

The Inefficiency of Refinancing: Why Prepayment Penalties Are Good for Risky Borrowers

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Motivation

- Refinancing penalties are increasingly used in the mortgage market, especially for the risky borrowers.
 - 80% of subprime (Standard & Poor's).
- Generate great controversy and criticism.
 - Mortgage Reform Act 2007 curtails refinancing penalties,
 - Draft Federal Reserve Board 2007 rules restrict their usage.

“I would eliminate the prepayment penalties that lead to such high rates of default”.

Hilary Clinton, March 24, 2008.

Motivation

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 - 80% of subprime (Standard & Poor's).
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 - Mortgage Reform Act 2007 curtails refinancing penalties,
 - Draft Federal Reserve Board 2007 rules restrict their usage.
- Globally mortgage prepayment penalties are the norm (except U.S. and the Netherlands)
- Most commercial loans restrict prepayment.

Our Question

Explore practice of refinancing in a competitive lending market model

- Most research focuses on refinancing as a response to interest rate reductions.
- We consider that the borrower's creditworthiness is likely an important driver of refinancing.
 - variability in credit is now much more critical.

Setup

- Risky borrowers want to receive credit to buy a house
 - initial wealth (creditworthiness) is observable to the lender
 - realize ex-post wealth shocks (house price changes, divorce, unemployment, promotion)
- Risk neutral lenders provide mortgage credit
- Fixed-rate mortgage
 - constant interest rates
 - costly foreclosure
 - may impose a prepayment penalty (commitment to lender)
- Competitive equilibrium

Lenders Must Break-Even

- Charge high premium (based on initial wealth/creditworthiness):
 - prices out the riskiest borrowers (credit rationing)
 - increases likelihood of costly foreclosure
- Raise ex-ante fees:
 - borrowers are liquidity constrained
 - prices out the riskiest borrowers (credit rationing)
- Impose prepayment penalty:
 - ex-post risk sharing between borrowers
 - lowers mortgage premium, reducing costly defaults

Intuition:

