Determinants of Mortgage Refinancing

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Disclaimer: These views are my own, and not those of the Philadelphia Fed, nor the Federal Reserve System

Introduction

- What can we say about mortgage refinancing: what does it look like today, and how it has changed over time?
- Why do we care?
  - Policy implications
  - Estimate Regulator's Risk
  - Valuation of MBS

- It isn’t that easy to identify refis.
  - Standard mortgage datasets do not specify exactly why a mortgage terminated, particularly when the borrower is current

- Previous studies have focused on:
  - New mortgages - identified as refis in mortgage dataset
    - E.g., Furlong and Takhtamanova (2012)
      - Study determinants of FRM vs ARM choice, comparing purchase loans to refis
      - But can’t say anything about what the old mortgage looked like (in particular, interest rate)

– Terminations of existing mortgages

- Examples:
  - Deng, Quigley and Van Order (2000): test option-theoretic model of mortgage default and prepayment
  - Krainer and Laderman (2011): look at how characteristics of how defaults and prepayments changed from 2001-2010
  - Goodstein (2011): documents differences in prepayments trends between LMI and non-LMI households
- All of these papers can only classify good vs. bad terminations (prepayment vs. default)
- Can’t distinguish between refinancing and moving, in particular.

- This may be important.
  - For example, the distinction between whether low house prices make refinancing more difficult, vs. impeding migration (Fernando Ferreira, Joseph Gyourko, and Joseph Tracy, 2010), could have important policy implications.
  - Similarly, in evaluating policies such as HARP 2.0 that are designed to encourage refinancing

This Paper

- We match credit bureau and mortgage data
  – Allows us to distinguish refinancing, from moving, from other mortgage payoff
    - Use information on addresses and new mortgage trades in bureau data
  – Can get some information on the new accounts
  – Gain insight from other credit accounts on refinancing behavior

Data

- Match LPS Mortgage Dataset with Federal Reserve Bank of New York/Equifax Consumer Credit Panel
  - LPS: take first mortgages originated from 2003-2007
    - Approximately 2/3 of all originations
  - Equifax Consumer Credit Panel
    - 5% percent random sample of consumer credit bureau files (since 1999); augmented with household members
    - Includes mortgage tradeline-level information (important), along with individual-level “rollups” (e.g. aggregate bankcard utilization rate)
  - Match on origination characteristics (date, balance)
  - 3.9 million loans uniquely matched
  - Used by Elul et al (2010) to study relative contributions of equity and liquidity in mortgage default decision

Identifying Refis

- For those loans that terminate, call this loan a *refi* if:
  - New mortgage opened shortly afterwards (in Equifax)
  - (Scrambled) address (in Equifax) does not change in the year following the termination date
  - 1.6m terminations through March 2012. 35% of these are refis.

