Payment Size, Negative Equity, and Mortgage Default

Paul Willen, Federal Reserve Bank of Boston
-
With Andreas Fuster (FRB NY)

FDIC Consumer Research Symposium
October 17, 2013

Disclaimer

- I am speaking today as a researcher and as a concerned citizen
- not as a representative of:
  - The Boston Fed
  - or the Federal Reserve System

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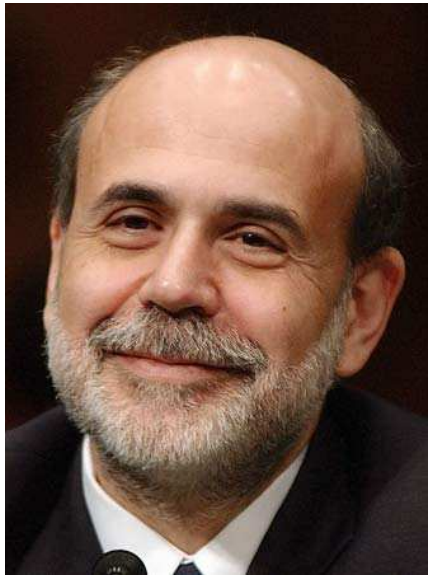

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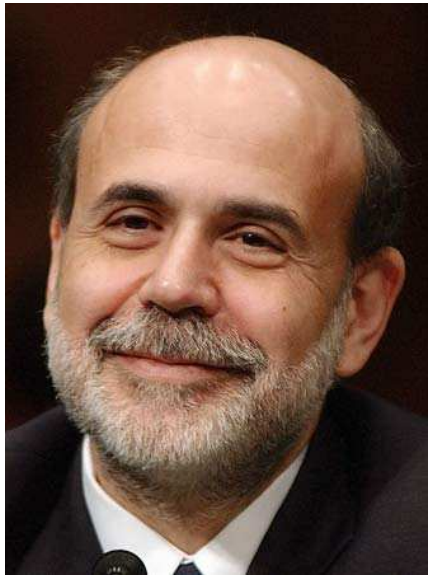

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Introduction

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  - the size of the required monthly payment

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- We study a sample of hybrid ARMs originated in 2005–06 that experienced large *downward* rate resets over 2008–11
  - Compare likelihood of delinquency and cures of loans that have reset lower with that of loans that have not (yet) reset
  - Argue that better identification than from upward resets or loan modifications, where selection effects important
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Main findings

- Interest rate reductions strongly reduce likelihood of delinquency
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Theory / Identification

- Strong theoretical prior that payment size should matter for default
  - both in frictionless and more realistic (double trigger) models
- Yet difficult to measure empirically
  - No randomized experiments
  - Fixed differences across borrowers clearly won't do
    $\Rightarrow$ need within-borrower variation
- Loan modifications: selection problem because servicers choose to whom they offer mods and at what terms
- What about resets?

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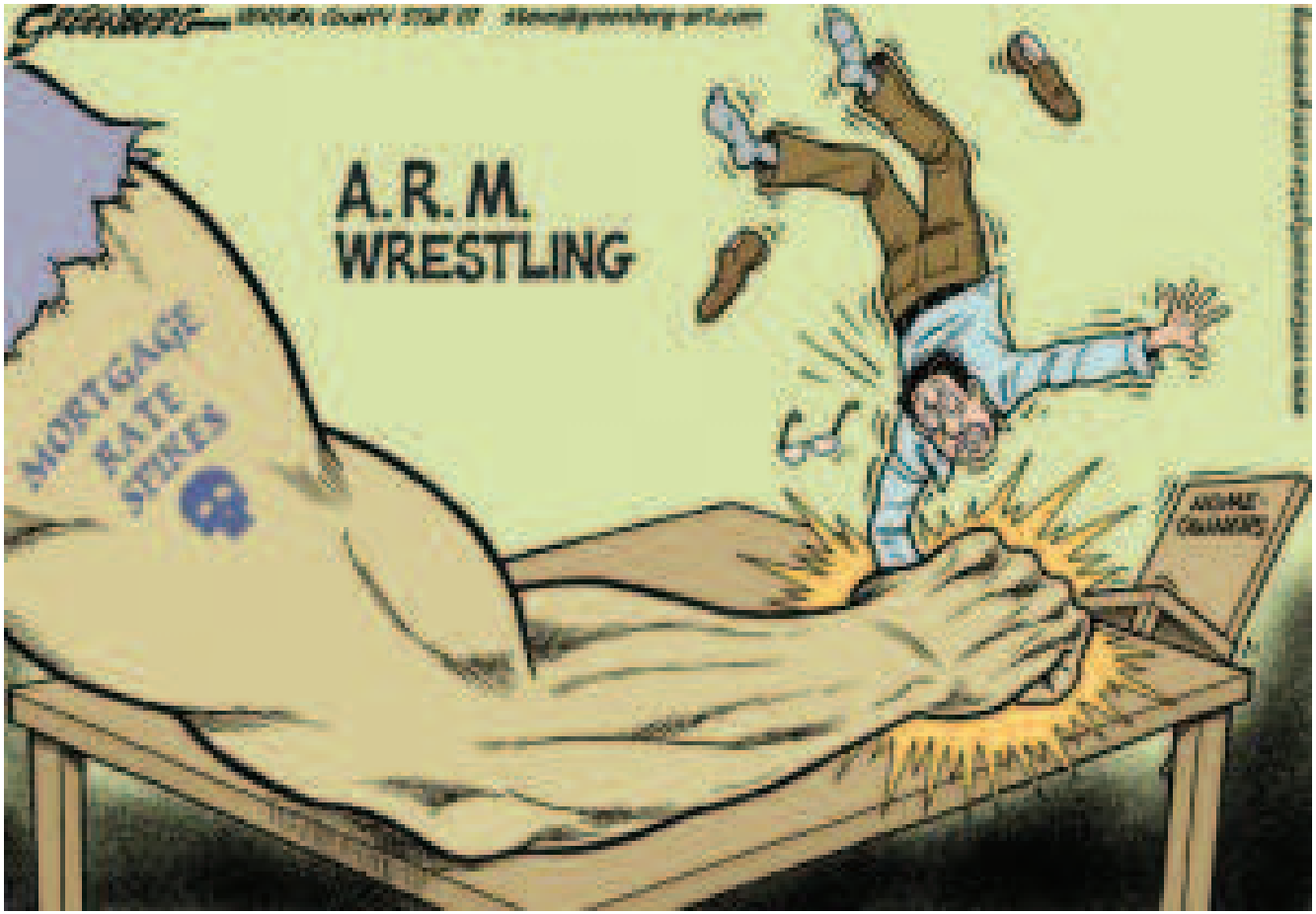
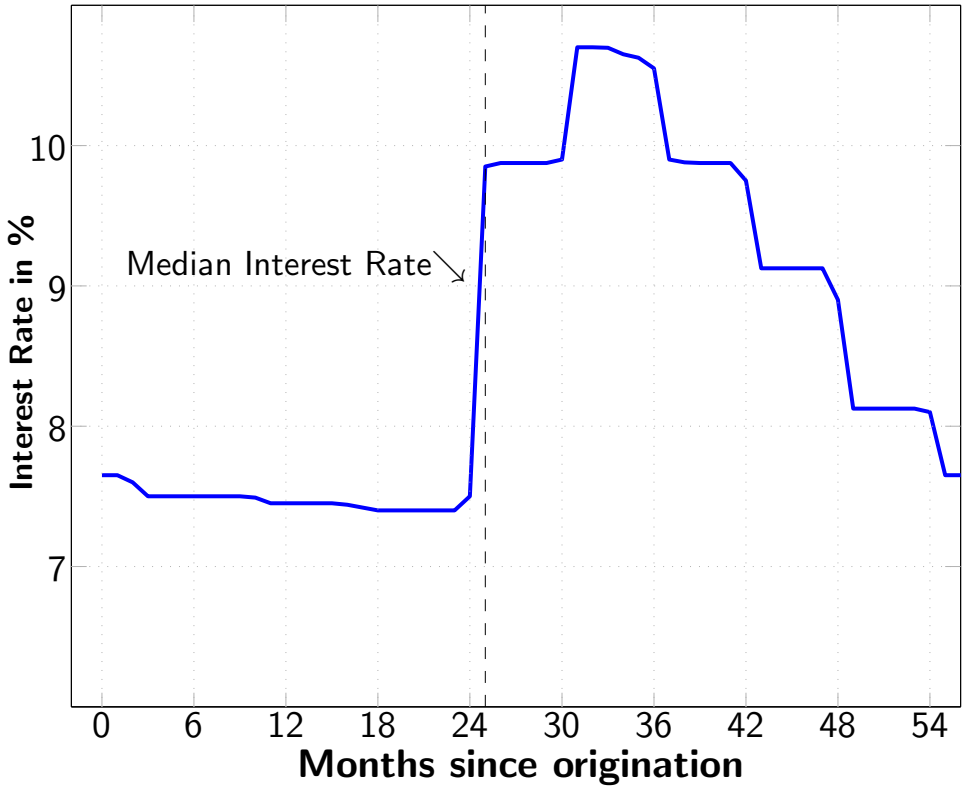


Upward resets and selection

- Subprime "2/28" ARMs, originated in Q1 2005
- Large increase in default hazard at reset
- but huge selection as well.