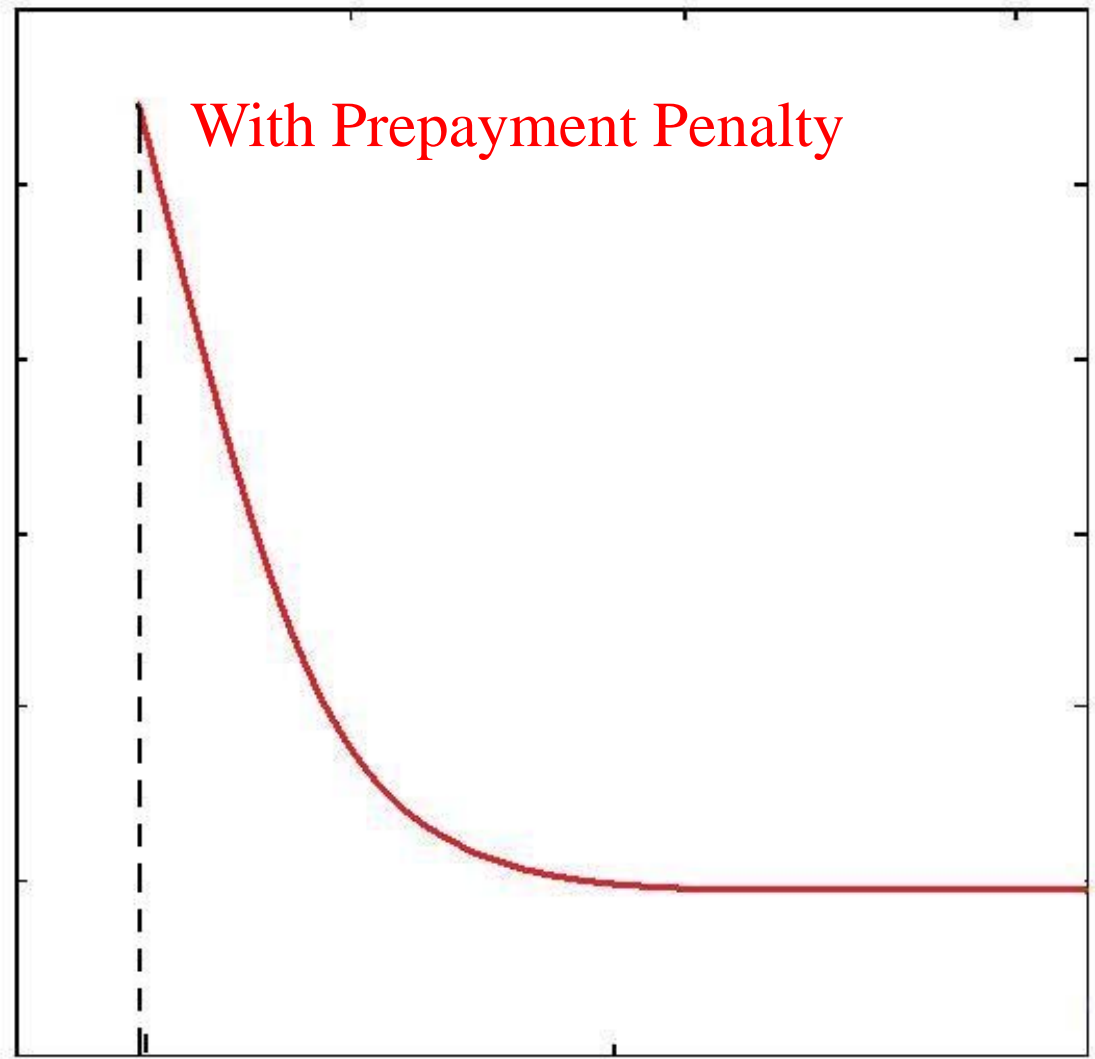
Same as for Life/Health Insurance

- “Reclassification risk”: bad news about the persistent health status of a consumer can result in increased premiums.
- Commitment to long term contracts allow insurance of “reclassification risk” [e.g. Hendel and Lizzeri (QJE, 2003)].
- Same issue for long-term care insurance, workers compensation etc...

Proposition 5 (Inefficiency of refinancing)

- i) (Ex-ante) Borrower benefits from prepayment penalty
- ii) Benefits from prepayment are increasing in the riskiness of the borrower (more ex-post risk sharing)
 - a) Without prepayment penalties, some risky borrowers are excluded from the mortgage market
 - b) Without prepayment penalties, mortgage risk premium increases for the riskiest borrowers (at an increasing rate)