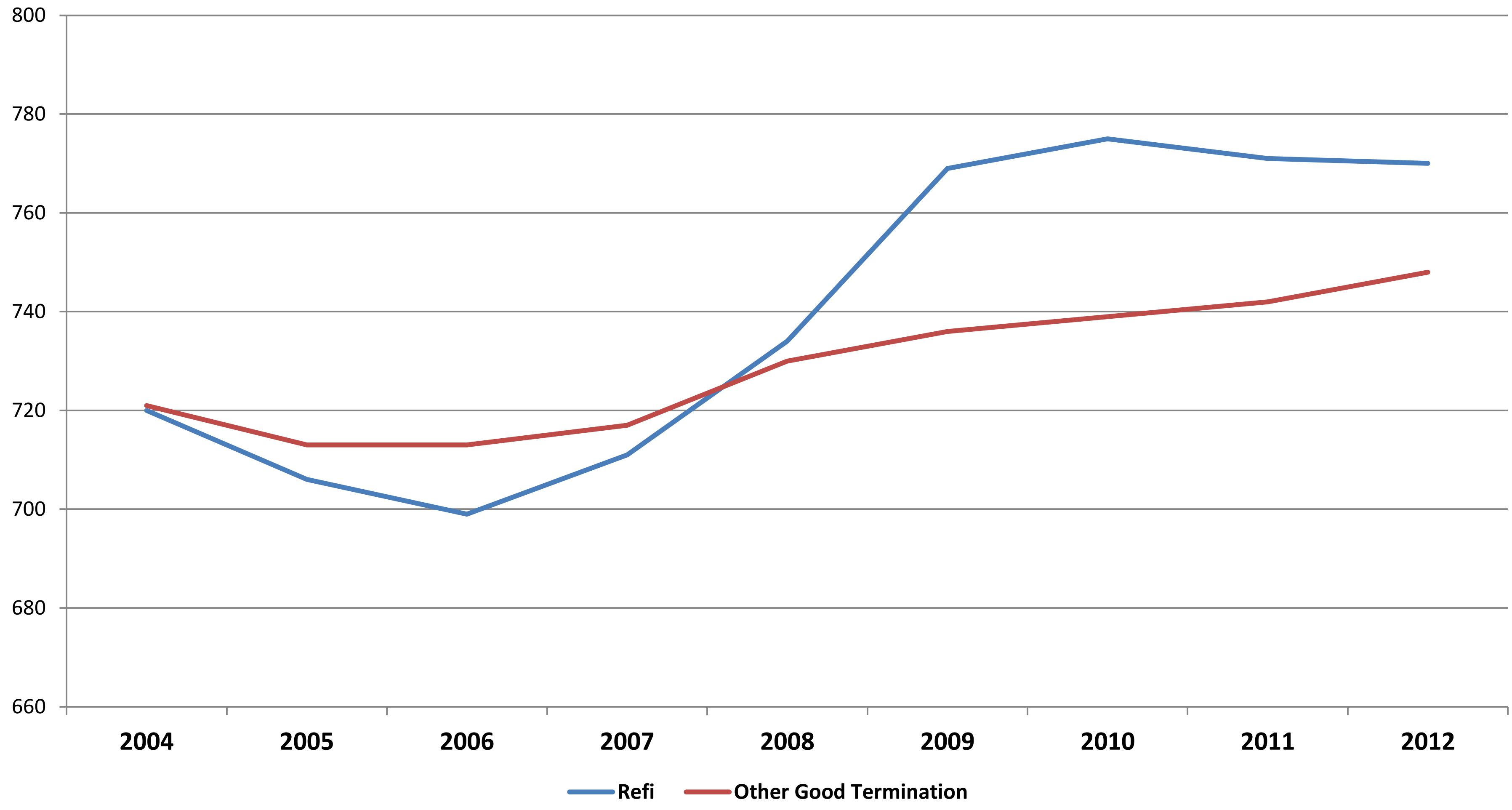
– Similar approach used by Haughwout et al (2011)
– Back-tested algorithm against origination data in LPS: identify approx. 80% of all refis