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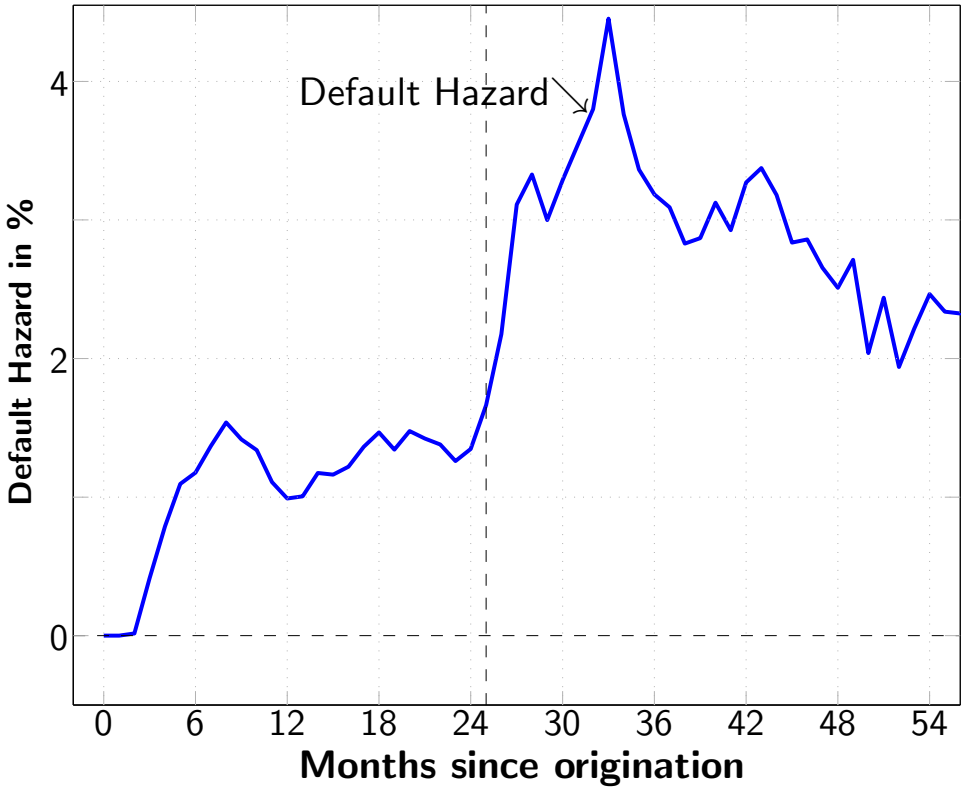

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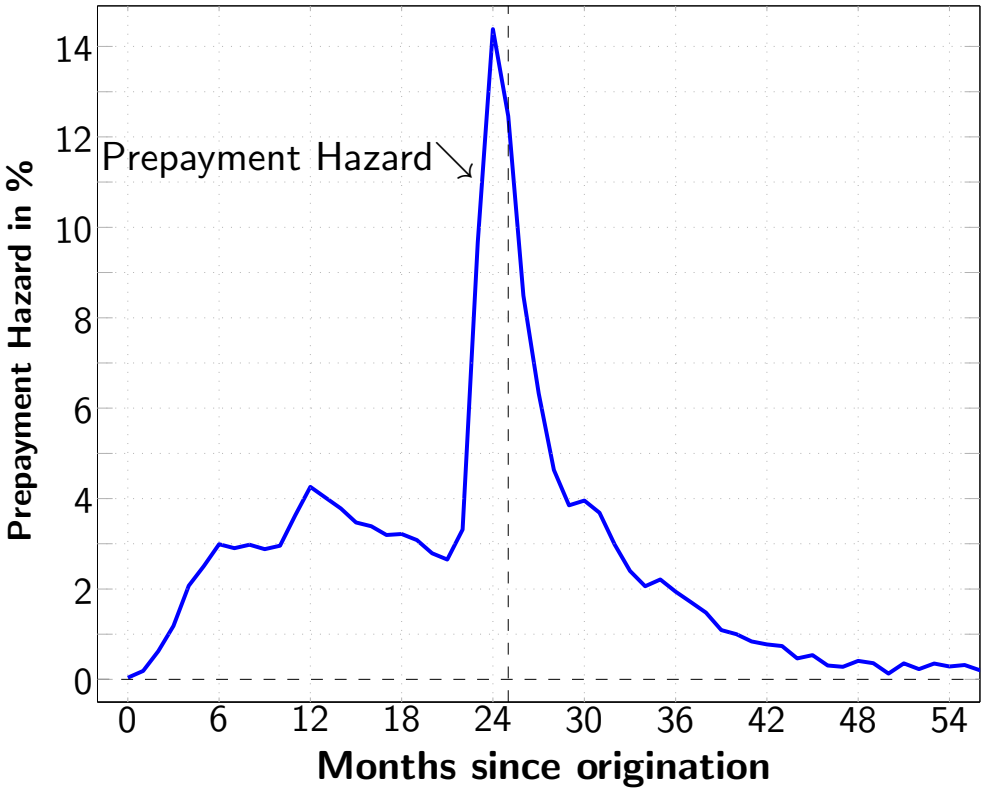

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- Hazard relative to loans that didn't reset
- Reset leads to big increase in relative hazard
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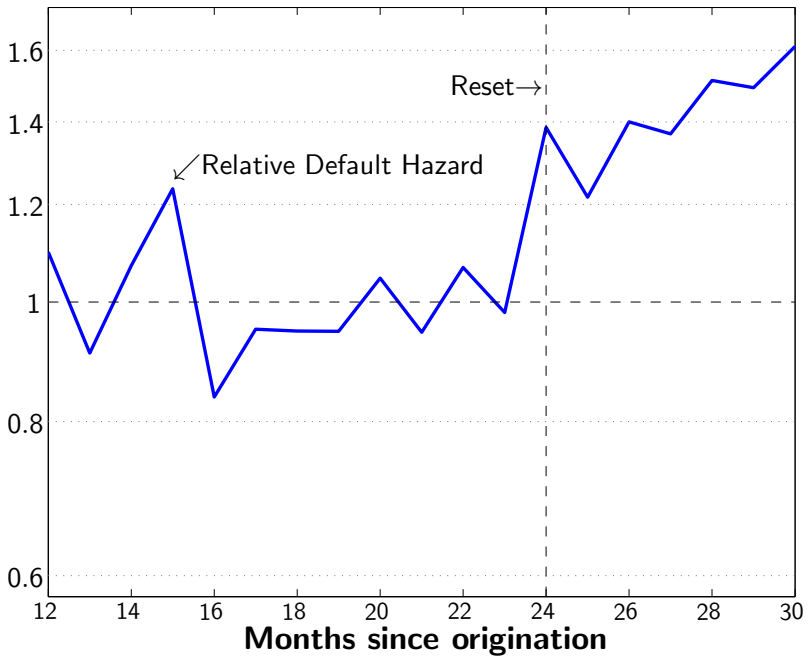

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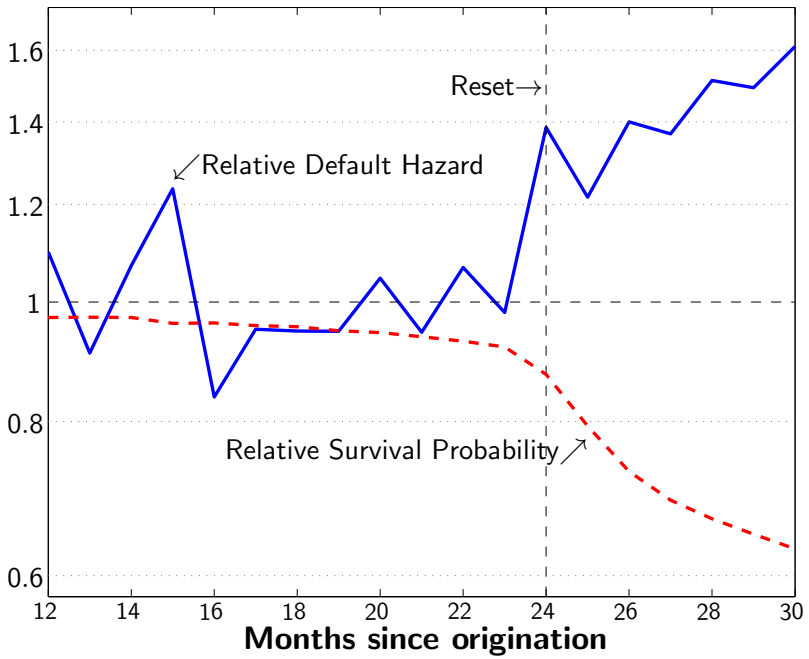