Mortgage Premia

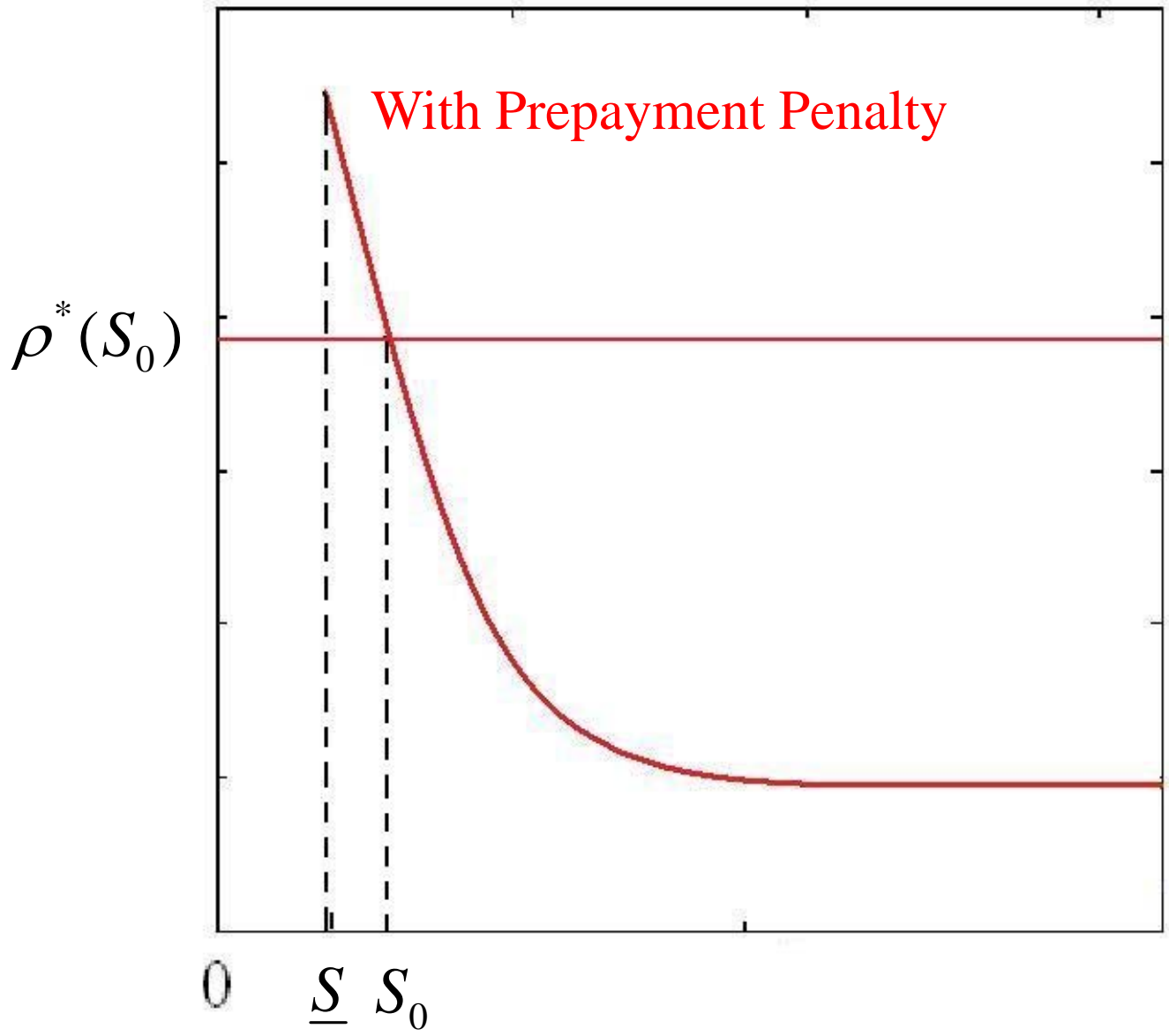


With Prepayment Penalty

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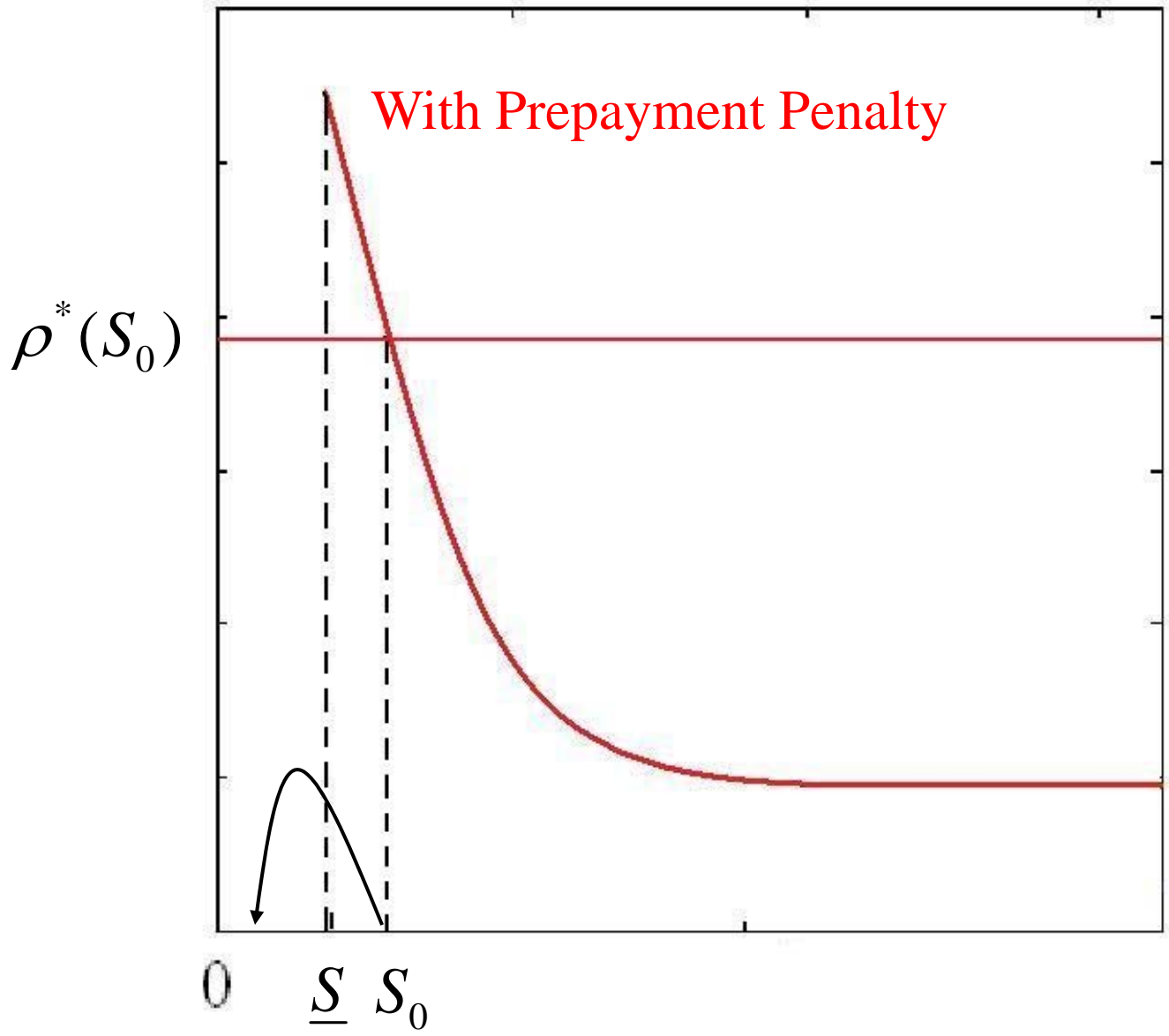
Creditworthiness (initial wealth)