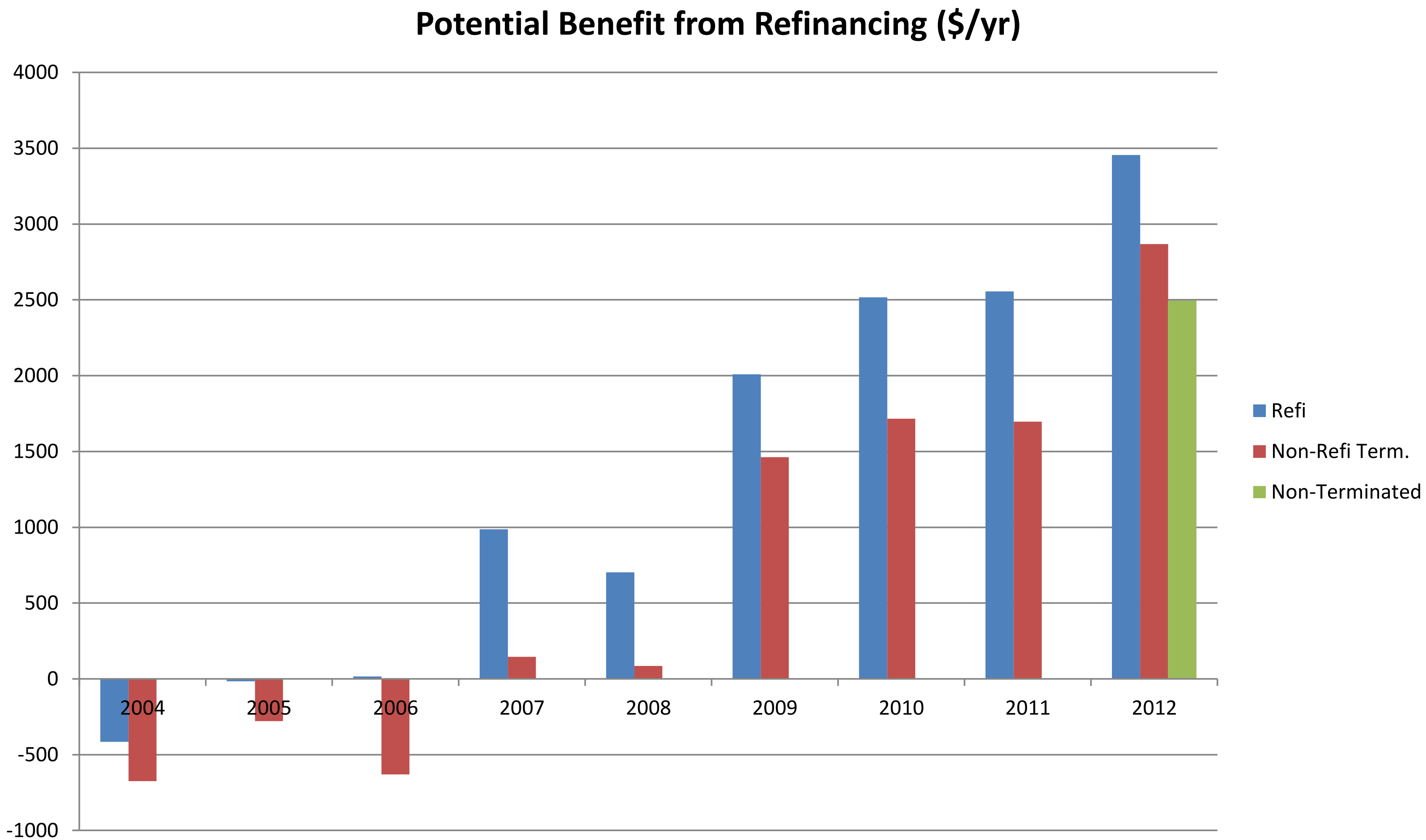
– Dataset used by Bond et al (2012), to study the effect of state laws governing the seniority of refinancing loans in the presence of second mortgages

What Do We Gain?

- To see the value of distinguishing refis, compare the Equifax riskscore of refis with other good mortgage terminations
  - Those who refinance have lower scores pre-2007, and higher scores afterwards
- Also, refis have a larger “benefit” than non-refis, and non-terminated loans
  - “Benefit” defined as balance×(current rate – 30 yr PMMS)

