Crowding Out Effects of Refinancing On New Purchase Mortgages

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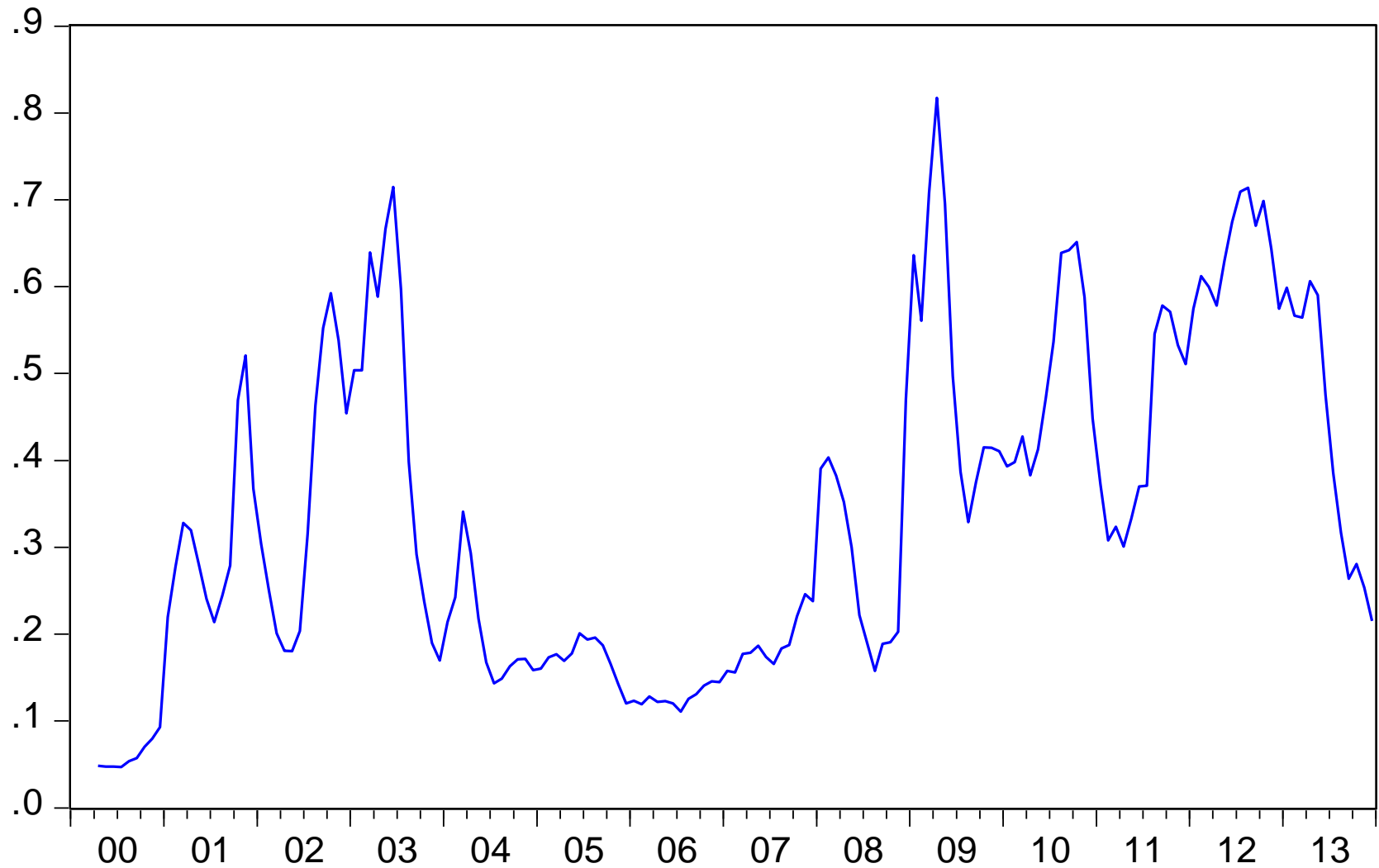## Conference on Bank Structure & Competition

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Disclaimer

- The views expressed herein are those of the authors and do not necessarily reflect the views of the Federal Reserve Board of Governors, its members, or its staff.