Mortgage Premia



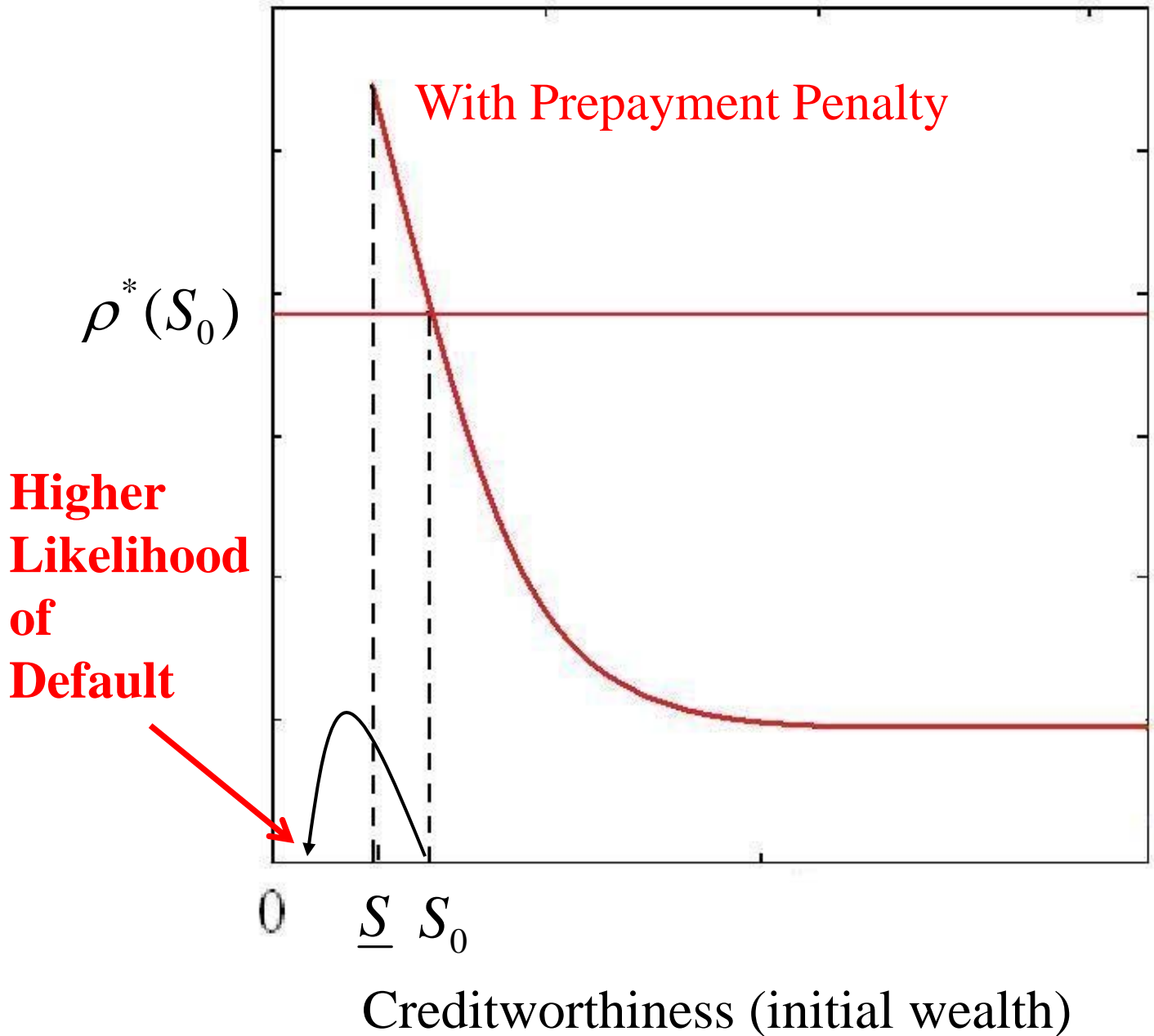
Creditworthiness (initial wealth)