Riskscore at Termination



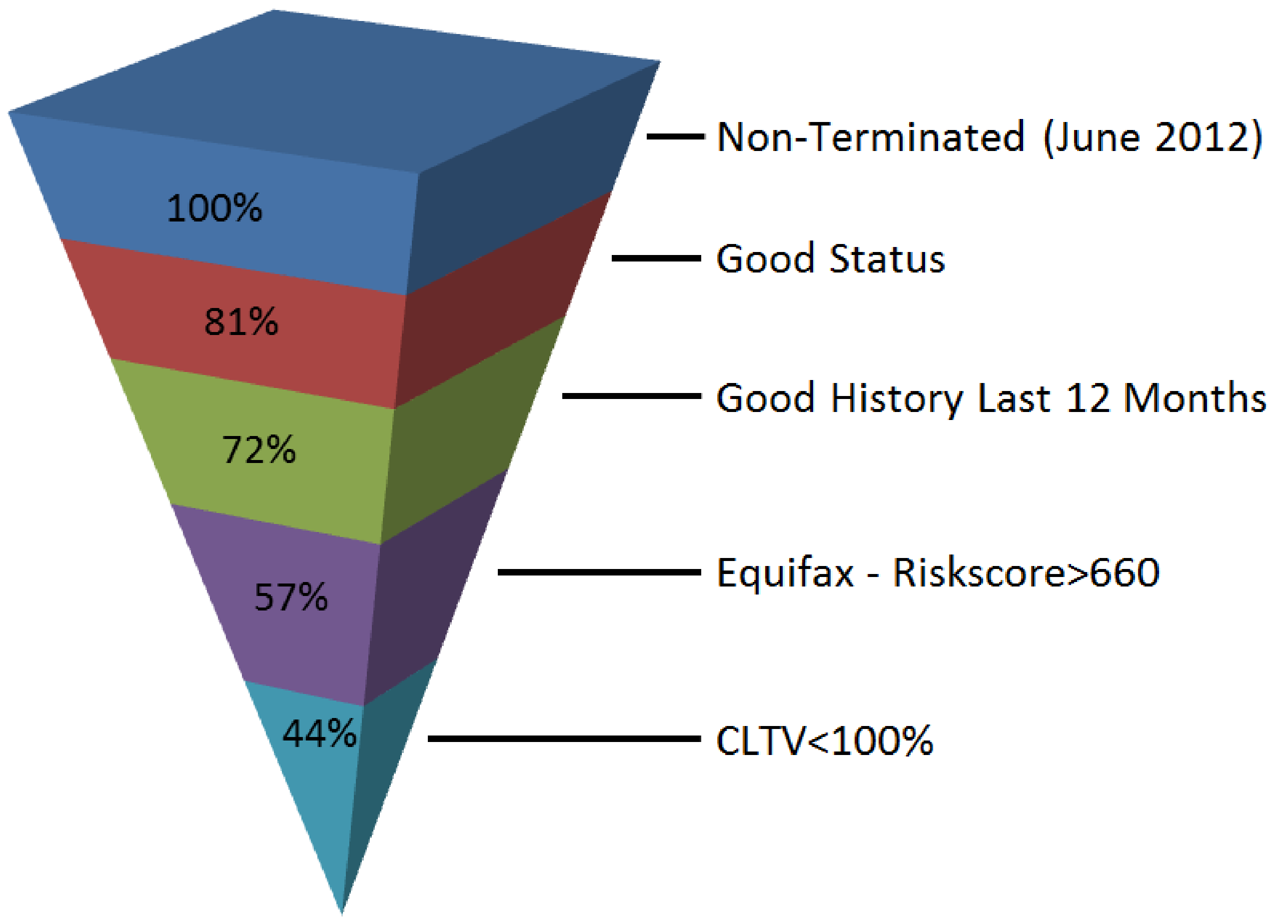

Potential Benefit from Refinancing ($/yr)
4000
3500
3000
2500
2000
1500
1000
500
0
-500
-1000
2004
2005
2006
2007
2008
2009
2010
2011
2012
Refi
Non-Refi Term.
Non-Terminated

Those Who Have Not Refinanced

- Statistics for recently terminated loans (2011,2012) as of termination date, for non-terminated loans, as of June 2012

	Refis	Other Good Term	Not Terminated
Equifax Riskscore	770	745	693
Balance ($)	186,116	147,293	162,131
LTV	0.70	0.61	0.76
CLTV	0.76	0.67	0.81
Int. Rate (%)	5.87	5.72	5.57
Bad Status	0.01	0.00	0.18