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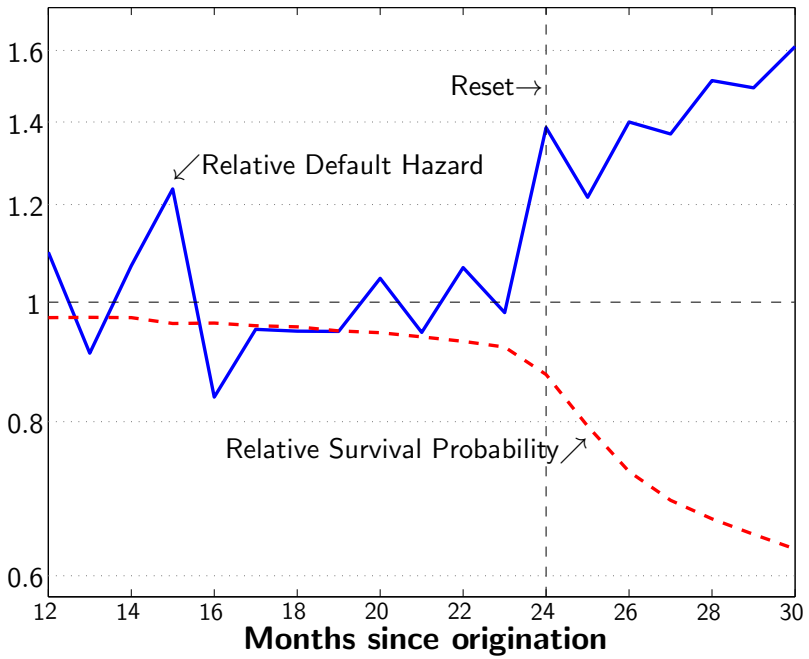

- Note: *number* of defaults stays relatively flat across reset

Our experiment

- All the resets are *down*
  - No incentive to refinance
- *And* most borrowers were underwater
  - Non-agency loans not eligible for HARP.
- No meaningful prepayments at the reset
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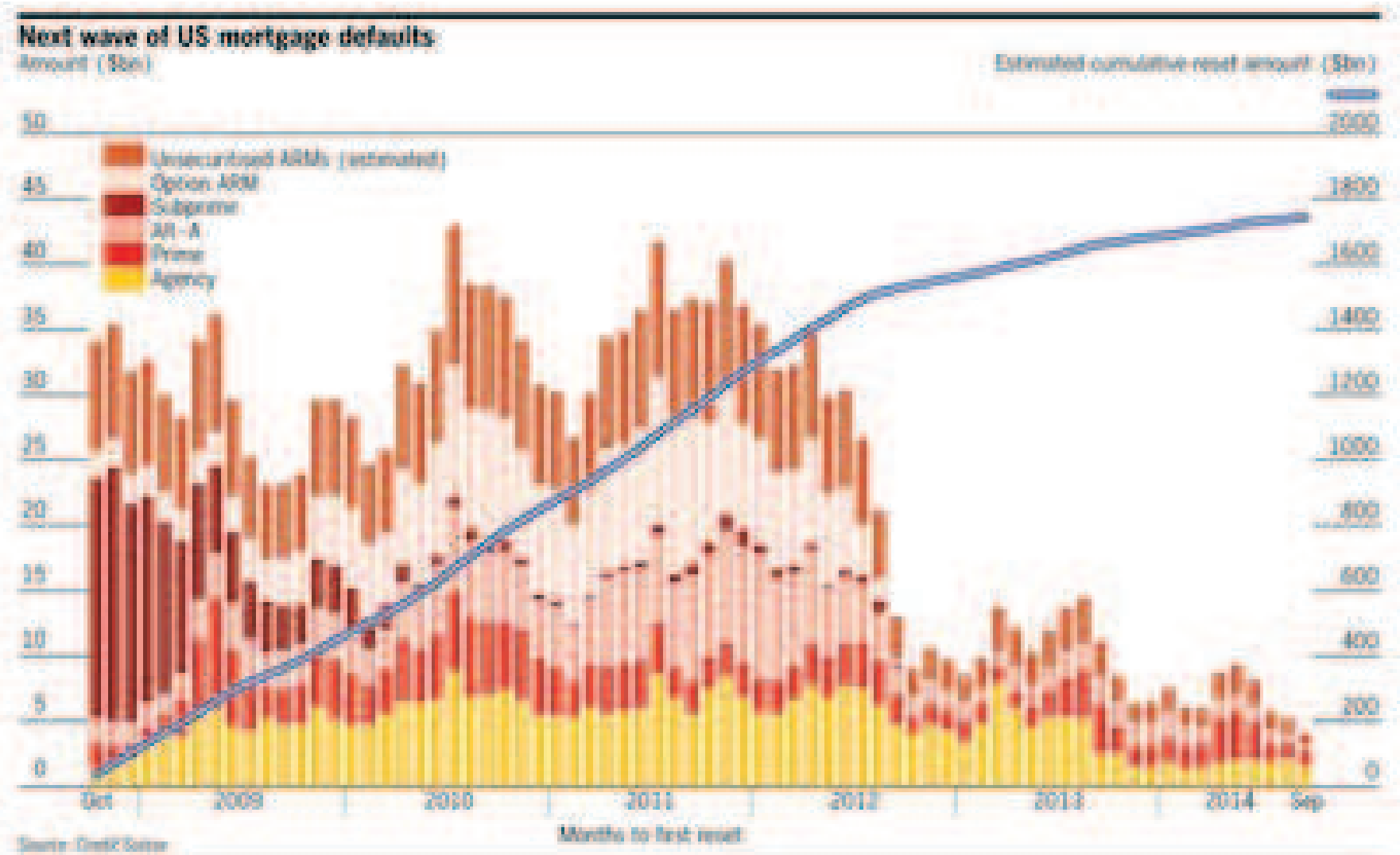
The Second Wave of Resets