Refi Applications and Mortgage Employees

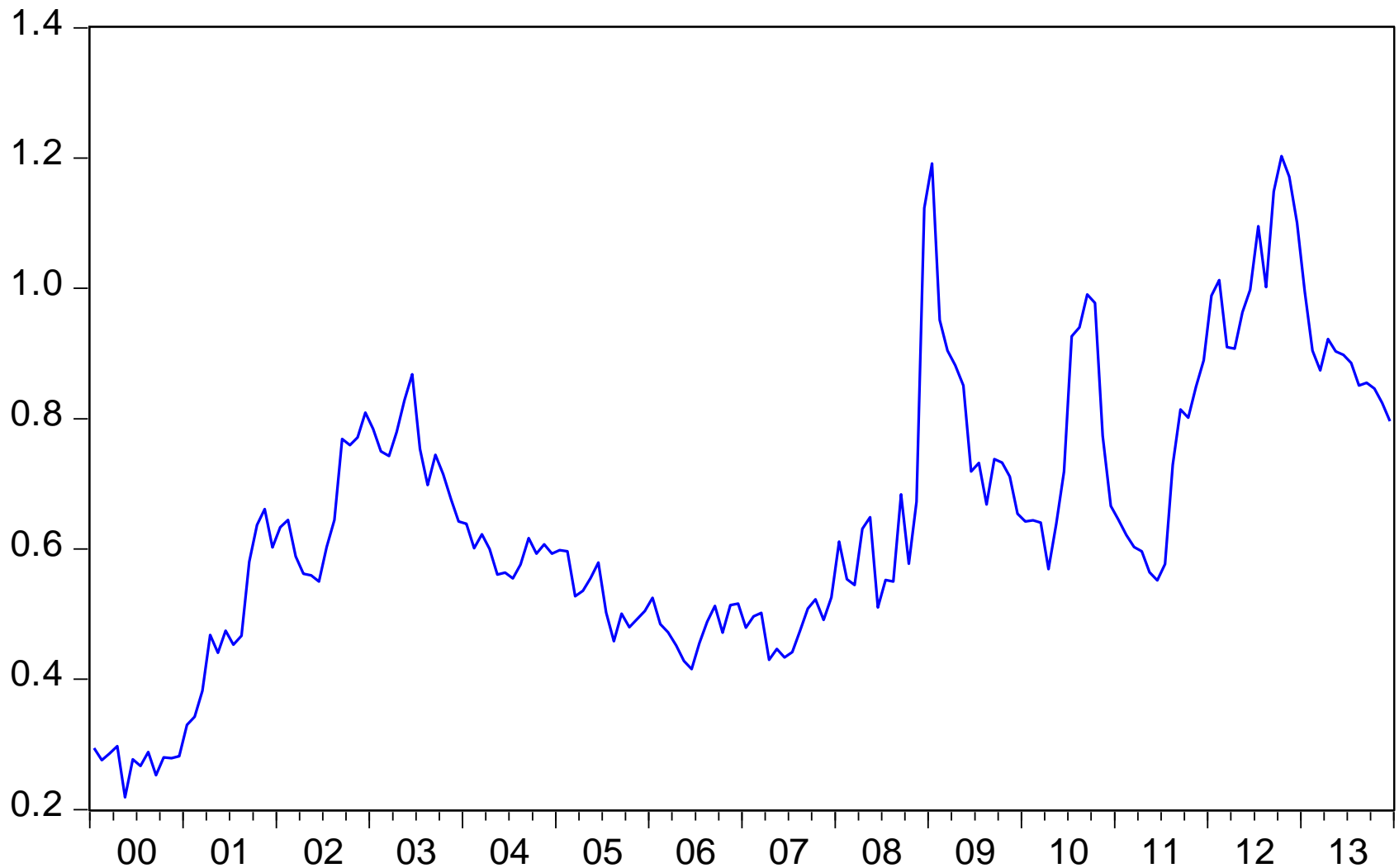# Capacity Utilization

Primary-Secondary Mortgage Rate Spread

Purchase Mortgage Originations
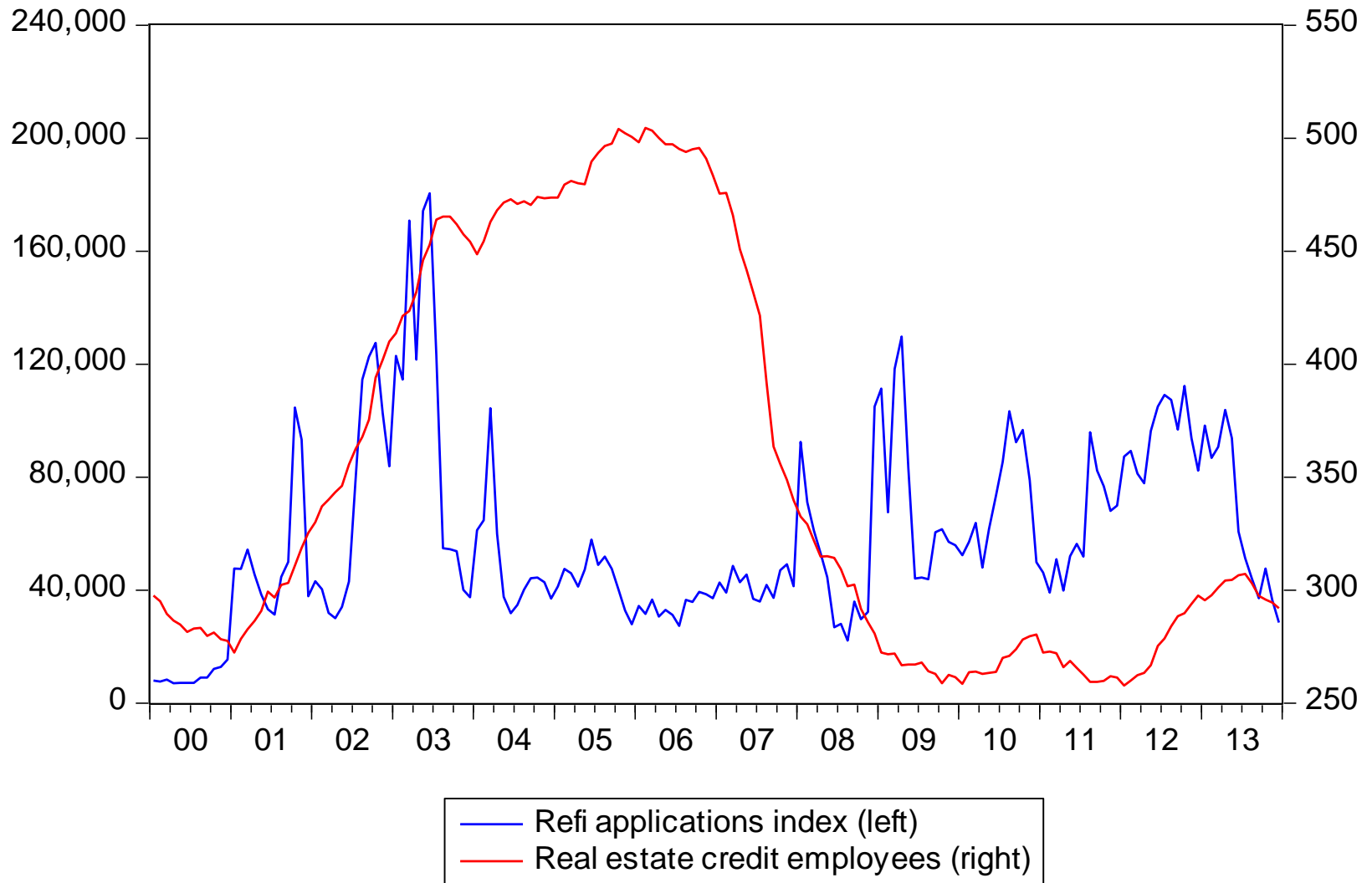
Source: Calculations from Lender Processing Services.

Credit Scores on New Purchase Mortgages

Legend:
- 10th percentile for credit score on GSE purchase originations (left)
- Capacity utilization (right)

This Paper

- Focuses on the quantity and characteristics of new purchase mortgage originations under capacity constraints

- We find that:
  - Primary-secondary spread positively correlated with capacity constraints (a la Fuster et al. (2013))
  - Lenders showed little propensity to expand capacity in response to increased refinance volumes
  - Capacity-constrained lenders might focus on mortgages that are easier and less costly to produce
  - As capacity constraints ease, lenders might turn to more difficult and more costly mortgages

This Paper

- Possible that purchase mortgage originations increase following a rise in interest rates

- Our estimates suggest that a 100 basis point increase in mortgage rates, such as that experienced in May 2013, could increase purchase mortgage originations for borrowers with credit scores of 621-680 by about 2.5 percent

  - Lower capacity utilization more than offsets the drag caused by higher mortgage rates

Model

$$\pi(N, R) = p_N(N)N + p_R(R)R - (N + R)i - u(R + \gamma N)$$

- $p_N' = -1/e, \; p_R' = -\theta/e$
  - $\theta < 1$: Refis more sensitive to interest rates than purchases

- $\frac{dN}{di} > 0 \; when: \; -1 + \frac{u'' e(\gamma - 1)}{2\theta} > 0$
  - $u'' \gg 0$ (marginal cost curve upward sloping)
  - $e \gg 0$ (elasticity really large)
  - $\gamma \gg 1$ (purchase mortgages much more costly)
  - $\theta \ll 1$ (refis much more interest rate sensitive)

- Possible to have $\frac{dN}{di} > 0$ under the right conditions

Simple Model

- Leontief production technology:
  - $N \stackrel{\text{def}}{=} min\{a_N(i), \gamma L_N\}, \; \gamma > 1$
  - $R \stackrel{\text{def}}{=} min\{a_R(i), L_R\}$