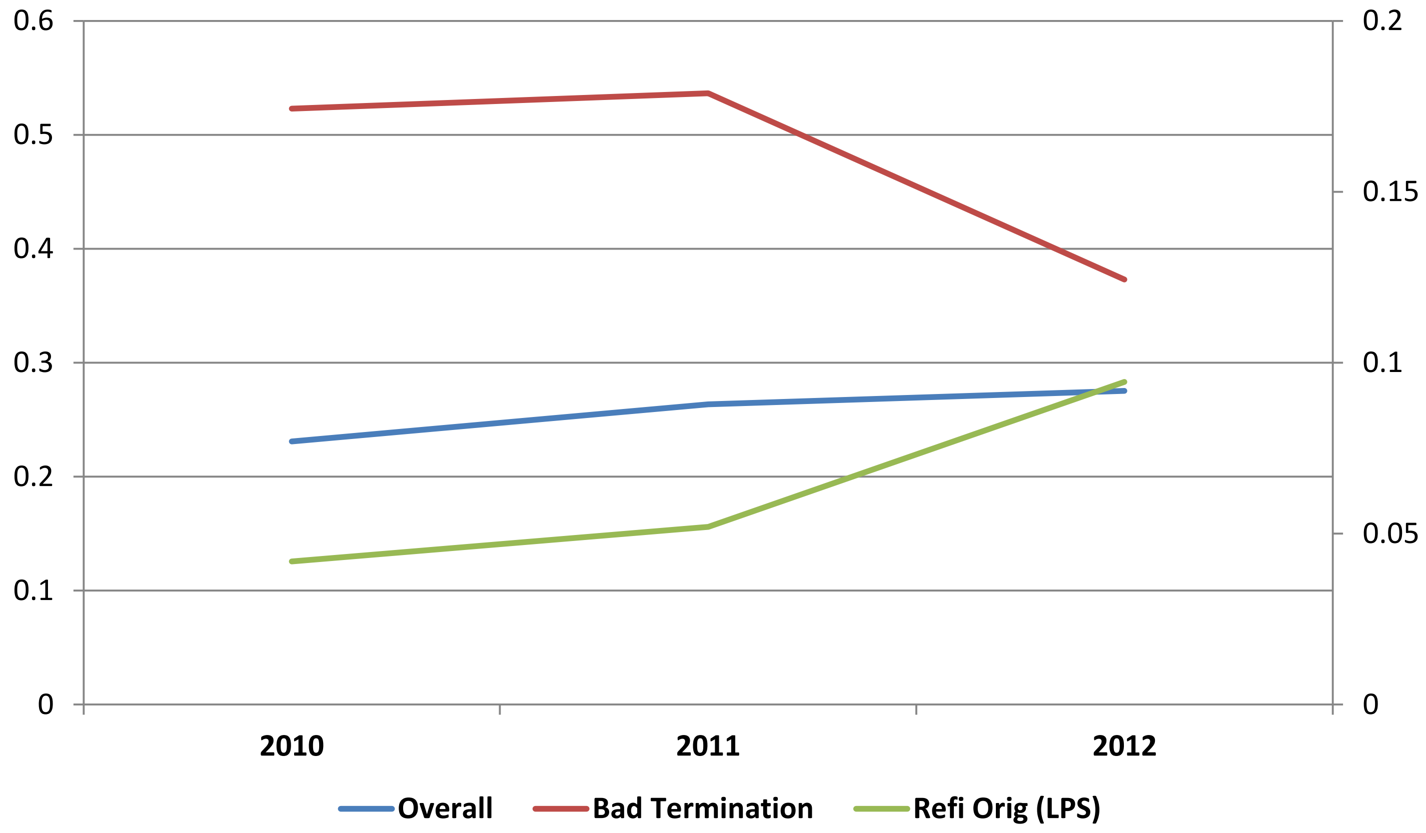
Non-Terminated Loans



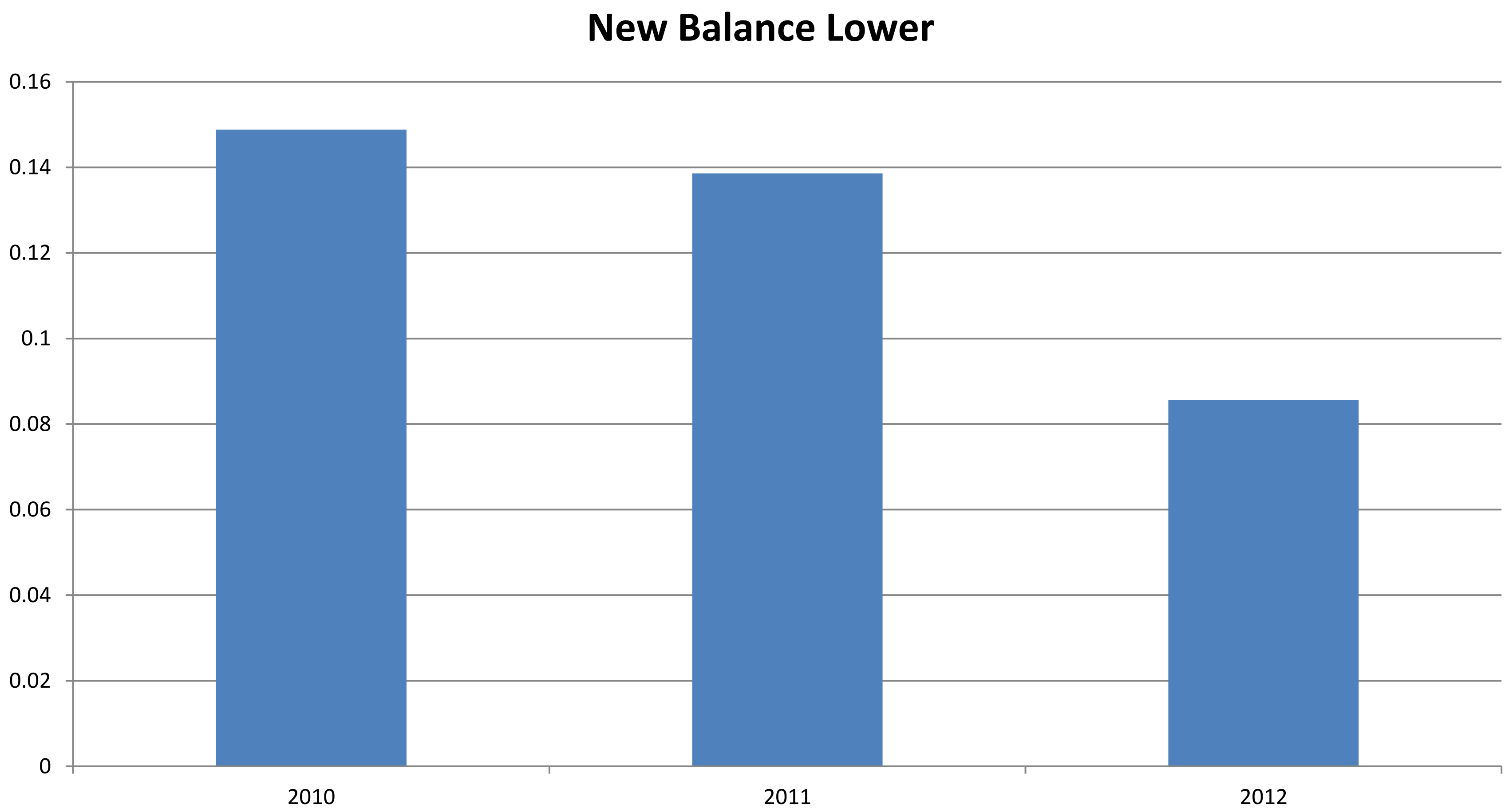
High-LTV Loans

- These are of particular interest, as they make up a large fraction of this cohort, an even larger fraction of defaults, and more programs are targeted at them.
  - High-LTV refinancings have increased in past year
  - Fewer of these borrowers seem to be paying down
  - But rate spreads have not changed