Mortgage Premia

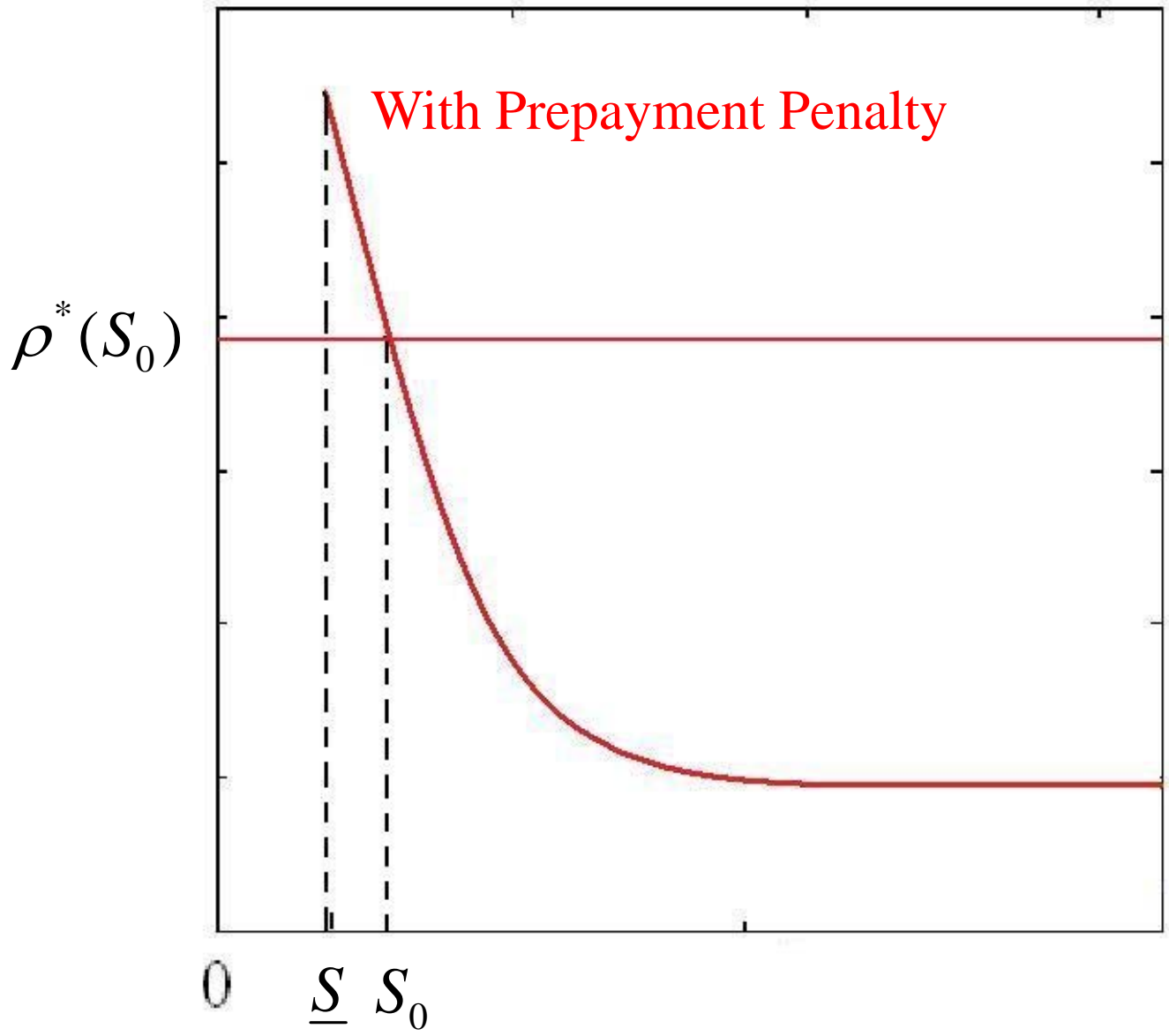


Creditworthiness (initial wealth)