- Maximize profits subject to labor constraint $L_N + L_R \leq \bar{L}$

Simple Model
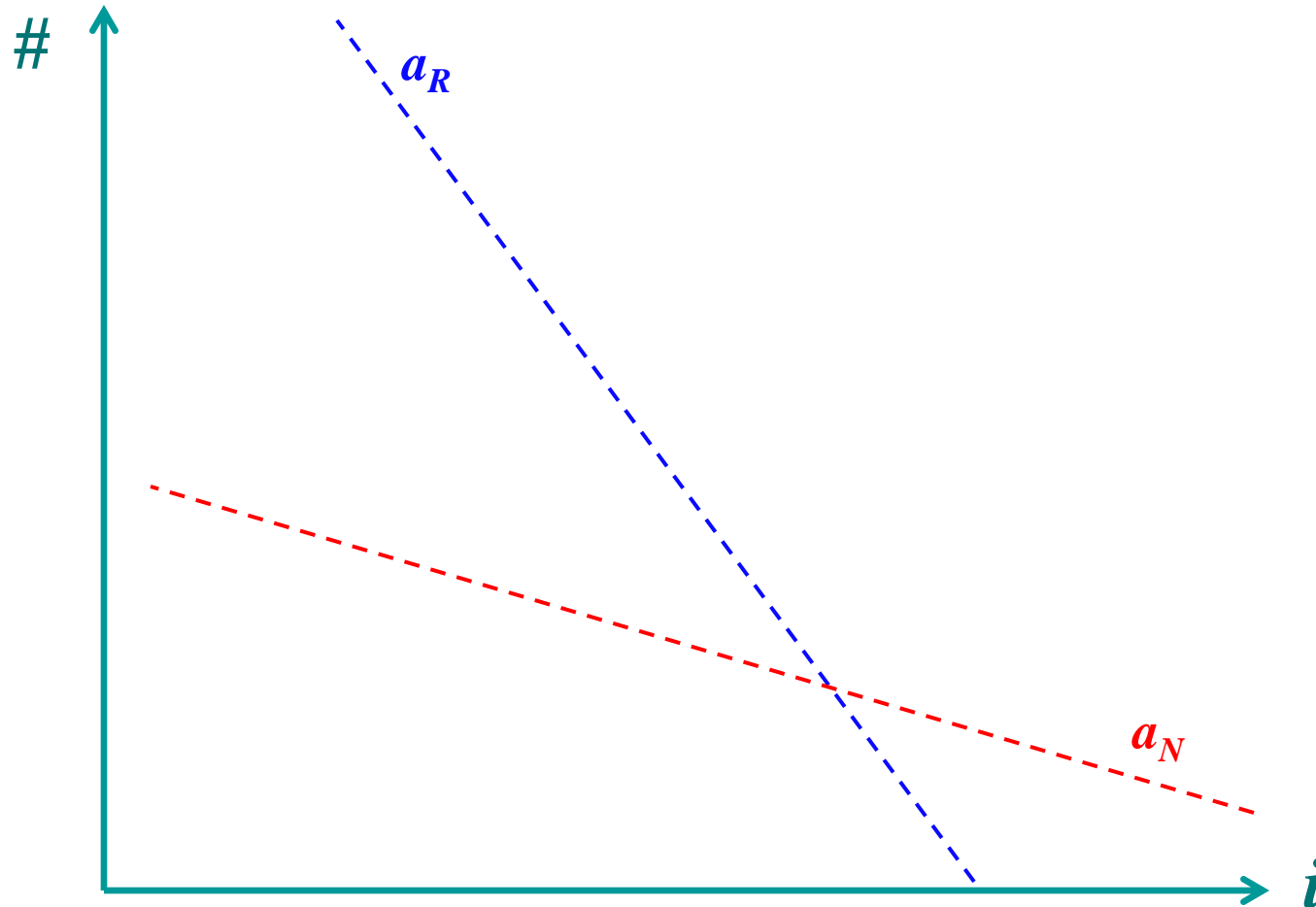
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