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- 221K Alt-A interest-only (IO) hybrid ARMs (reset after 3, 5, 7, or 10 years) originated between Jan 2005 and June 2006
  - From CoreLogic LoanPerformance dataset
  - Track interest rate, delinquency status monthly
  - Updated estimate of CLTV – "TrueLTV"
- 3/1s and 5/1s have reset; 7/1s and 10/1s have not
- Why Alt-A?
  - Subprime loans almost all had "floors" at initial rate
  - Prime (LPS): studied by Tracy and Wright (2012) who also find significant effects of rate reductions
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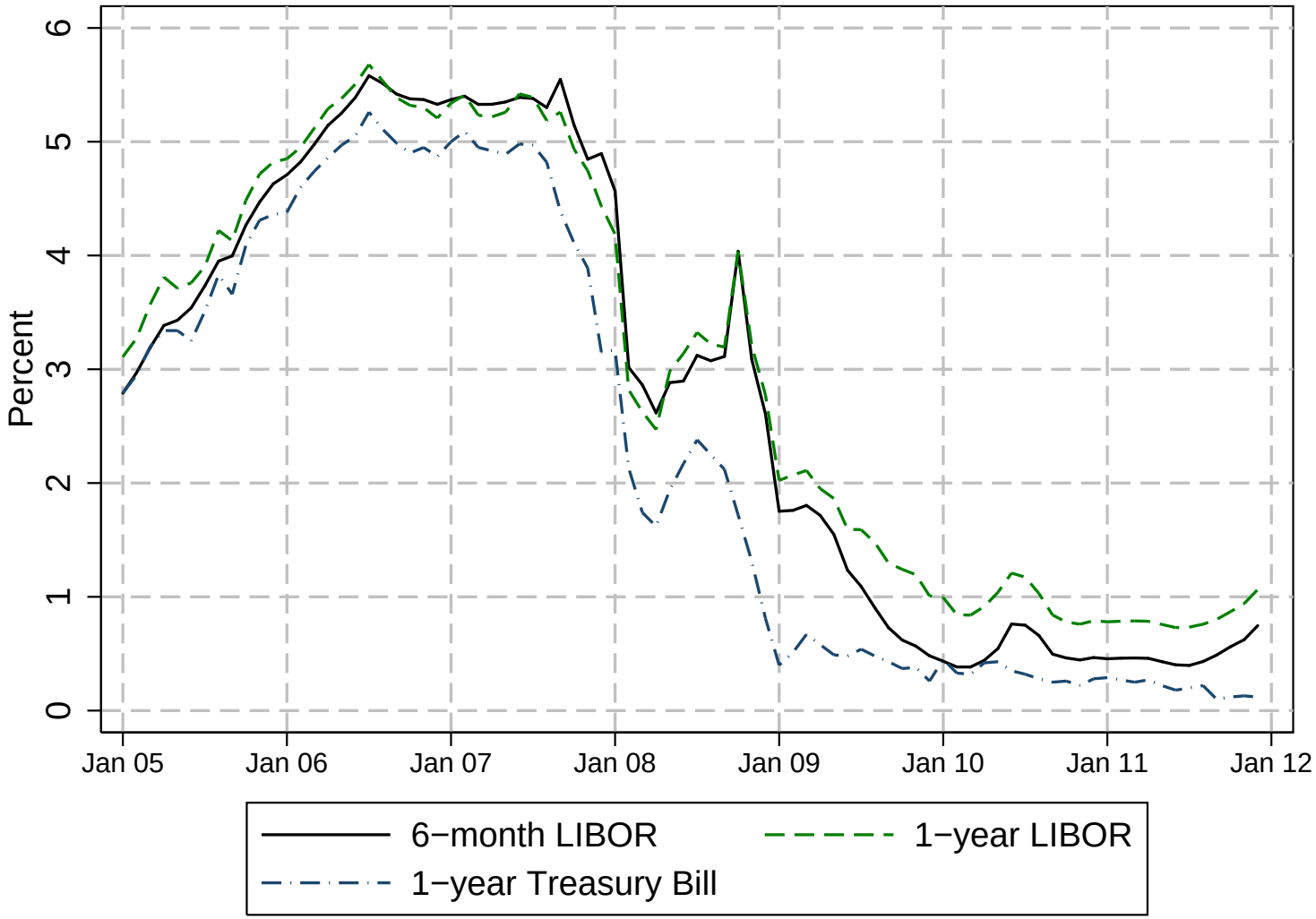
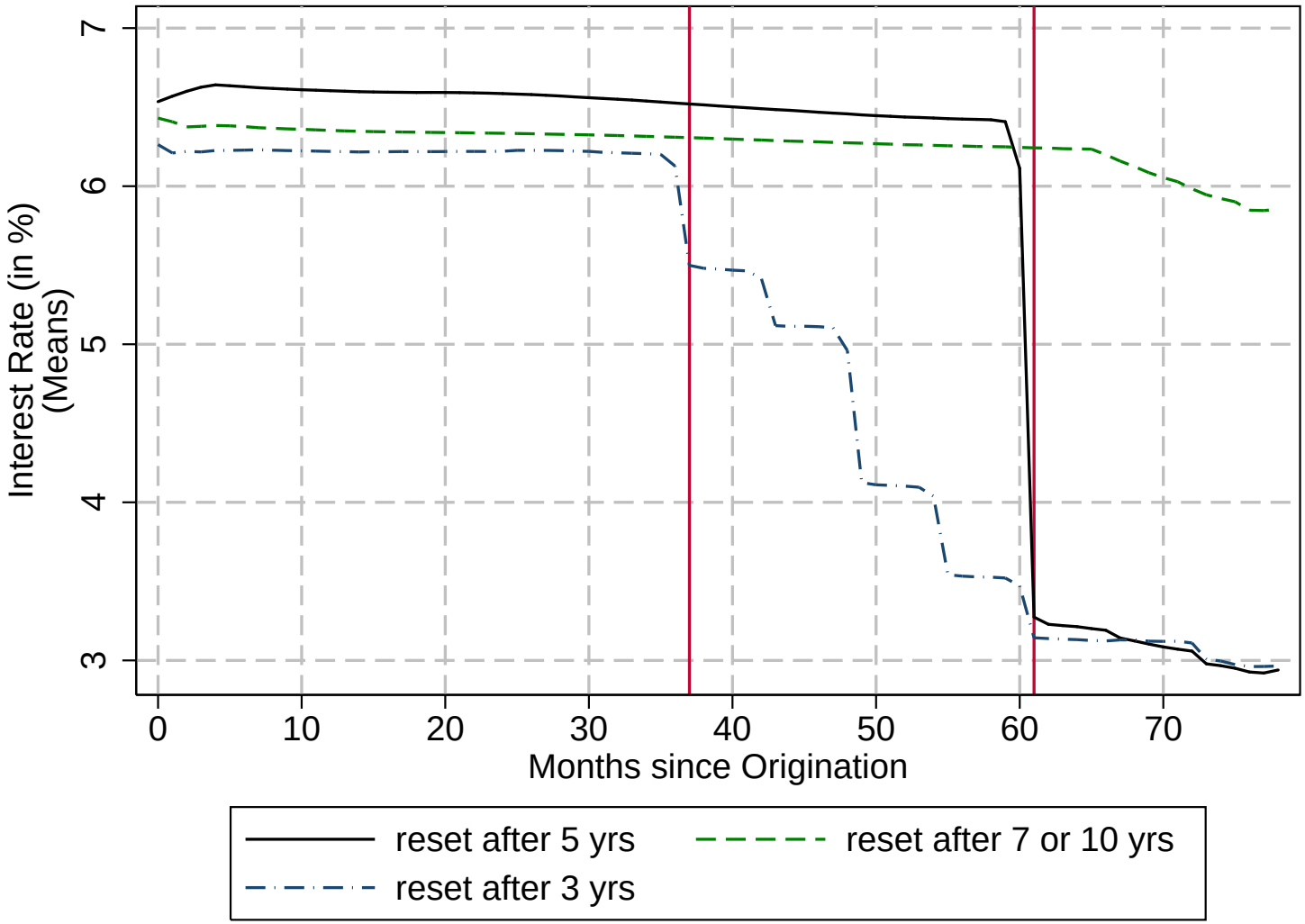
Index rates

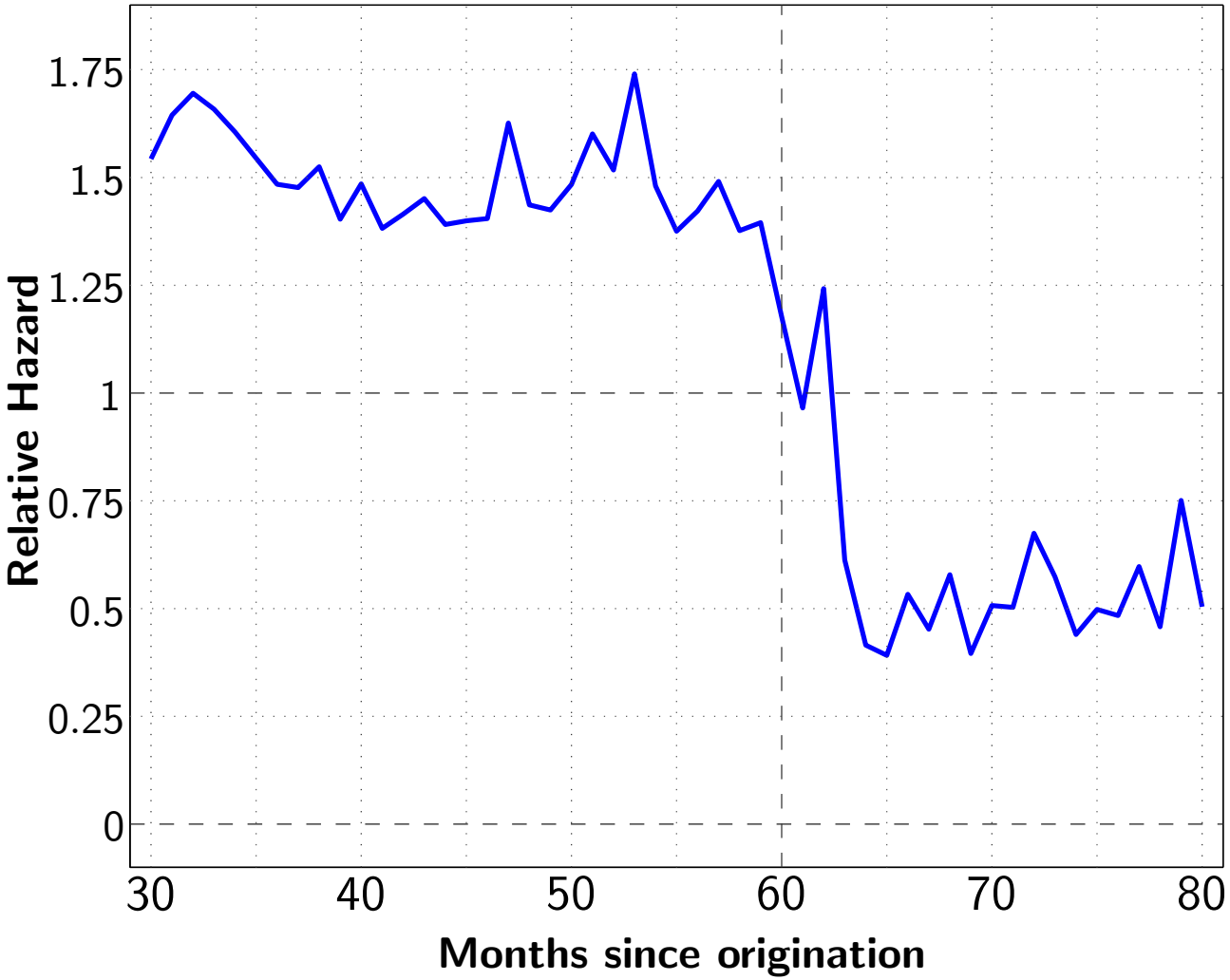

Percent
0
1
2
3
4
5
6
Jan 05
Jan 06
Jan 07
Jan 08
Jan 09
Jan 10
Jan 11
Jan 12
6−month LIBOR
1−year LIBOR
1−year Treasury Bill

