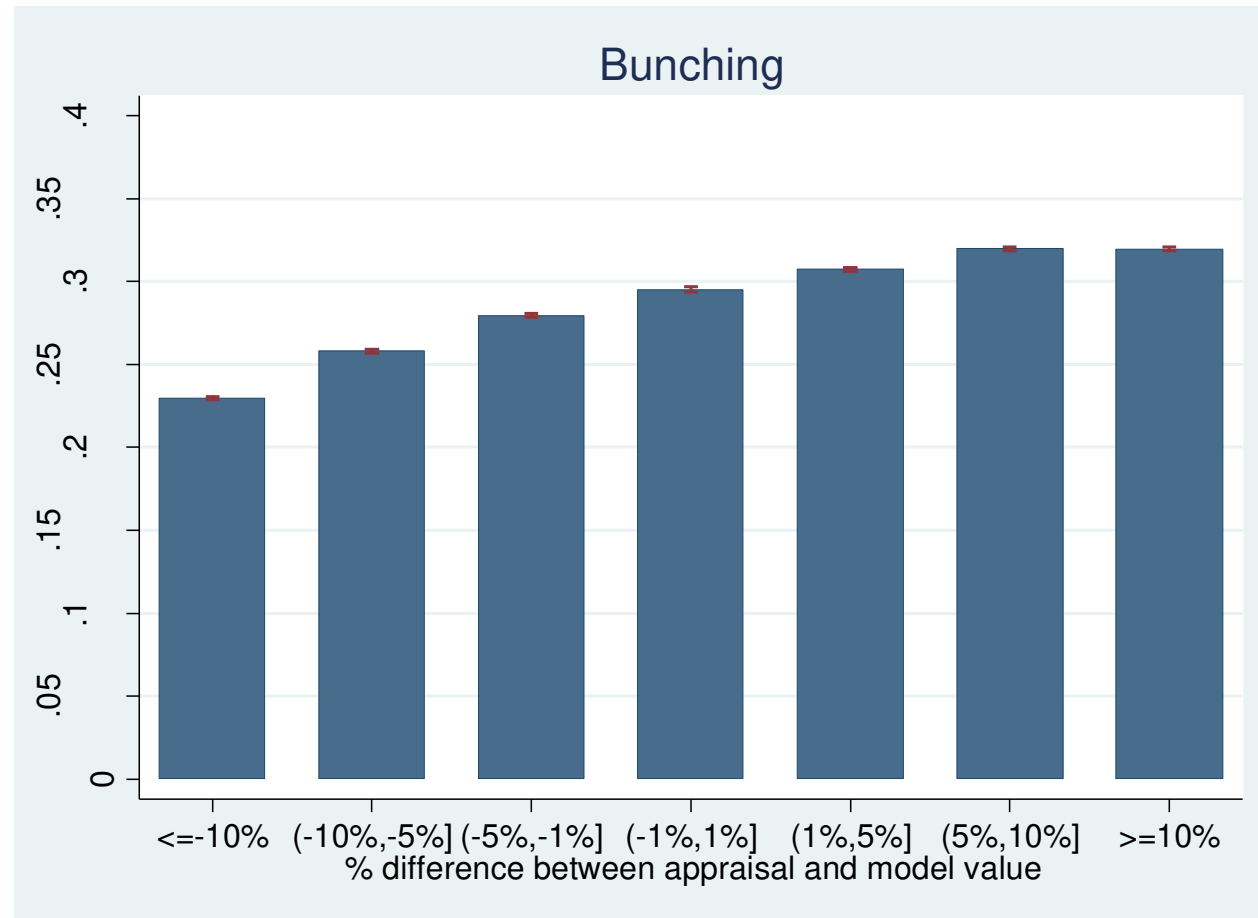
Bunching

- Bunching is not due to small error-contract price is close to model price
- More bunching if housing is over valued

What are the consequences of bunching?