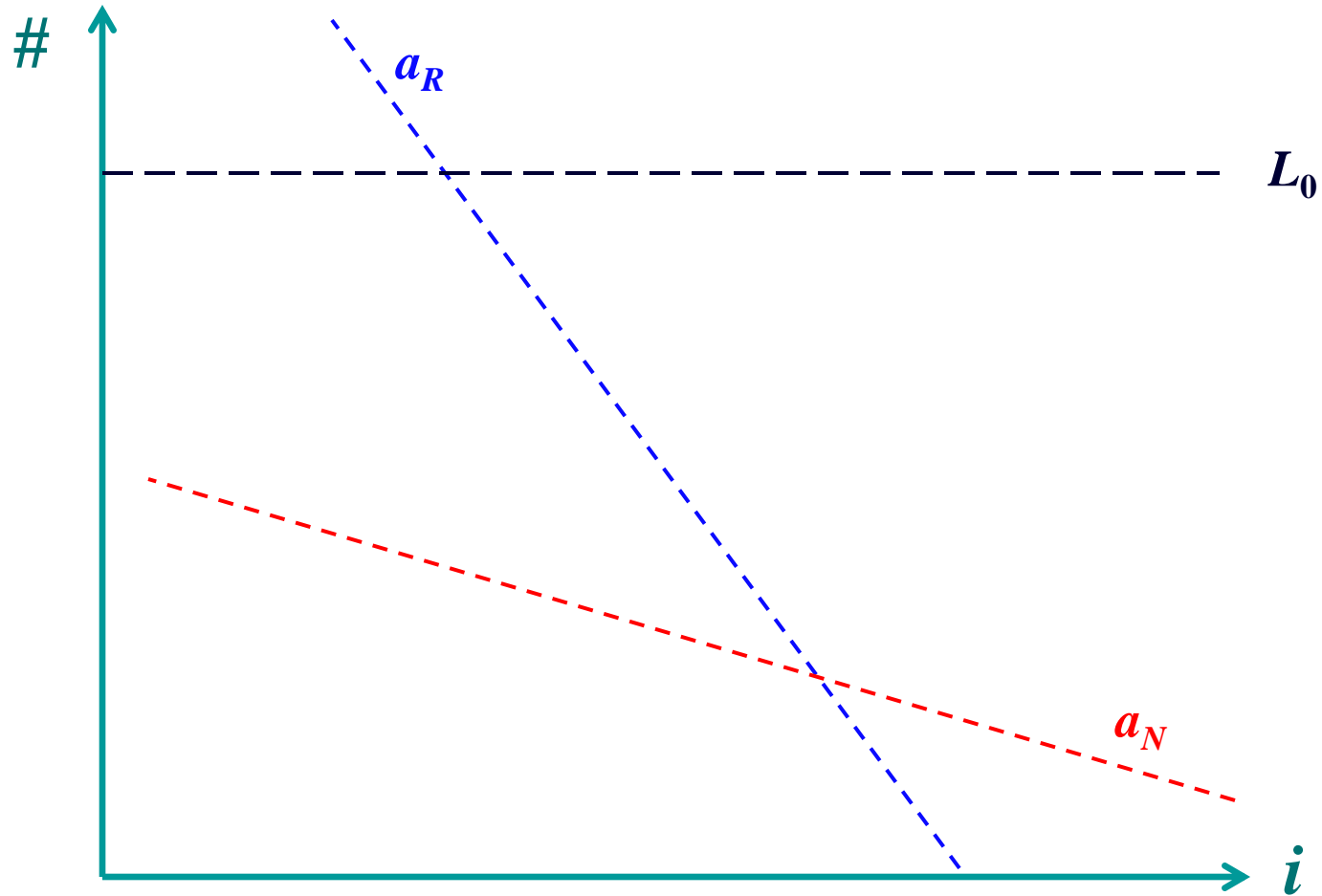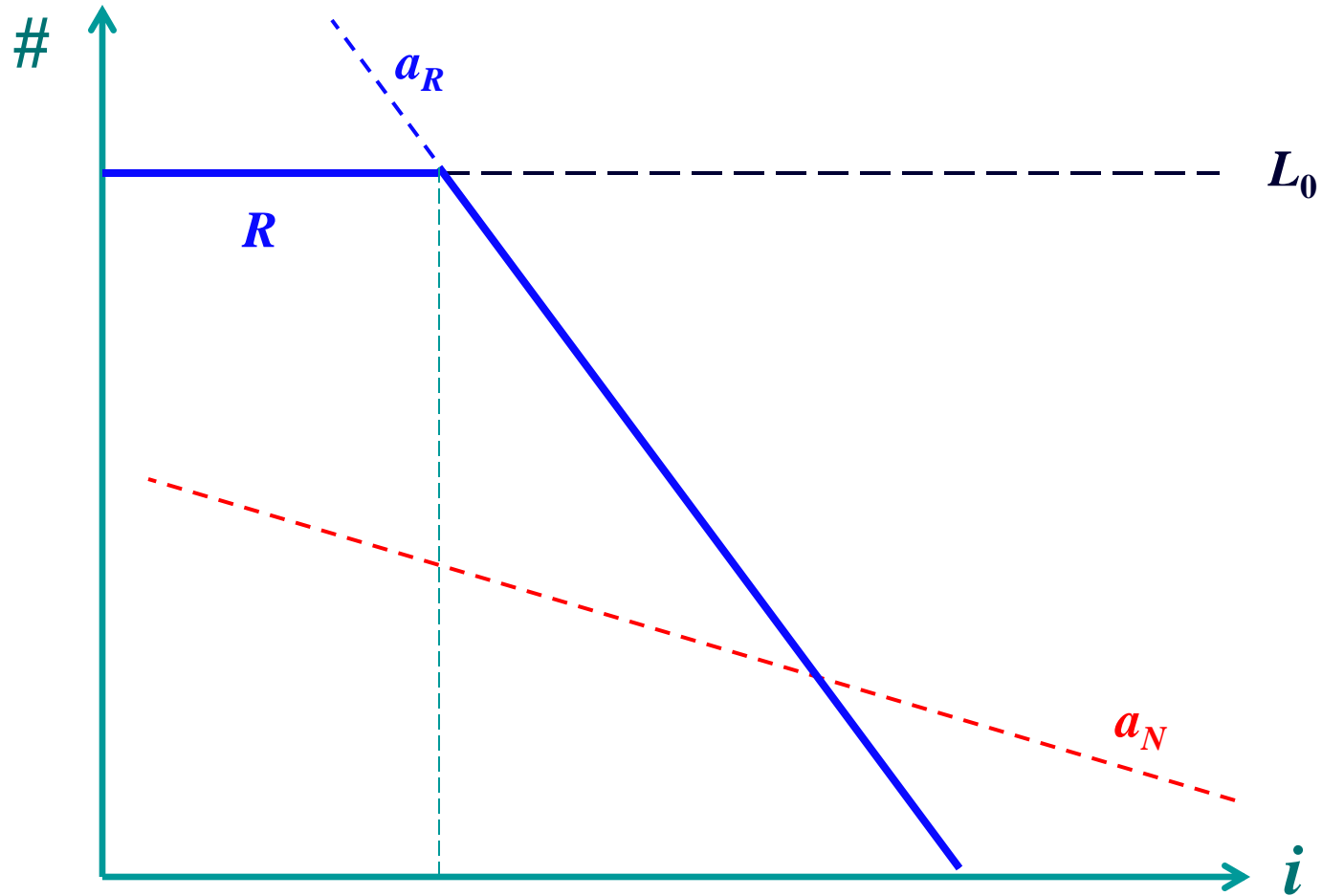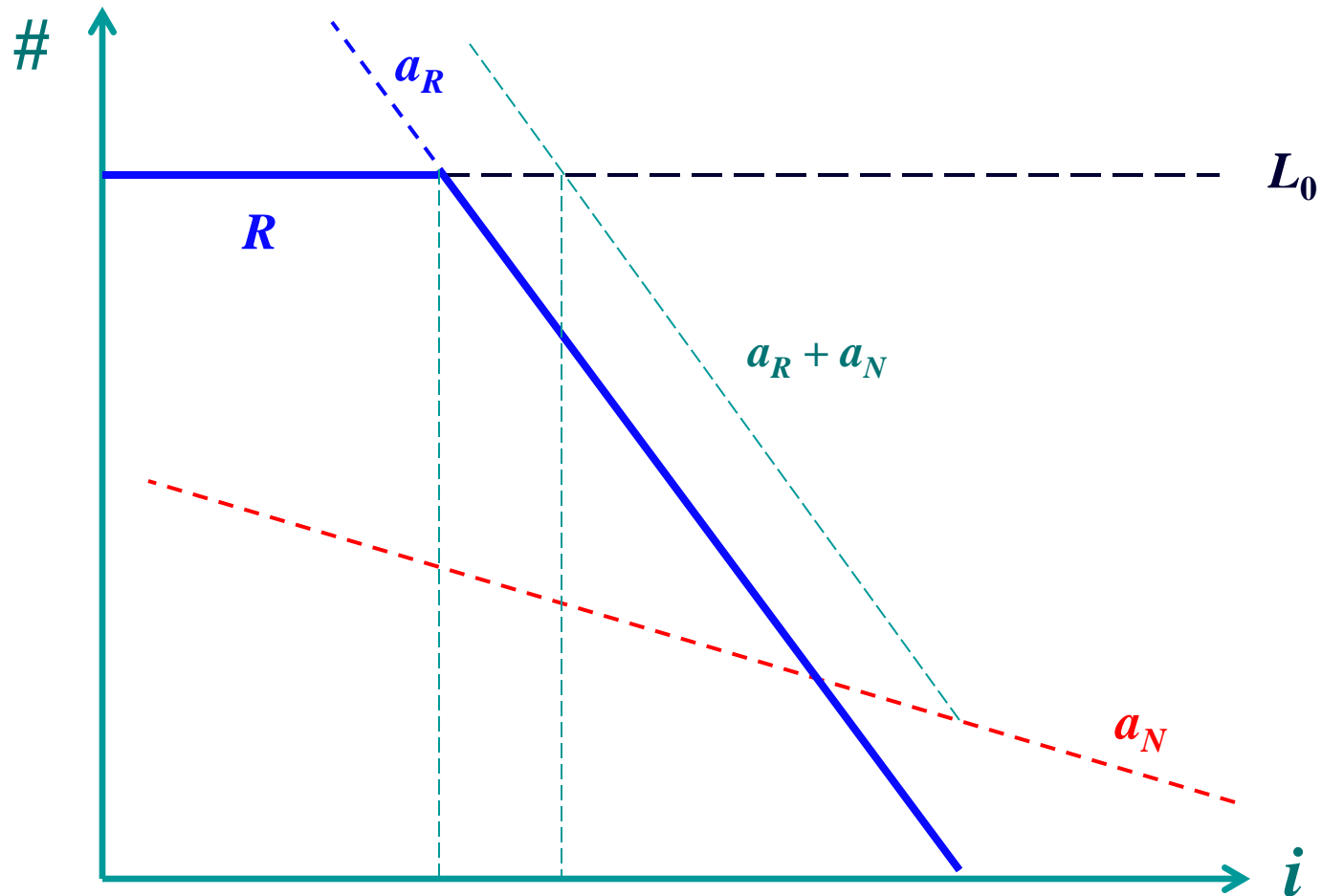
Simple Model