Interest rates of Alt-A ARMs originated in 2005/6



60-day delinquency hazard of same loans

Relative hazard of 5/1 and 7/1 ARMS at 60 months



Econometric analysis

- Cox proportional hazard framework:

$$h(t|\mathbf{X}_{it}) = h_0(t) \cdot exp(\mathbf{X}_{it}\beta)$$

where $\mathbf{X}_{it}$ contains

  - Origination characteristics (don't vary with t): e.g. FICO, initial rate
  - Macro variables (don't vary with i): e.g. unemployment
  - Calendar quarter $\times$ loan category dummies
  - Time-varying mortgage characteristics: e.g. CLTV (bins)
  - Main variable of interest: rate_{it} relative to rate_{i0} (bins)

- Let baseline hazard $h_0(t)$ vary by origination quarter

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  - Main variable of interest: rate_{it} relative to rate_{i0} (bins)

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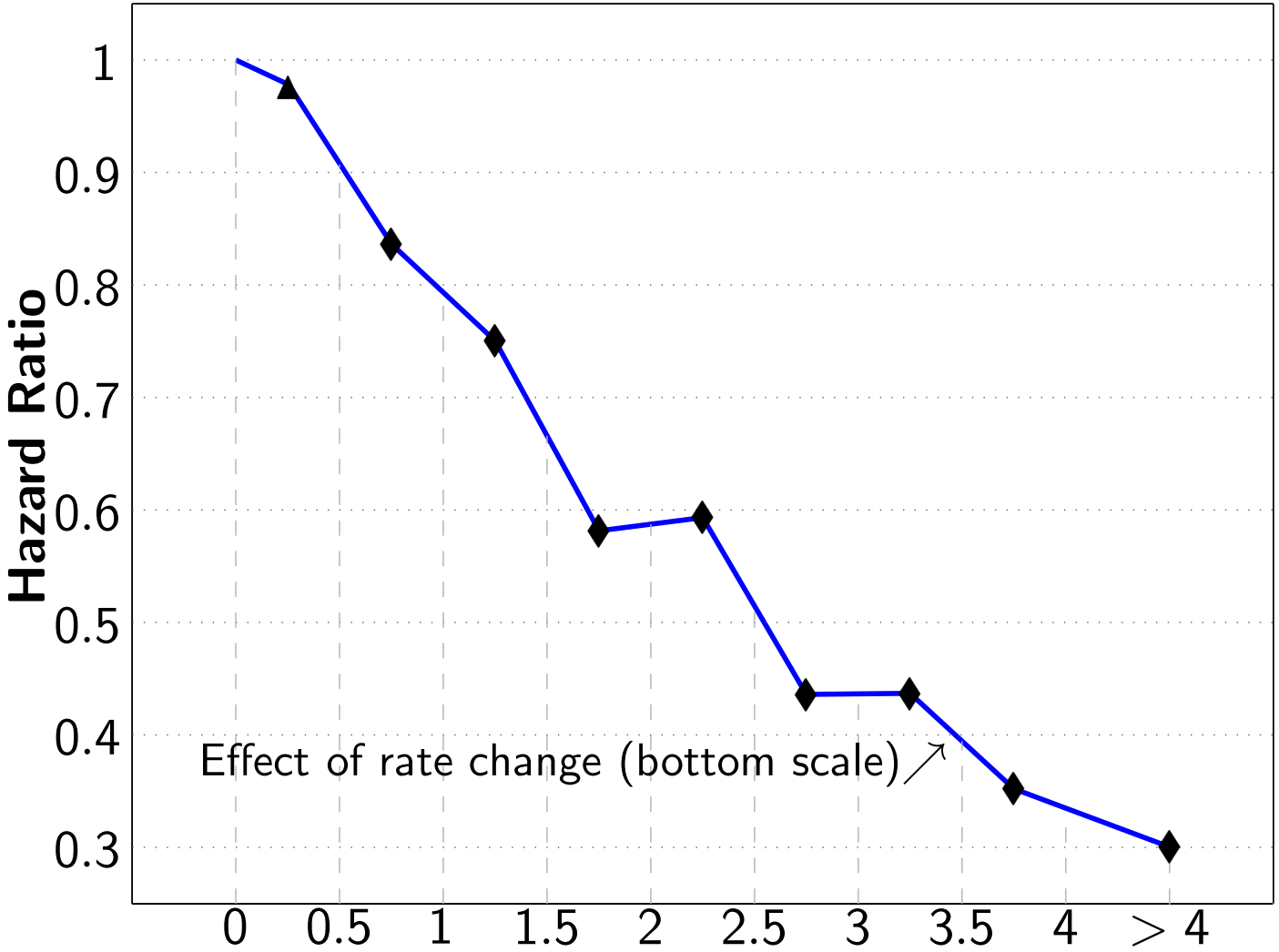
60-day delinquency hazard — baseline results



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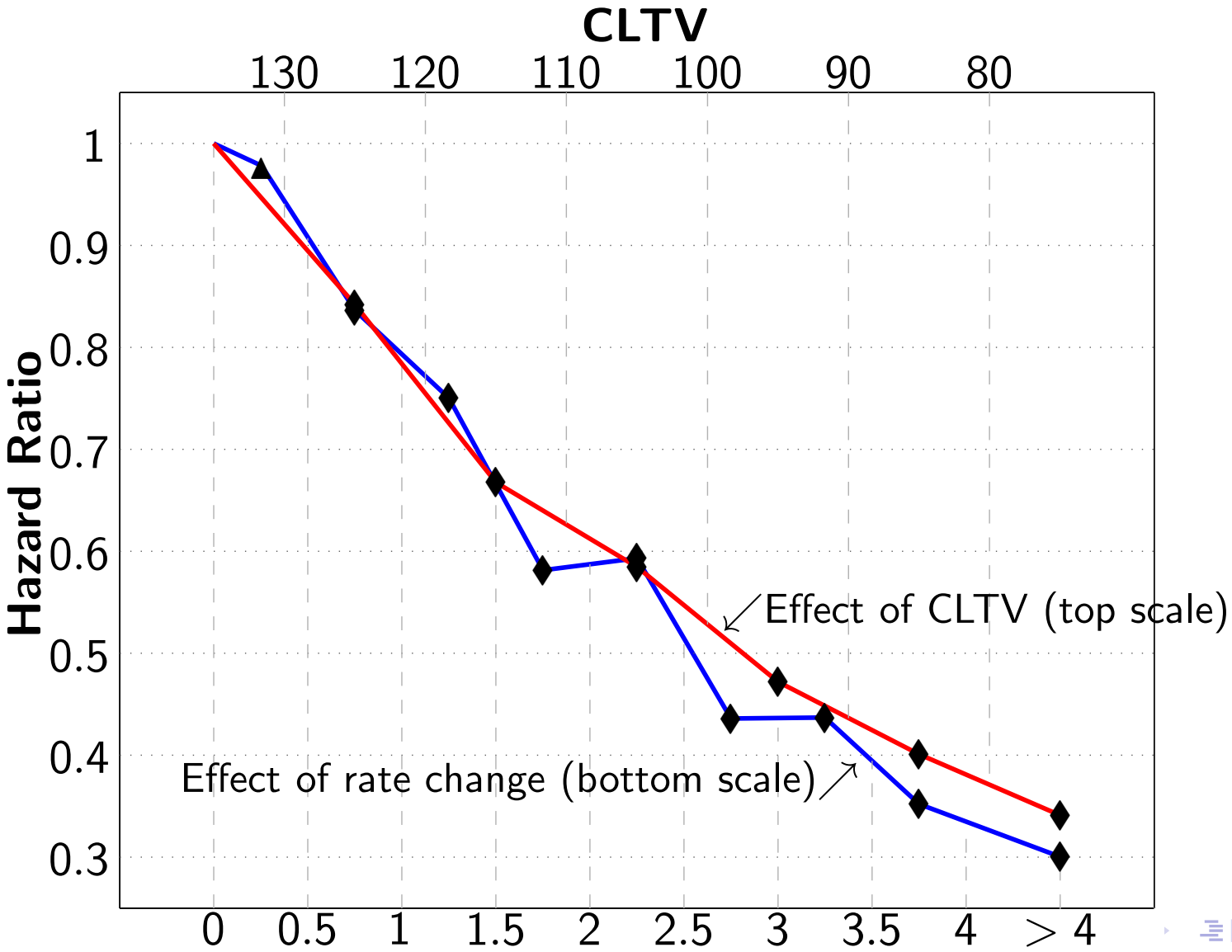