Dep. Var.	Approval x 100		Default x 100		Prepay x 100	
	(1)	(2)	(3)	(4)	(5)	(6)
Above-Contract Appraisals	1.4792***	-0.1640	-0.0126	0.1742	0.9874***	8.6438*
	(0.1061)	(0.1148)	(0.0274)	(0.3710)	(0.2036)	(4.7931)
x Last_LTV >= 90		3.6393***				
		(0.2330)				
x Last_FICO < 660		1.8283***				
		(0.5536)				
x Ch. in Interest Rate				0.0005		0.0190
				(0.0009)		(0.0117)
At-Contract Appraisals	1.5660***	-0.1182	-0.0145	-0.1554	0.0734	-9.170***
	(0.1051)	(0.1096)	(0.0267)	(0.3682)	(0.2028)	(2.6331)
x Last_LTV >= 90		3.9839***				
		(0.2400)				
x Last_FICO < 660		2.5275***				
		(0.5720)				
x Ch. in Interest Rate				-0.0003		-0.0229***
				(0.0009)		(0.0066)
Property Attributes	Yes	Yes	Yes	Yes	Yes	Yes
Appraiser FE	Yes	Yes	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes	Yes	Yes
YYMM FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1603081	1603081	871526	871526	871526	871526
Adjusted R-squared	0.070	0.073	0.007	0.007	0.119	0.119

What are the consequences of bunching?

Macro outcomes

Dep. Var.	100 x Log (HPI) (1)	100 x Log (Employment) (2)	100 x Log (Income) (3)
No of At-Contract Appraisals	1.7095***	-0.0118	-1.4930***
	(0.3042)	(0.0692)	(0.1643)
No of Below-Contract Appraisals	-0.5799**	-0.6752***	-0.4873*
	(0.2821)	(0.1434)	(0.2735)
County FE	Yes	Yes	Yes
YYQQ FE	Yes	Yes	Yes
Observations	15057	10094	10094
Adjusted R-squared	0.955	1.000	0.999

What are the consequences of bunching?

- Bunched appraisals do facilitate housing price recoveries, while below-contract appraisals are detrimental
- Below-contract appraisals are detrimental to employment
- Below-contract appraisals are detrimental to income
- Bunched appraisals are detrimental to income (compared to above-contract appraisals)
  - Magnitude of effect is 3 times larger than that of below-contract appraisals

Conclusion

- 31% of appraisals in the US bunch at the contract value
- Bunching is driven by reputational concern and moral hazard, but not altruism
- Lenders punish appraisers with below-contract price appraisals by reducing business volume and terminating of relationship
- Consequences:
  - Bunching helps constrained borrowers get their loans approved
  - Bunching is correlated with higher housing price growth
- Implications
  - Independent examiners should have larger market power
  - Independent examiners should be assigned anonymously or randomly to achieve one shot transaction