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Somewhat constrained

Unconstrained

a_R

R

L_0

$a_R + a_N$

N

a_N

#

i

Simple Model

Somewhat constrained

a_R

Unconstrained

L_0

R

Severely constrained

$a_R + a_N$

N

a_N

#

i
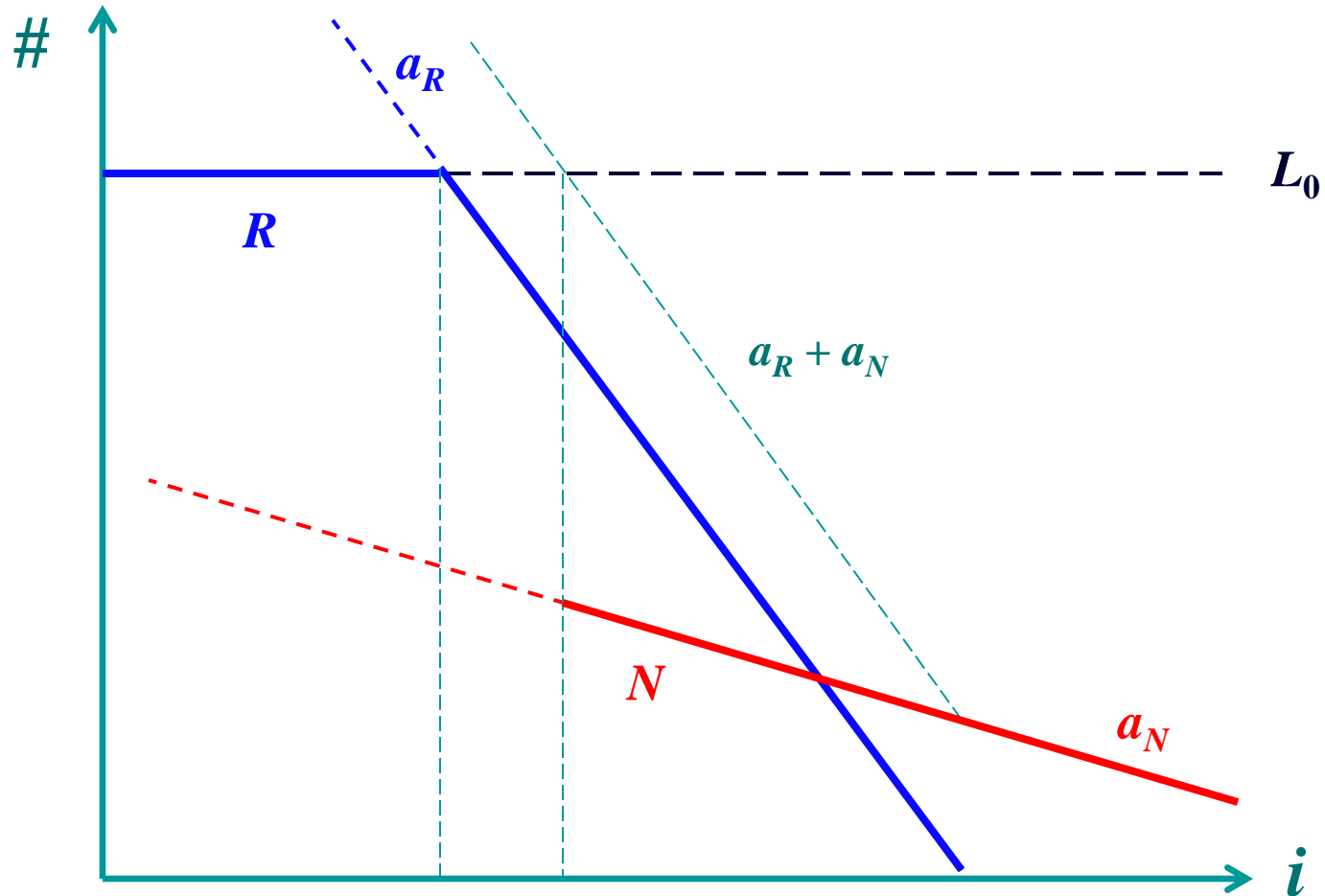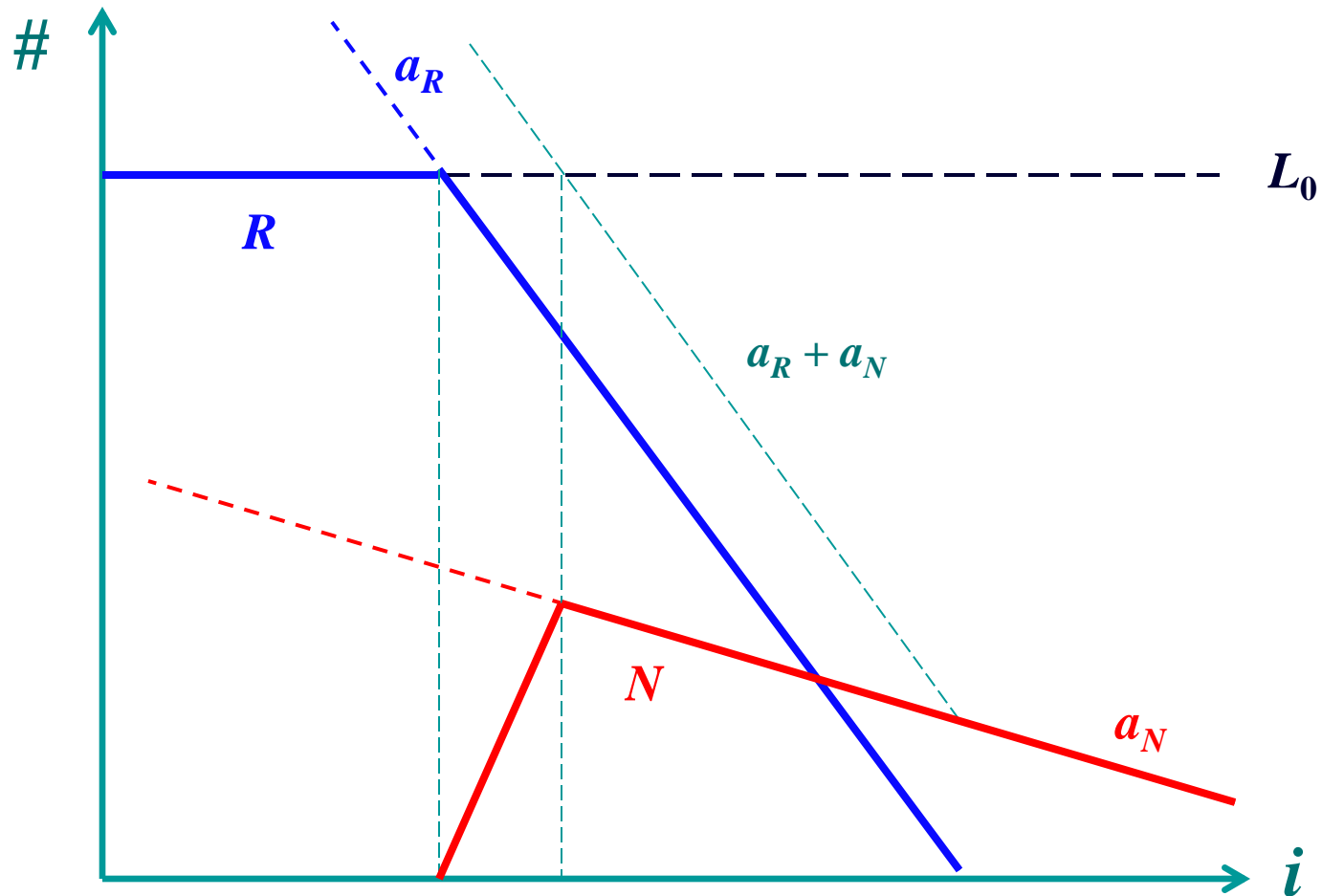