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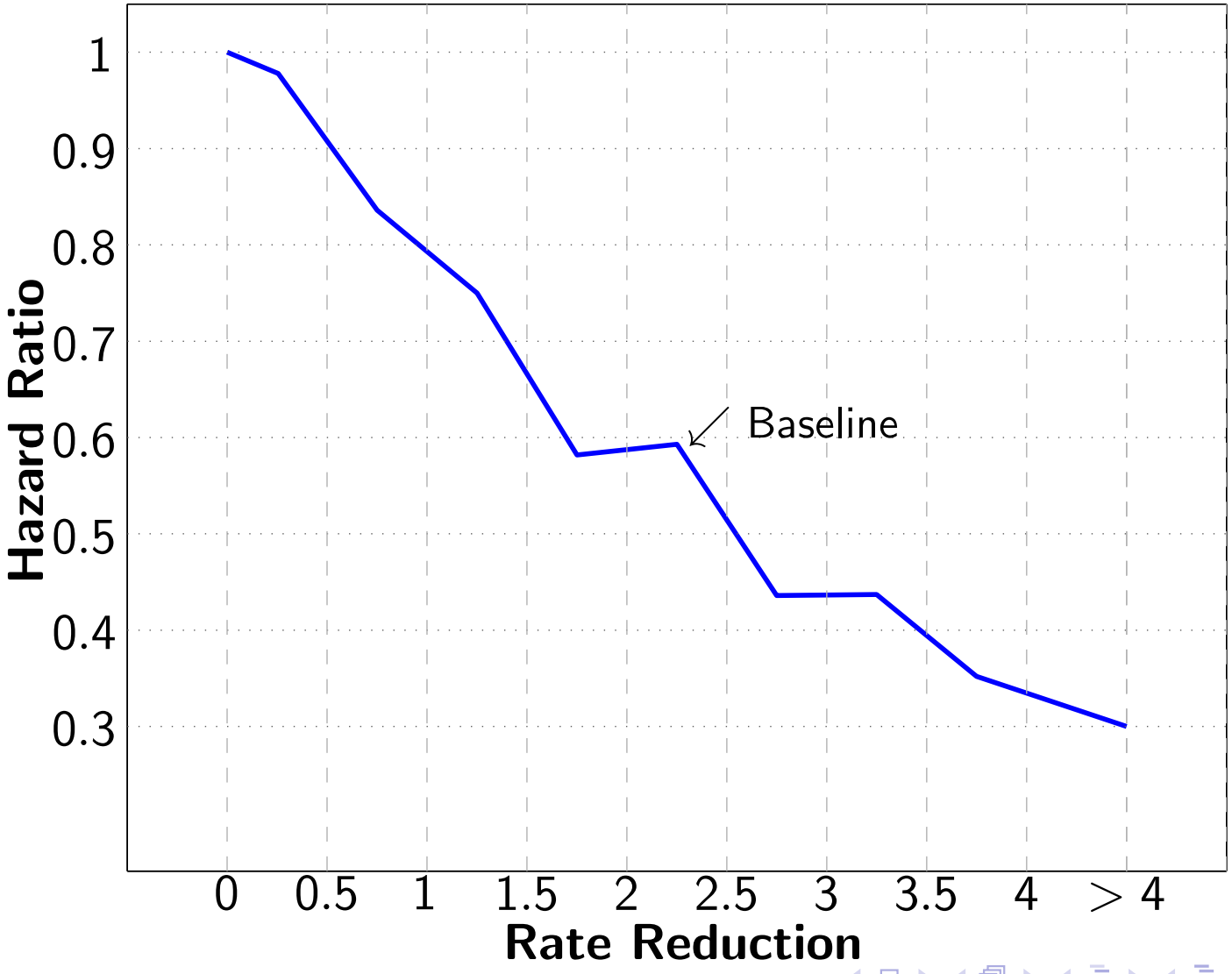

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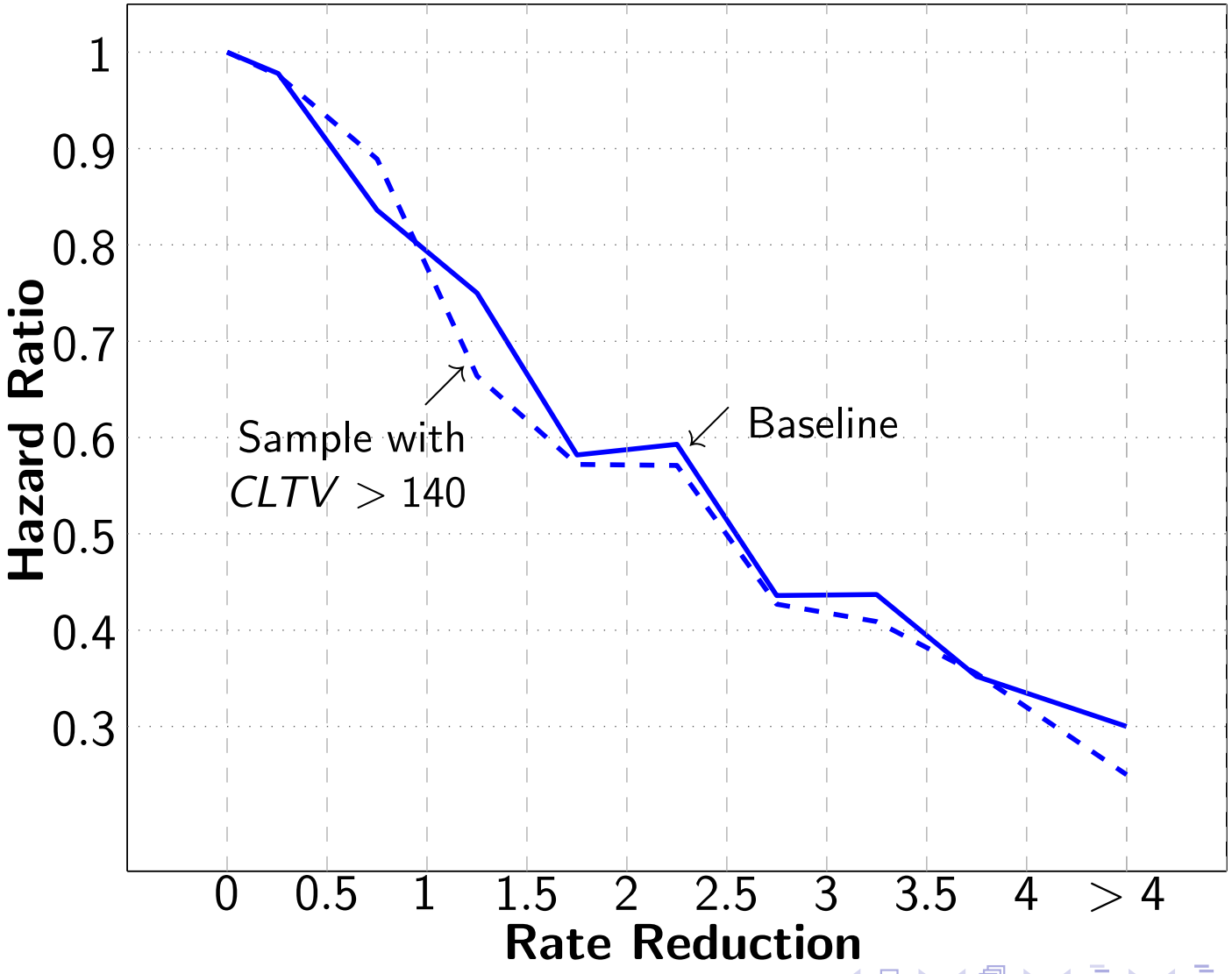