Question and Answer

Thanks
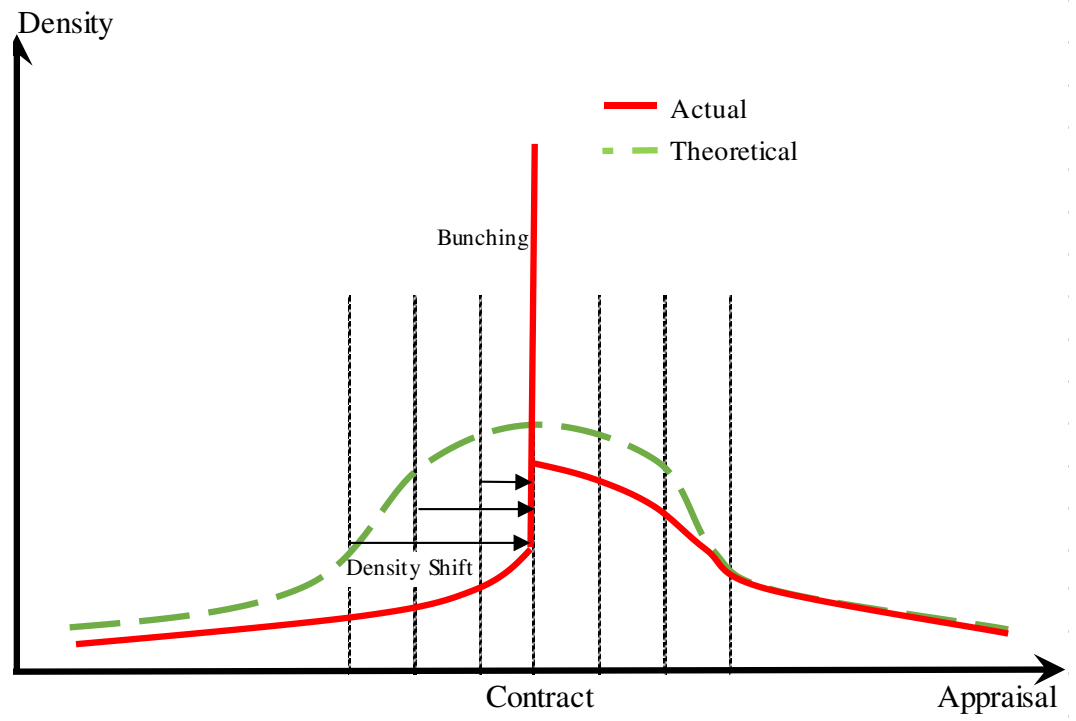
Density

Actual
Theoretical

Bunching

Density Shift

Contract

Appraisal

How do appraisers conduct appraisals?

- Comparable sales approach is the most commonly-used approach in residential appraising

- At least 3 comparable transactions required

- Appraisers are to adjust comparables' prices based on differences with the subject

- Assign implicit weight to each comparable and take a weighted average

How do appraisers rationalize bunching?

Distribution of contract-comparable value differences

Proportional difference between contract value and value of comparable houses

Arm's-Length Purchases   REO Sales

When contract value is available for reference, appraisers select more comps whose prices best match the contract value

How do appraisers rationalize bunching?

To explore the ways in which appraisers rationalize bunching, we use the following regression specification:

$$Bunch_i = \alpha_i + \lambda_i + \gamma_i + \mu_t + \beta_1 Characteristics_{s,i,t} + \varepsilon_i$$

- $Bunch_i$ is an indicator for bunched appraisal
- α_i are appraiser fixed effects
- λ_i are lender fixed effects
- γ_i are county fixed effects
- μ_t are month fixed effects
- $Characteristics_{s,i,t}$ is a full set of neighborhood and structural characteristics that define property value in typical hedonic equations (s can be subject, comp or contract)

How do appraisers rationalize bunching?

Characteristic of subject properties

Dep. Var.	At-Contract Appraisals		Above-Contract Appraisals	
Sample	At-Contract vs Below-Contract		Above-Contract vs Below-Contract	
	(1)	(2)	(3)	(4)
Ln(Contract Price)	-0.0191***		-0.0027	
	(0.0021)		(0.0025)	
Ln(GLA)		0.0319***		0.0557***
		(0.0027)		(0.0036)
Ln(Lot)		-0.0004		0.0027***
		(0.0007)		(0.0006)
Ln(Property Age)		0.0069***		0.0087***
		(0.0010)		(0.0010)
Ln(No of Bedrooms)		0.0234***		0.0111***
		(0.0039)		(0.0038)
Ln(No of Bathrooms)		-0.0056***		0.0001
		(0.0019)		(0.0014)
Ln(Condition)		0.0532***		0.0320***
		(0.0039)		(0.0038)
Ln(Quality)		0.0062*		0.0204***
		(0.0036)		(0.0024)
County HP Growth in Prior 3 Months	-0.0237*		-0.0158	
	(0.0127)		(0.0106)	
County Housing Turnover	3.3109**		1.6472*	
	(1.3571)		(0.9470)	
Appraiser FE	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes
YYMM FE	Yes	Yes	Yes	Yes
Observations	1170858	1146355	2185681	2043312
Adjusted R-squared	0.191	0.193	0.152	0.161

How do appraisers rationalize bunching?

- Negative relationship between contract price and bunching
  - Partially explained by the fact that expensive houses are less liquid and hence have fewer comps available to rationalize bunching
- Large houses with more living space and bedrooms and those in good condition and of high quality are more likely to see at-contract appraisals, while new constructions are less likely to be appraised exactly at the contract value
  - Houses in good conditions and of high quality are also in high demand, hence bunching can be rationalized with a wide array of comp values
- Markets with higher turnover see more bunched appraisals

How do appraisers rationalize bunching?