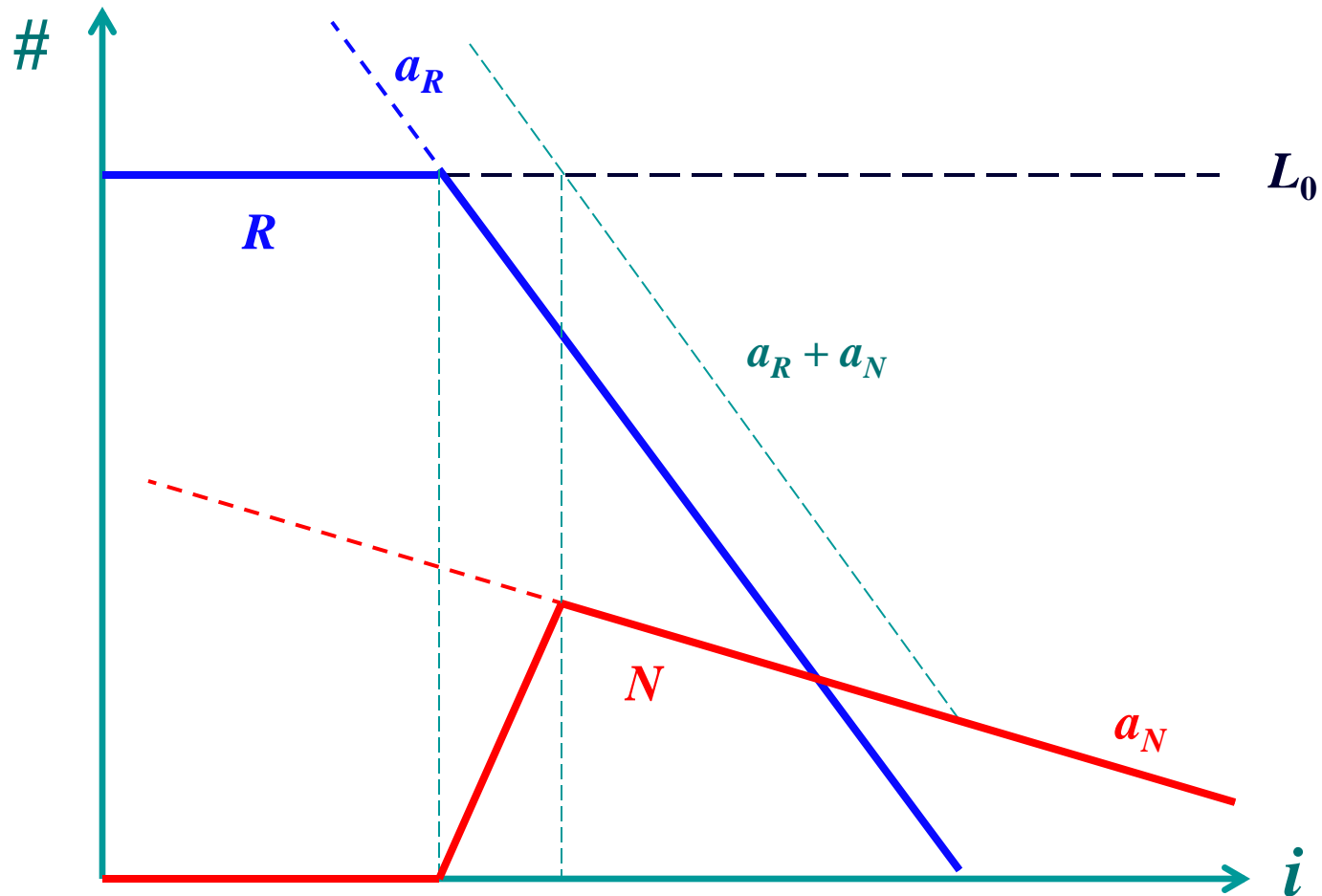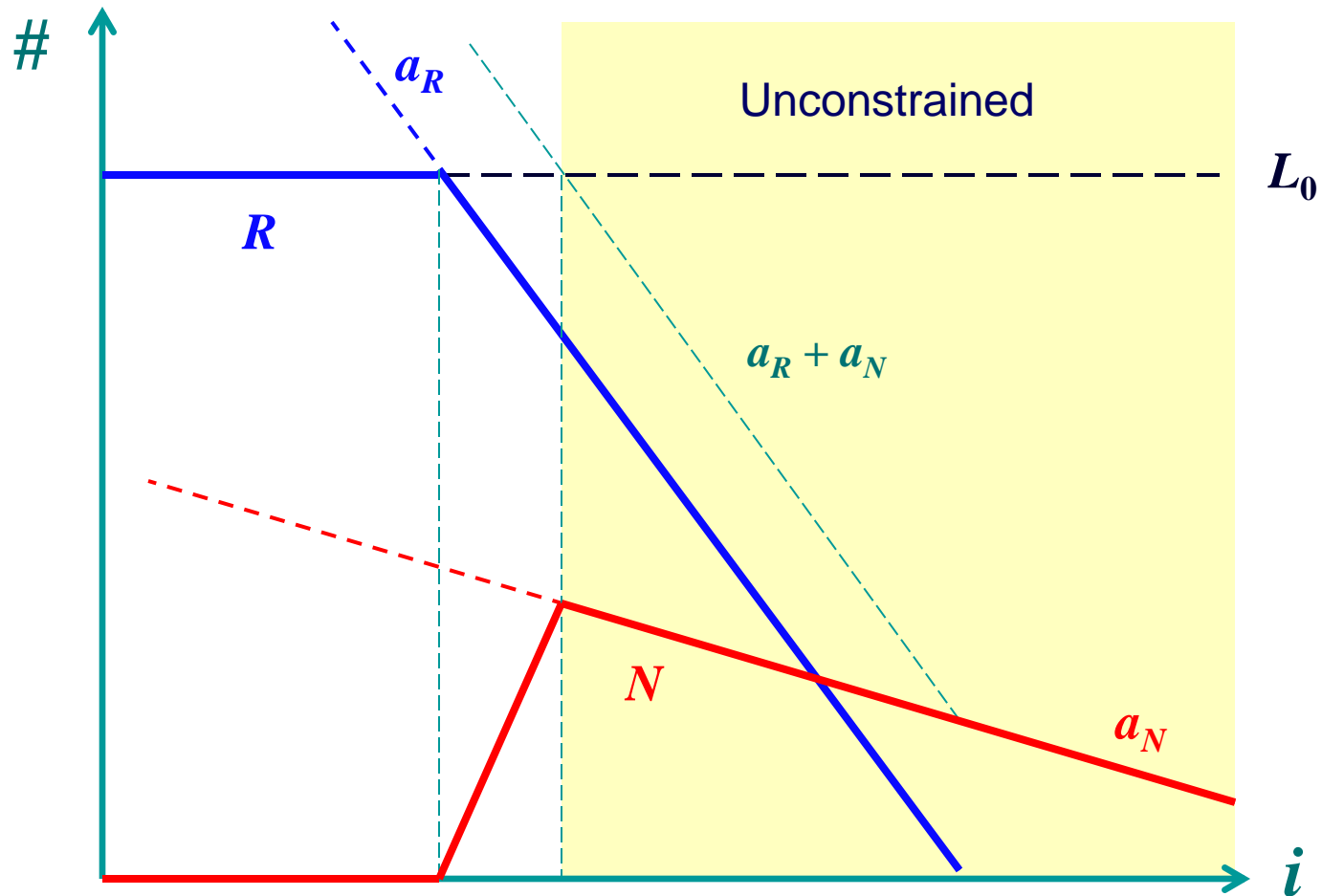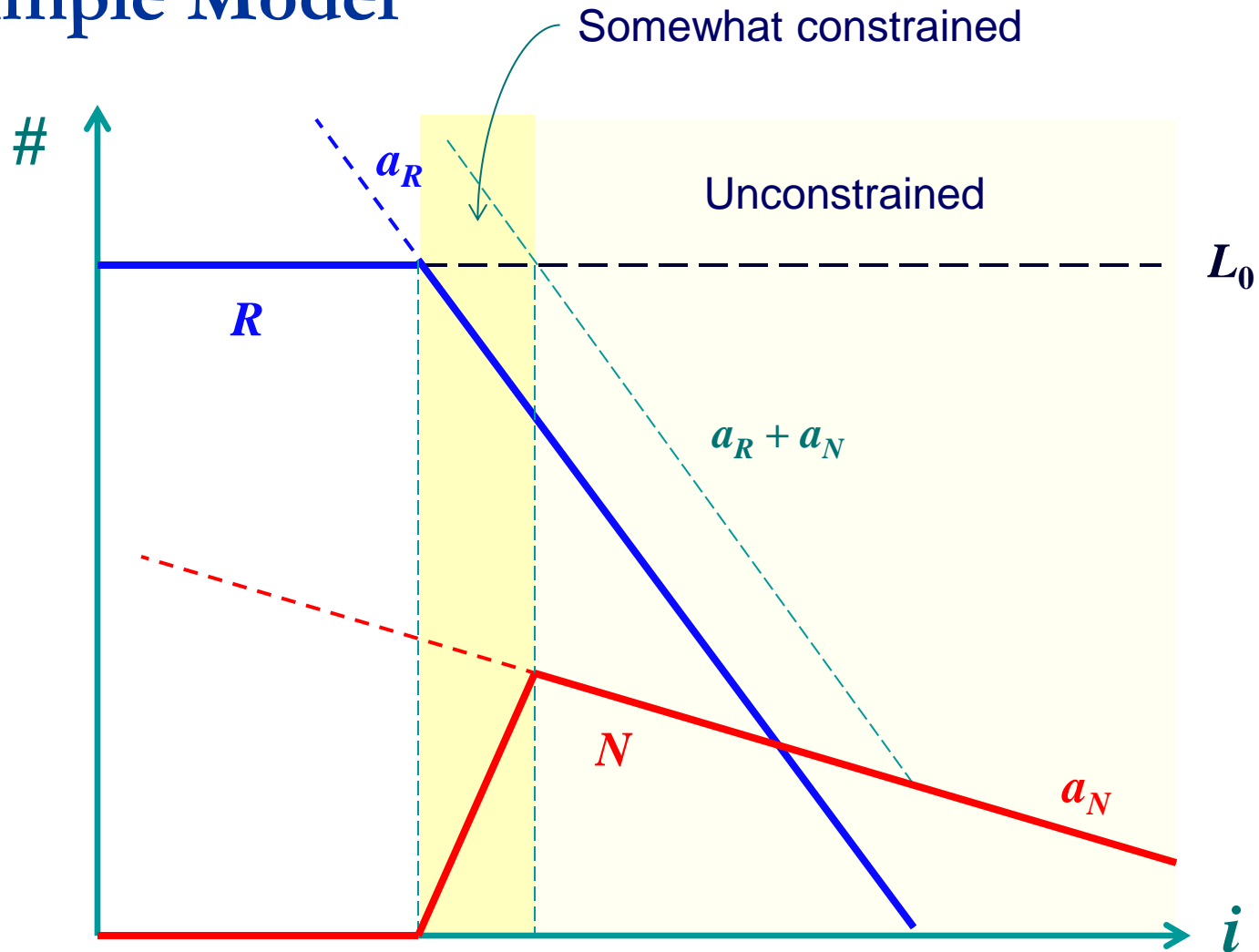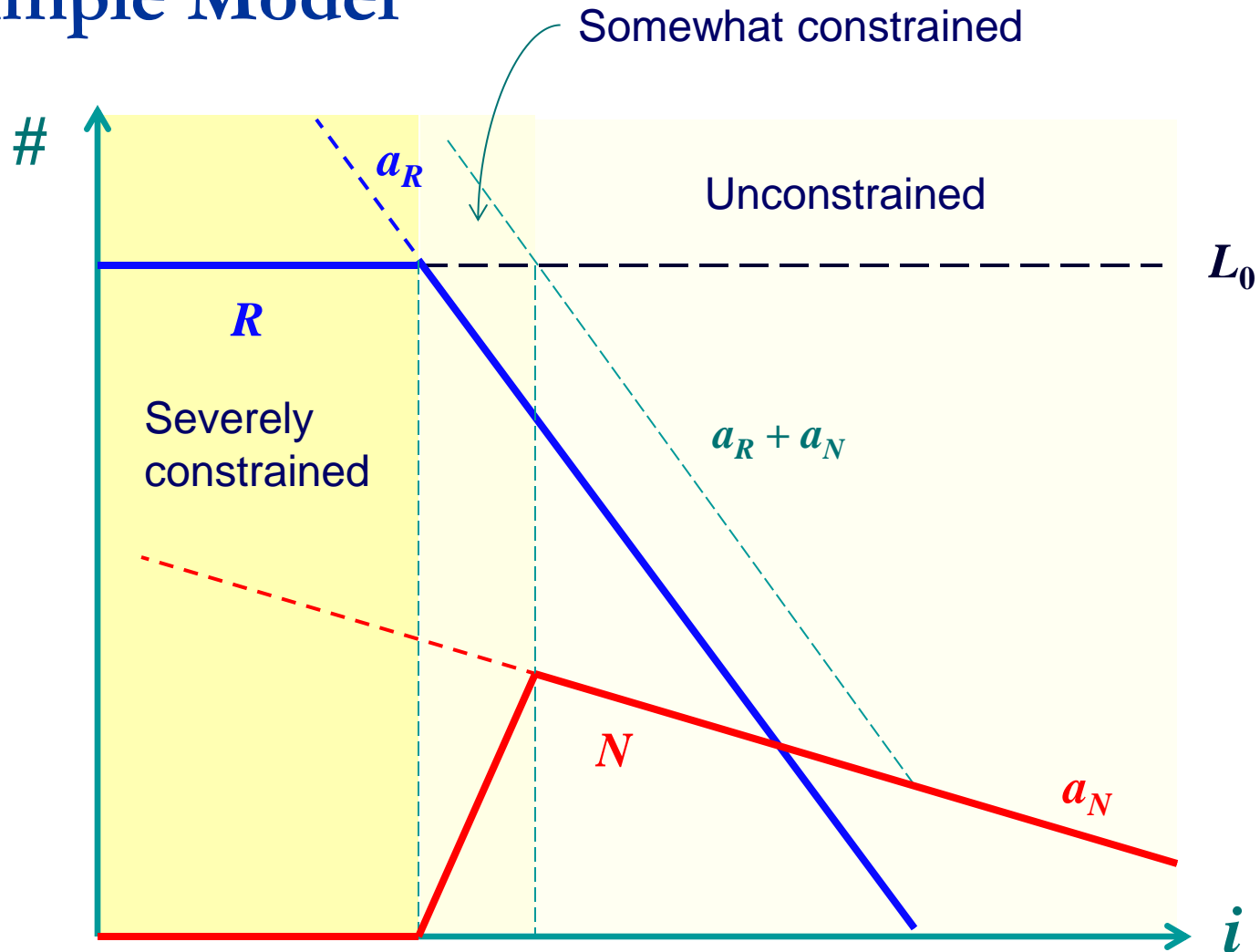
Simple Model