Mortgage Premia

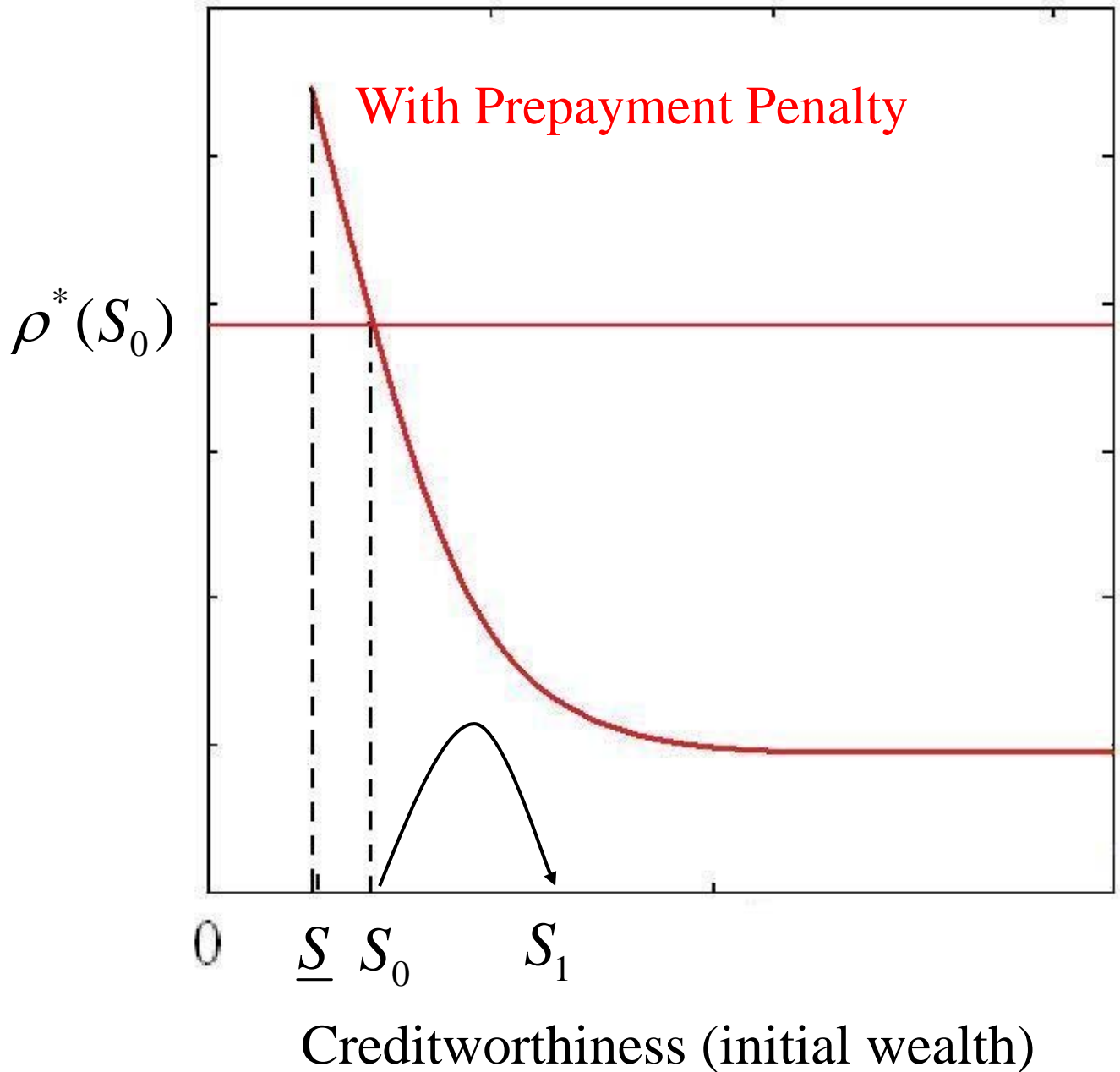


Mortgage Premia

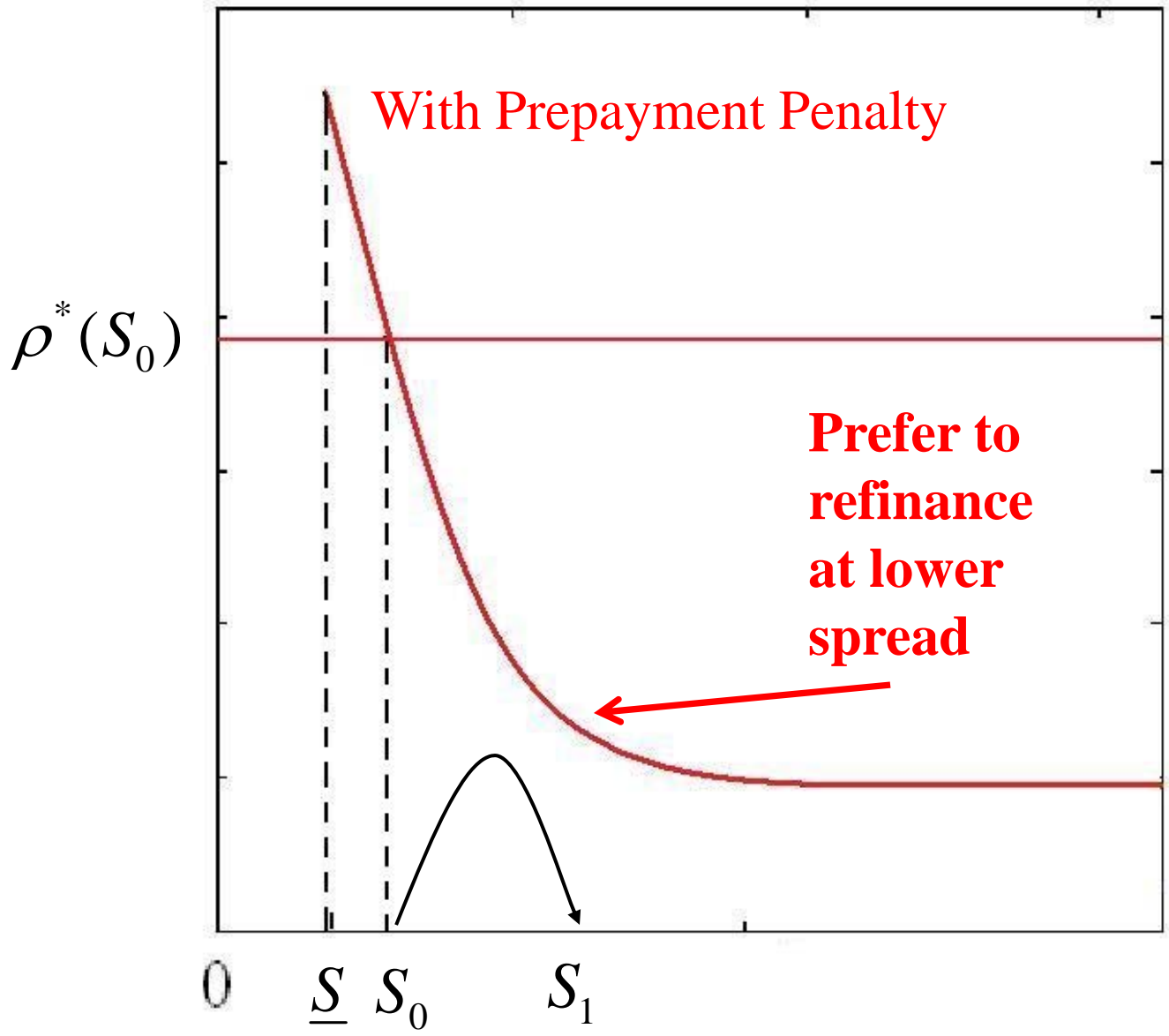


Creditworthiness (initial wealth)