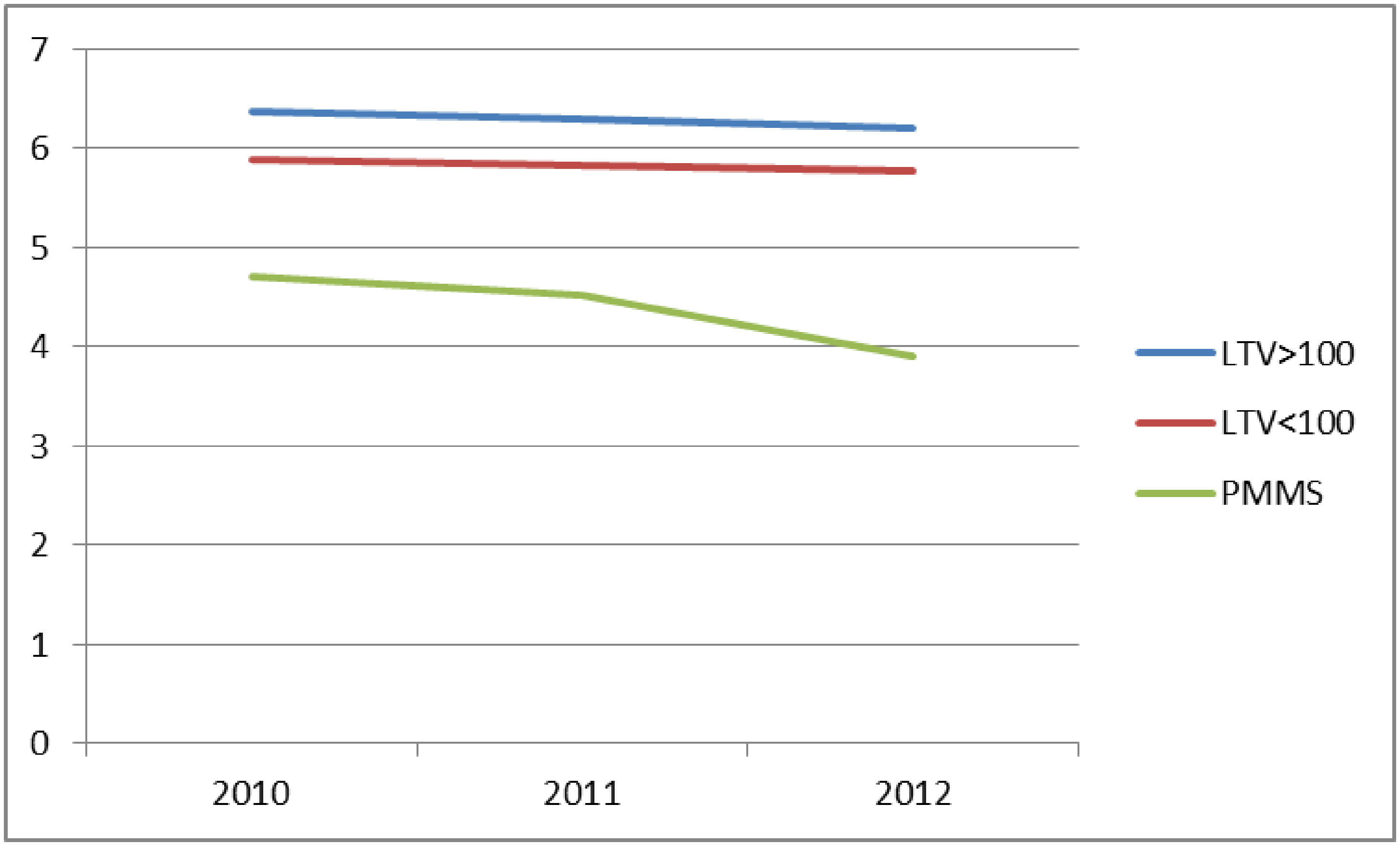
Fraction with Negative Equity



Balance Paydowns
Refis with Negative Equity



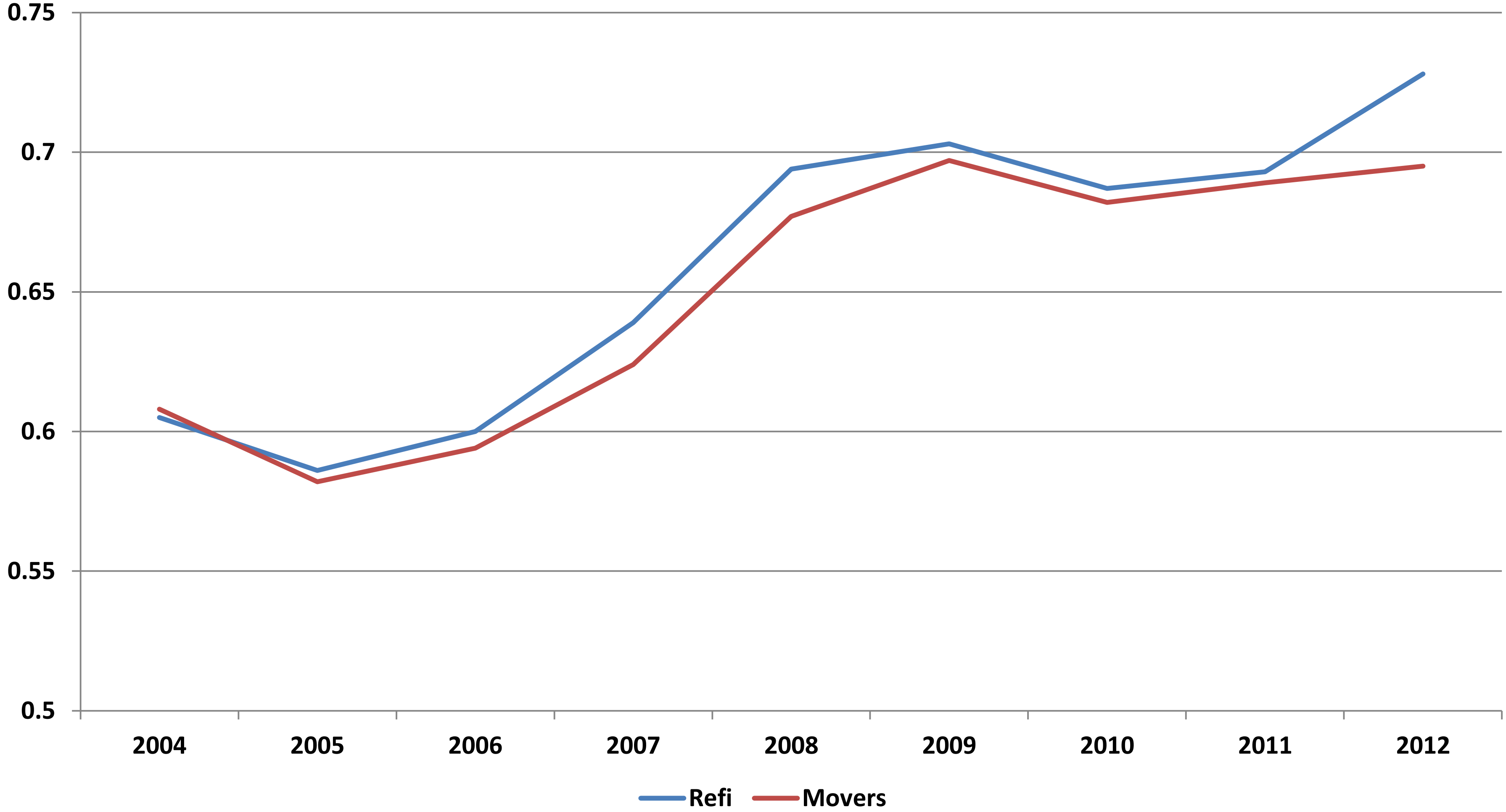
Interest Rates at Refinancing



Refis vs. Movers

- Identify "movers" as those with a new mortgage, but a different scrambled Equifax address following the termination date.
  - This is useful, as it allows us to see that – precisely as intended - HARP 2.0 does indeed facilitate higher-LTV's, but only for Refis.

LTV at Termination



Empirical Model of Refinancing

- Logit Model of Refinancing, *conditional on having a good termination*
  - Termination-year dummies not reported
- Sample size: 885,390
- First regression: Entire sample (2003-2012 terminations)
  - Most of the covariates related to the benefit from refinancing (interest rate, loan amount, age), FRM have the expected signs

	Coef.		SE
Equifax Riskscore @ Term.			
(660,750]	-0.151	**	0.009
(750,800]	-0.146	**	0.009
(800,850]	-0.146	**	0.010
Below 660×Post '08	-1.309	**	0.013
Age @ Term.			
(35,55]	0.365	**	0.006
(55,75]	0.281	**	0.007
(75,85]	-0.030		0.019
Interest Rate @ Term (%)	0.225	**	0.003
CLTV @ Term.	0.107	**	0.012
Orig Yr. 2004	0.153	**	0.007
2005	0.173	**	0.007
2006	0.352	**	0.008
2007	0.488	**	0.009
ln(principal)	0.445	**	0.005
Jumbo @ Term	-0.142	**	0.015
Jumbo×Post '08	-0.304	**	0.019