- When interest rates increase
    - Refinance activity is unambiguously lower
    - Purchase activity could increase or decrease

Data

- Monthly originations of first-lien fixed-rate GSE purchase mortgages from LPS Applied Analytics
  - Credit score groups: 620 or less, 621-680, 681-710, 711-740, 741-770, 771-790, and greater than 790

- Mortgage applications indexes from Mortgage Bankers Association

- Mortgage employees from the Bureau of Labor Statistics

- National house price index from CoreLogic

- Mortgage rates from Freddie Mac and LoanSifter

- Unemployment rate from the Bureau of Labor Statistics

Mortgage Employees

■ Long-run cointegrating relationship:

$$\log(Employees_t) + \delta_1 \log(PurcApps_t) + \delta_2 \log(RefiApps_t) = 0$$

Mortgage Employees

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	2000-2006	2009-2013
$\log(Employees_t)$	1.000	1.000
$\log(PurcApps_t)$	-0.470 **	-0.186 **
	(0.182)	(0.091)
$\log(RefiApps_t)$	-0.189 **	-0.056
	(0.040)	(0.059)

- Strong long-run relationship between the number of mortgage employees and mortgage applications
- Purchase applications have a statistically significant positive effect on employment

Mortgage Employees

- Long-run cointegrating relationship:

$$\log(Employees_t) + \delta_1 \log(PurcApps_t) + \delta_2 \log(RefiApps_t) = 0$$

	2000-2006	2009-2013
$\log(Employees_t)$	-0.057 **	-0.091 **
	(0.016)	(0.031)
$\log(PurcApps_t)$	0.004	0.254
	(0.112)	(0.313)
$\log(RefiApps_t)$	-0.053	-1.565 **
	(0.511)	(0.663)

- Number of mortgage employees tends to adjust very slowly, only about 6-9 percent per month

Purchase Mortgage Originations

$$log(Origs_{it}) = \beta_0 + \beta_1 CapUtil_{t-1} + \beta_2 log(Apps_{t-1}) + \beta_3 X_t + \varepsilon_{it}$$

- Proxy for latent mortgage demand: $log(Apps_{t-1})$

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	Credit Score						
	<=620	621-680	681-710	711-740	741-770	771-790	>790
$2009 - 13$	-1.441 **	-0.406 **	-0.110	0.098	0.178	0.243	0.288 **
	(0.683)	(0.147)	(0.126)	(0.134)	(0.138)	(0.123)	(0.122)

- As capacity utilization increases:
  - Fewer purchases mortgages are produced for the lowest credit score groups (620 or lower, and 621-680)
  - More purchase mortgages are produced for the highest credit score group (790 or higher)

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$2003 - 07$	0.625 **	0.573 **	0.806 **	0.860 **	0.834 **	0.903 **	1.205 **
	(0.149)	(0.109)	(0.142)	(0.140)	(0.137)	(0.134)	(0.168)

- Capacity utilization matters more during recent refinancing episodes than in the past

Purchase Mortgage Originations

- Our estimates suggest that a 100 basis point increase in mortgage rates, such as that experienced in May 2013, could increase purchase mortgage originations for borrowers with credit scores of 621-680 by about 2.5 percent
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Purchase Mortgage Credit Scores

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	Median	10th Percentile
$CapUtil_{t-1}$	8.1 **	14.6 **
	(2.3)	(2.3)

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	Median	10th Percentile
$CapUtil_{t-1}$	8.1 **	14.6 **
	(2.3)	(2.3)

- Increased capacity utilization in 2012:
  - Increased median credit score about 2.5 points
  - Increased tenth percentile credit score about 5 points
- Lower capacity utilization latter half of 2013:
  - Decreased median credit score about 3 points
  - Decreased tenth percentile about 6 points

Robustness

$$log(Origs_{it}/Origs_{850,t}) = \beta_0 + \beta_1 CapUtil_{t-1} + \beta_3 X_t + \varepsilon_{it}$$

- Implicit proxy for latent mortgage demand: $log(Origs_{850,t})$

Legend: 621-680 relative to >790 — 681-710 relative to >790 — 711-741 relative to >790 — Capacity utilization (right, inverted)
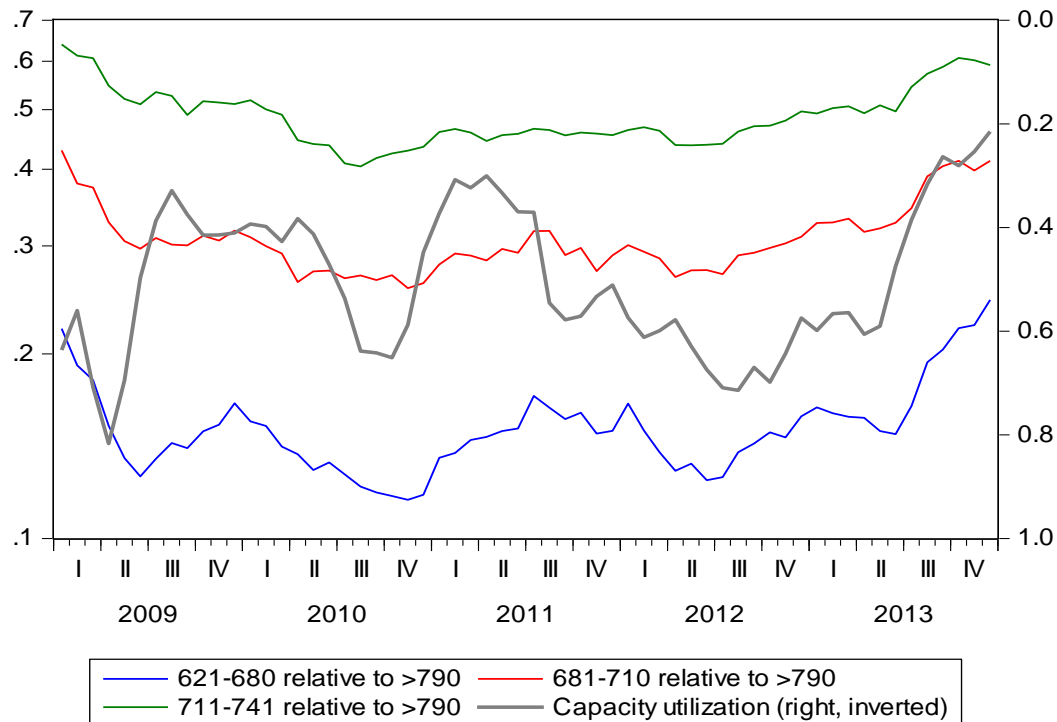
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	Credit Score					
	<=620	621-680	681-710	711-740	741-770	771-790
2009 − 13	-2.424 **	-0.745 **	-0.473 **	-0.303 **	-0.222 **	-0.097
	(0.808)	(0.129)	(0.097)	(0.105)	(0.098)	(0.049)
2003 − 07	-0.599 **	-0.706 **	-0.453 **	-0.398 **	-0.441 **	-0.372 **
	(0.181)	(0.118)	(0.105)	(0.108)	(0.119)	(0.103)

■ Originations among the lowest credit score groups are suppressed relative to those in higher credit score groups

Conclusions

- Binding mortgage processing capacity constraints can reduce new purchase mortgage originations
    - Mortgage lenders complete mortgages that are easier and less costly to produce
    - Adverse effect on low- to modest-credit-quality borrowers when interest rates are low

- When rates rise and capacity utilization falls
    - Purchase mortgage originations can actually increase
    - Particularly for borrowers of low to modest credit quality

Conclusions

- Our estimates suggest that a 100 basis point increase in mortgage rates, such as that experienced in May 2013, could increase purchase mortgage originations for borrowers with credit scores of 621-680 by about 2.5 percent
  - Lower capacity utilization more than offsets the drag caused by higher mortgage rates

- Lower capacity utilization latter half of 2013:
  - Decreased median credit score about 3 points
  - Decreased tenth percentile about 6 points

Extensions

- HMDA data
  - Denial rates
  - Origination timelines
  - Credit scores?
    - Match with other data
  - 2013 data not yet available

- Equifax/NYFed CCP data
  - Better and more consistent coverage of mortgages?