Mortgage Premia

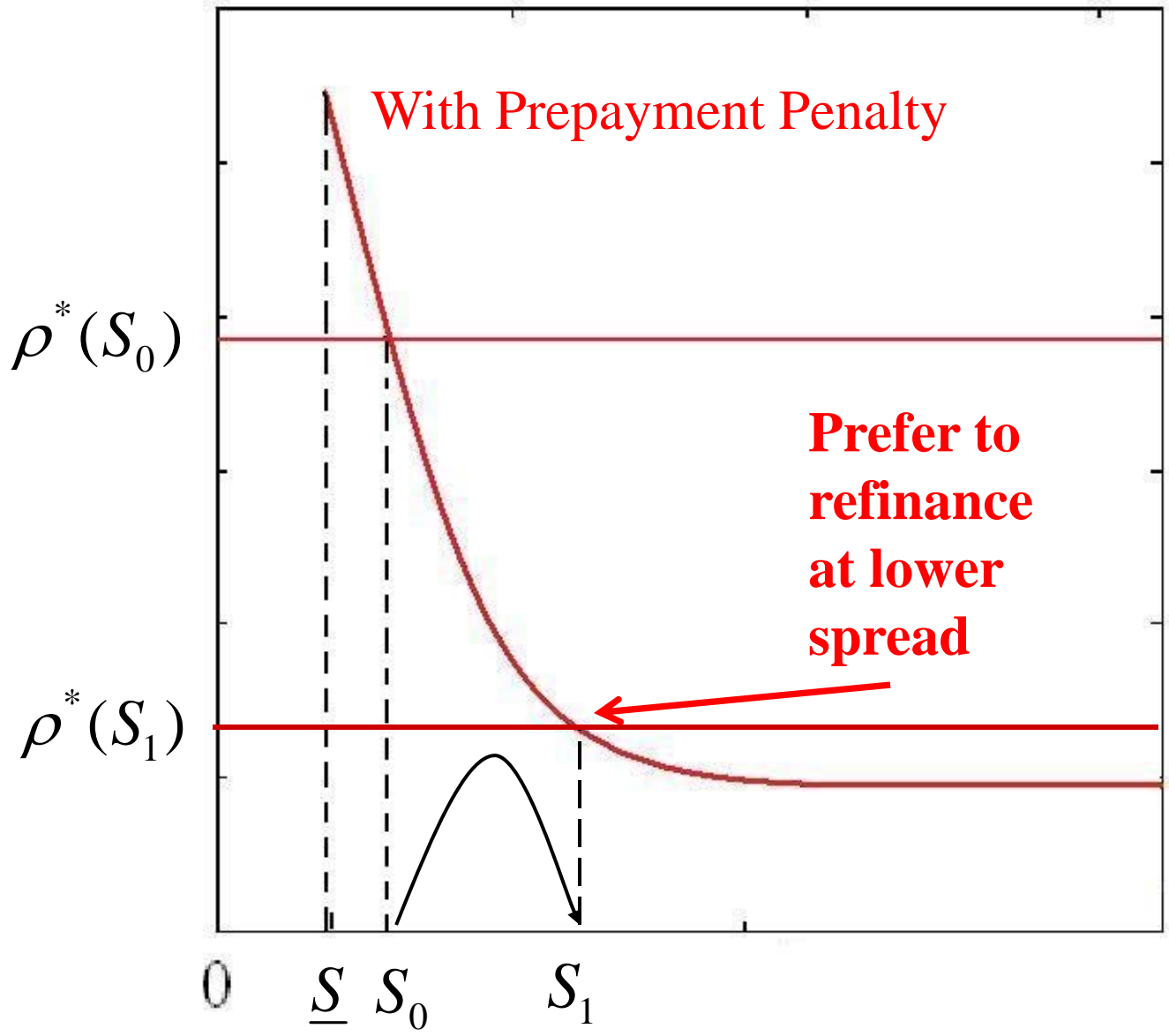


Mortgage Premia



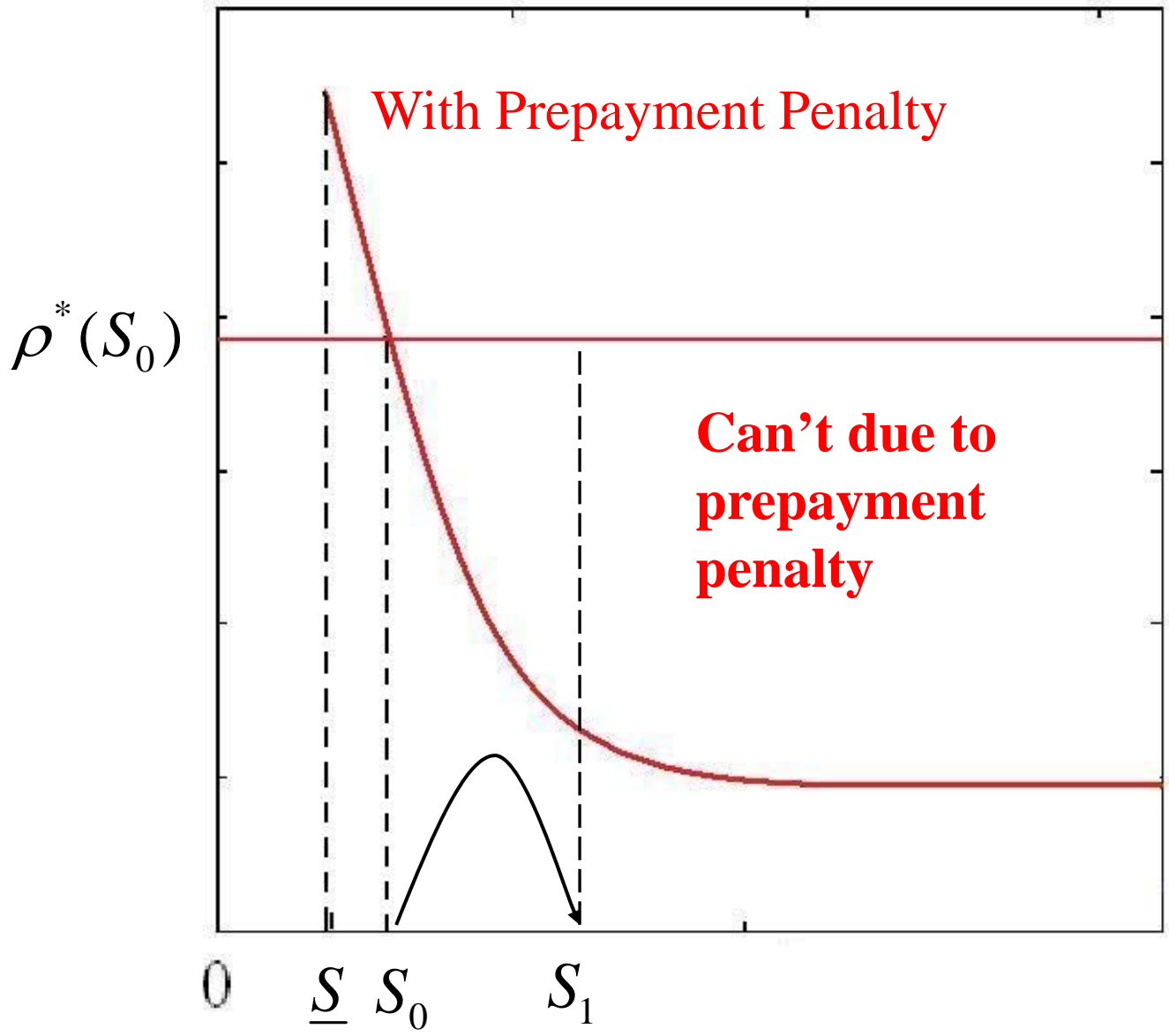
Creditworthiness (initial wealth)