ARM Fixed Period (mo.)			
24	-0.150	**	0.015
36	-0.034	**	0.013
60	-0.231	**	0.010
84	-0.210	**	0.015
120	-0.127	**	0.018
W/in 1 yr of ARM Adjustment	0.260	**	0.012
Original Term (mo.) 360	-0.126	**	0.008
480	-0.096	**	0.029

2008-2012 Terminations

	Coef.		SE
Equifax Riskscore @ Term.			
(660,750]	1.001	**	0.011
(750,800]	1.254	**	0.010
(800,850]	1.310	**	0.011
Age @ Term.			
(35,55]	0.380	**	0.008
(55,75]	0.278	**	0.010
(75,85]	-0.090	**	0.024
Interest Rate @ Term (%)	0.272	**	0.005
CLTV @ Term.	0.243	**	0.015
Orig Yr. 2004	0.125	**	0.009
2005	0.149	**	0.009
2006	0.278	**	0.010
2007	0.436	**	0.010
ln(principal)	0.470	**	0.006
Jumbo @ Term	-0.512	**	0.015
ARM Fixed Period (mo.)			
24	-0.094	**	0.034
36	-0.312	**	0.028
60	-0.329	**	0.015
84	-0.221	**	0.019
120	-0.119	**	0.022
W/in 1 yr of ARM Adjustme	0.320	**	0.018
Original Term (mo.) 360	-0.147	**	0.010
480	-0.082	*	0.045

- Post-2008:
  - High riskscores much more important
  - Jumbo loans hard to refi
  - Otherwise, qualitatively similar

Conclusions

- Identified some significant differences between refis and other terminations
  - Policy implications
  - MBS valuation
- Future work:
  - Incorporate this into a full-fledged model of the termination decision
  - “Grasshoppers” vs. “woodheads”?
- Some other approaches that may yield more precise identification of refis…