Timing of effects of rate reductions

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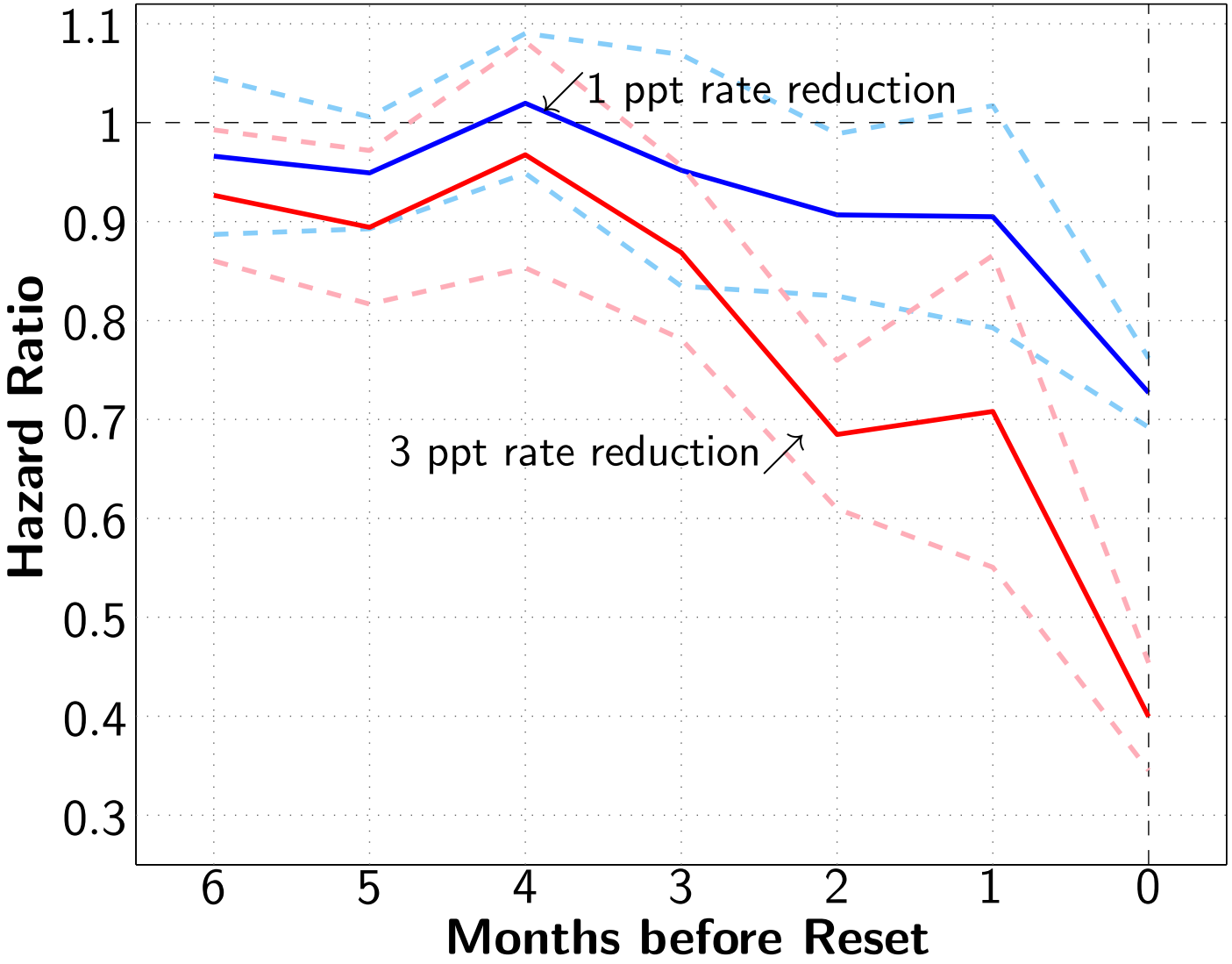
Do borrowers anticipate the reset?



(dashed lines represent 95% confidence interval)

Discussion – Policy implications

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- Suggest that programs such as HARP, HAMP can be effective at reducing defaults
- Principal reductions clearly also very effective (reduce CLTV *and* payment)
  - Do not attempt cost/benefit analysis here
- More broadly: with ARMs, monetary policy can be a powerful tool to reduce delinquencies
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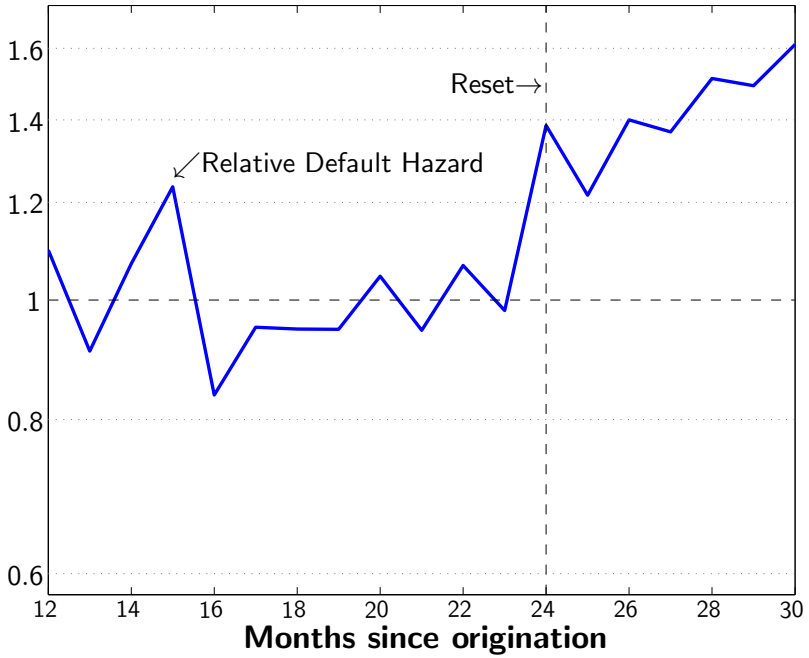

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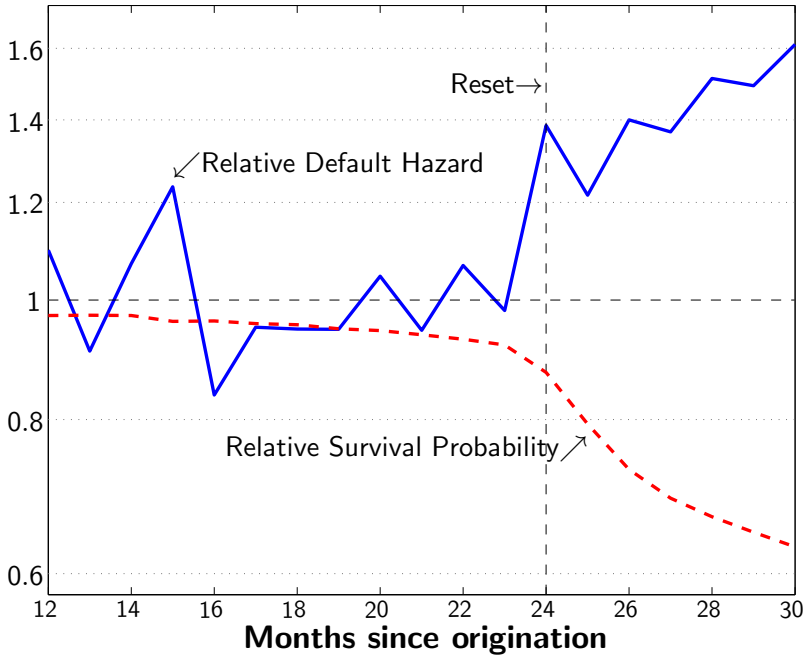

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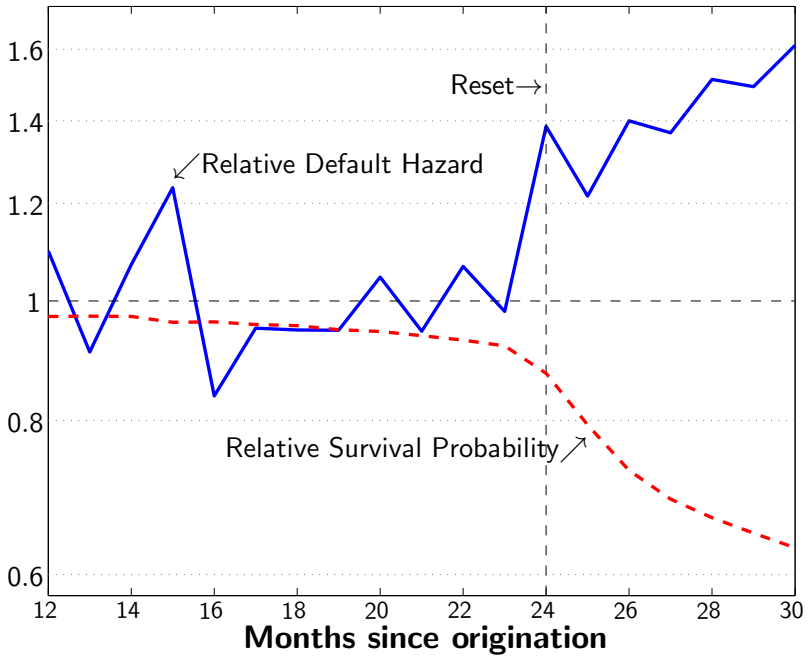