Selection of comparables and adjustments

Dep. Var.	At-Contract Appraisals		Above-Contract Appraisals	
Sample	At-Contract vs Below-Contract		Above-Contract vs Below-Contract	
	(1)	(2)	(3)	(4)
No of Comps	-0.0449***		-0.0391***	
	(0.0009)		(0.0009)	
Difference in Time (in Quarters)	-0.0103***		-0.0082***	
	(0.0008)		(0.0005)	
Ln(Proximity)	-0.0003		0.0025***	
	(0.0007)		(0.0007)	
Difference in Ln(GLA)	-0.0041*		-0.0335***	
	(0.0024)		(0.0032)	
Difference in Ln(Lot)	-0.0120***		-0.0074***	
	(0.0009)		(0.0009)	
Difference in Age	-0.0003***		-0.0003***	
	(0.0000)		(0.0000)	
Difference in Condition	0.0353***		0.0288***	
	(0.0021)		(0.0021)	
Ln(Total Adjustments)		-0.0140***		0.0056***
		(0.0024)		(0.0020)
Ln(Adjustments for Time)		-0.0038*		0.0016
		(0.0023)		(0.0021)

How do appraisers rationalize bunching?

- Negative relationship between number of comps used and bunching
  - Supports moral hazard
- Comps used in bunched appraisals are less distant in time from time of appraisal
- Comps used in bunched appraisals are less different from the subject in living area, lot size and age
  - But they are more different from the subject in conditions
- Appraisers make significantly fewer adjustments in bunched appraisals

Altruism?

Dep. Var.	Monthly No of At-Contract Appraisals				
	Appraiser-Lender Pairs				
	(1)	(2)	(3)	(4)	(5)
No of Appraisals in Prev. Month	0.0955*** (0.0020)	0.0957*** (0.0020)	-0.0369*** (0.0043)	0.0786*** (0.0017)	0.0970*** (0.0021)
x Exiting Appraisers		-0.1081*** (0.0106)			
x Top Performers			0.1862*** (0.0050)		
x Near Capacity				0.0489*** (0.0041)	
x Captive Appraisers w/ majority lender					-0.0251* (0.0128)
x Captive Appraisers w/ minority lender					-0.1540*** (0.0546)
Exiting Appraisers		0.1466*** (0.0155)			
Top Performers			-0.3096*** (0.0122)		
Near Capacity				-0.2780*** (0.0148)	
Captive Appraisers w/ majority lender					0.2553*** (0.0326)
Captive Appraisers w/ minority lender					-0.1892*** (0.0711)
No of At-Conrtact Appraisals in Prev. Month	0.0777*** (0.0052)	0.0778*** (0.0052)	0.2495*** (0.0080)	0.0797*** (0.0052)	0.0776*** (0.0052)
No of Appraisals in Curr. Month	0.0441*** (0.0019)	0.0441*** (0.0019)	0.0305*** (0.0021)	0.0466*** (0.0020)	0.0445*** (0.0019)
Appraiser FE	Yes	Yes	No	Yes	No
Lender FE	Yes	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes	Yes
YYMM FE	Yes	Yes	Yes	Yes	Yes
Observations	1572655	1572655	1575366	1454401	1534106
Adjusted R-squared	0.315	0.315	0.629	0.320	0.318

- Before quitting their jobs, appraisers' bunching behaviour do not respond to the number of appraisals from previous month.
- Support reputation concern, but not altruism

Why are appraisers bunching?

Highly-motivated homebuyers

Dep. Var.	Bunch = 1		
	(1)	(2)	(3)
LTV = 80	0.0078***		
	(0.0030)		
LTV = 80.1-84.9	0.0123***		
	(0.0042)		
LTV = 85.0-89.9	0.0161***		
	(0.0032)		
LTV = 90-95	0.0165***		
	(0.0032)		
First Loan Application:		0.0012	
Approve for GSE Securitization		(0.0023)	
First Loan Application:		0.0002	
Approve for Non-GSE Securitization		(0.0024)	
Last Loan Application:			0.0271***
Approve for GSE Securitization			(0.0042)
Last Loan Application:			0.0187***
Approve for Non-GSE Securitization			(0.0046)
p-value (GSE = Non-GSE)		0.3066	0.0000***
Appraiser FE	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes
County FE	Yes	Yes	Yes
YYMM FE	Yes	Yes	Yes
Observations	758423	1603081	1603081
Adjusted R-squared	0.167	0.165	0.165

Why are appraisers bunching?

- Incidence of bunching increases with LTV
- Coefficients on underwriting outcomes of first submission are not statistically significant
  - This is expected since contract value instead of appraisal value is used in calculating the LTV in the first submission
- Coefficients on underwriting outcome of last submission are positive and statistically significant
  - Getting the loan approved is a factor influencing bunching