- Note: *number* of defaults stays relatively flat across reset

Descriptive statistics at origination

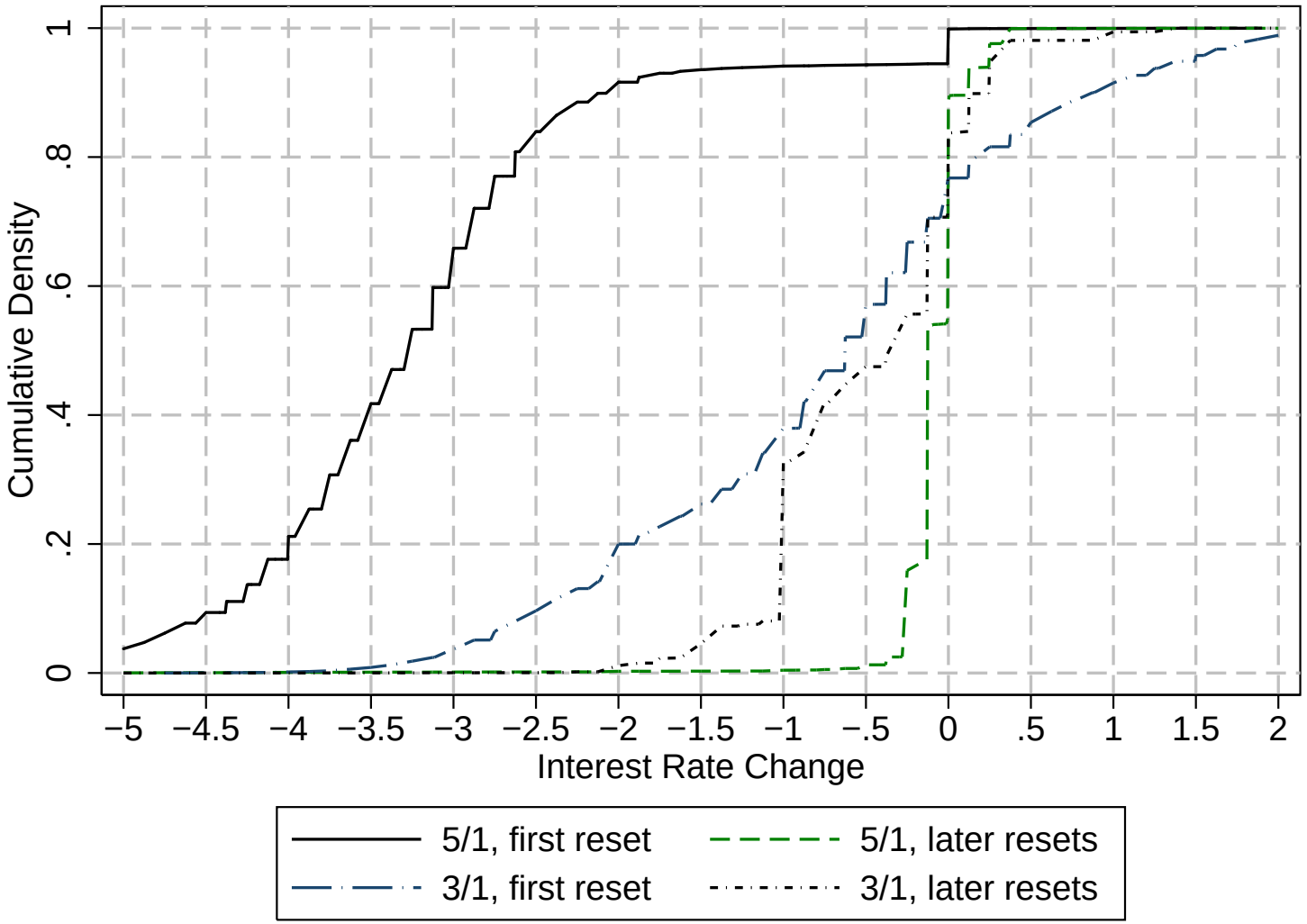
	3/1s	5/1s	7/1s	10/1s	Total
Origination amount (000s)	294	272	345	414	306
LTV on first lien (%)	78	77	77	74	77
CLTV (TrueLTV; %)	93	94	93	88	93
Number of Liens	1.7	1.7	1.6	1.5	1.7
FICO score	714	710	717	721	713
Initial interest rate (%)	6.2	6.6	6.6	6.3	6.5
Investor or 2nd home	0.24	0.28	0.19	0.15	0.24
Low documentation	0.73	0.69	0.63	0.74	0.70
No documentation	0.04	0.06	0.04	0.06	0.06
CA, NV, FL, or AZ	0.57	0.52	0.57	0.67	0.56
Purchase mortgage	0.68	0.70	0.61	0.57	0.67
Resets every 6 months	0.85	0.79	0.45	0.28	0.69

Descriptive statistics — CLTVs and outcomes

	3/1s	5/1s	7/1s	10/1s	Total
January 2008	109	108	107	102	107
January 2010	144	142	139	130	139
November 2011	150	147	146	137	145

Fraction of loans that have . . .	3/1s	5/1s	7/1s	10/1s	Total
Gone 60+ days delinquent	0.37	0.46	0.45	0.36	0.43
Ended in foreclosure / short sale	0.30	0.38	0.35	0.26	0.34
Prepaid voluntarily	0.46	0.36	0.32	0.35	0.37
Been modified at least once	0.04	0.07	0.08	0.07	0.07

Distribution of rate changes



Effects on prepayments, overall incidence of delinquency, and cures

- Run similar proportional hazard analysis for prepayments
- Rate reductions also strongly reduce prepayments...
- ...as do high CLTV levels.
- Overall prepayment hazard $<<$ delinquency hazard

- Predict cumulative incidence of delinquency for "typical" 5/1s
  - Estimates imply that for CLTV $\in [130, 140)$, a 3 pp. reduction reduces fraction of defaults from age 63 to 75 by 9 pp., or about 50%

- Also find effects on cures of similar magnitude
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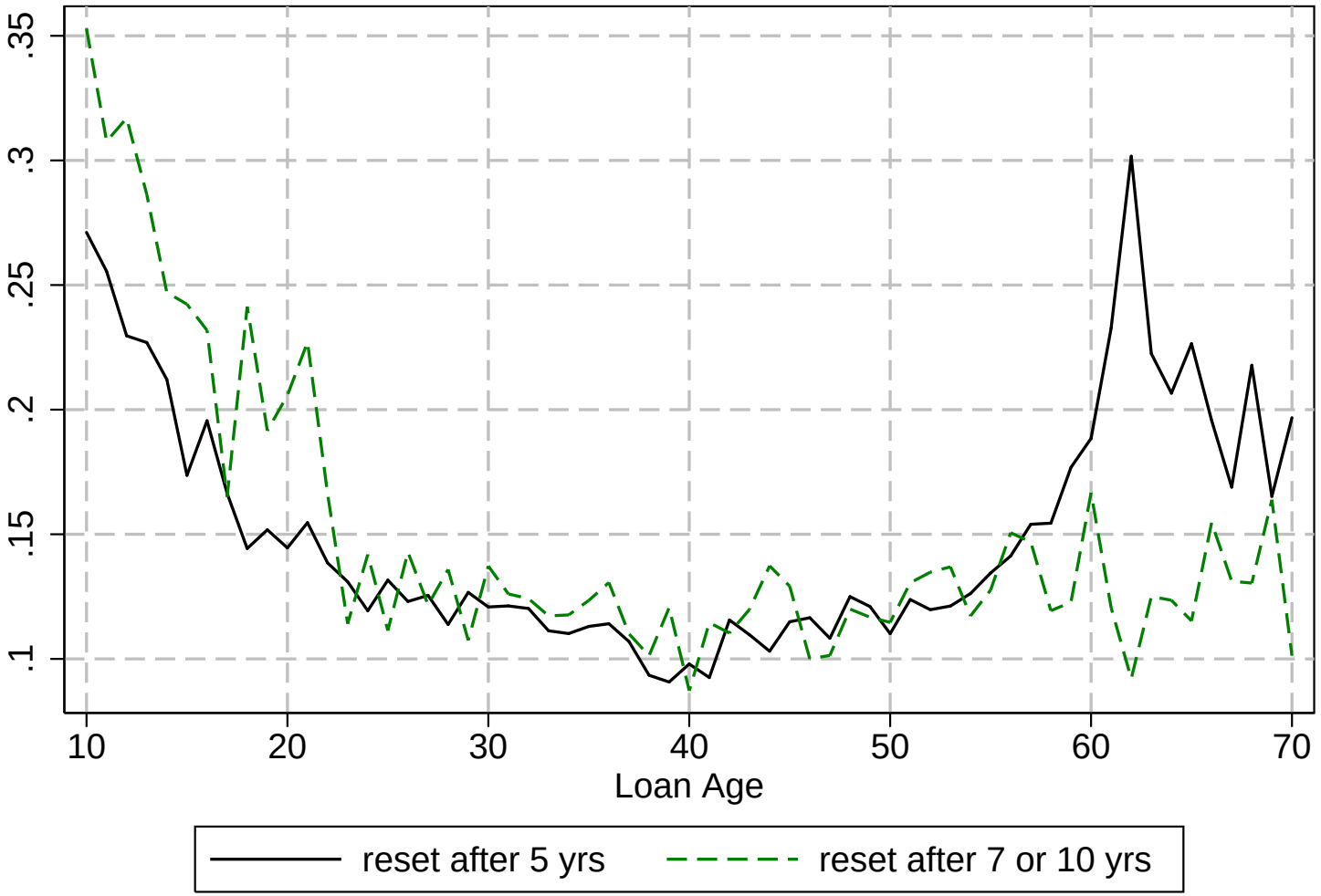
Cure hazard by loan age, newly 60 dpd loans



Cure = become current or pay off mortgage within 3 months of becoming 60 days delinquent.