Mortgage Premia



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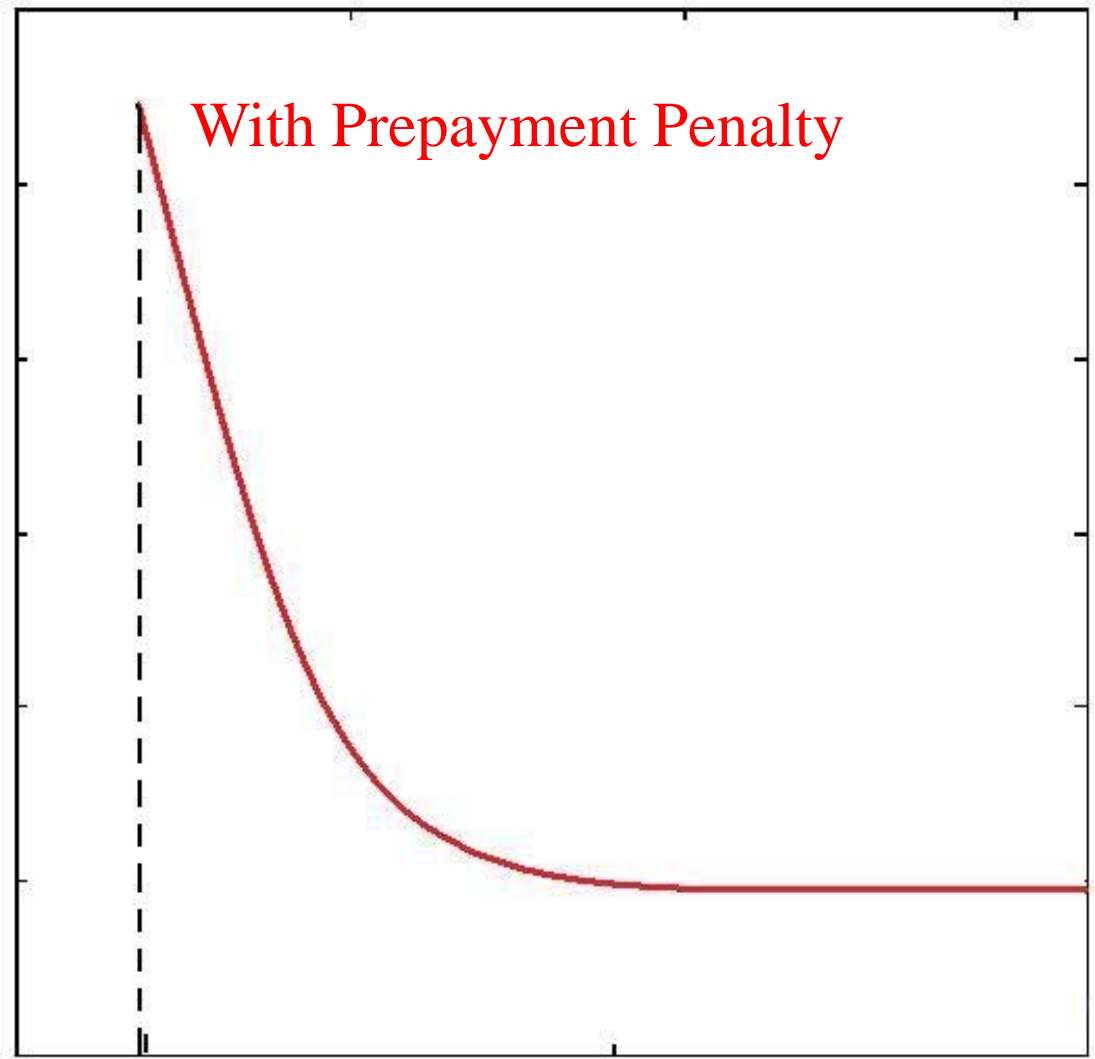
With Prepayment Penalty

Can't due to prepayment penalty

$\rho^*(S_0)$

0 S S_0 S_1

Mortgage Premia

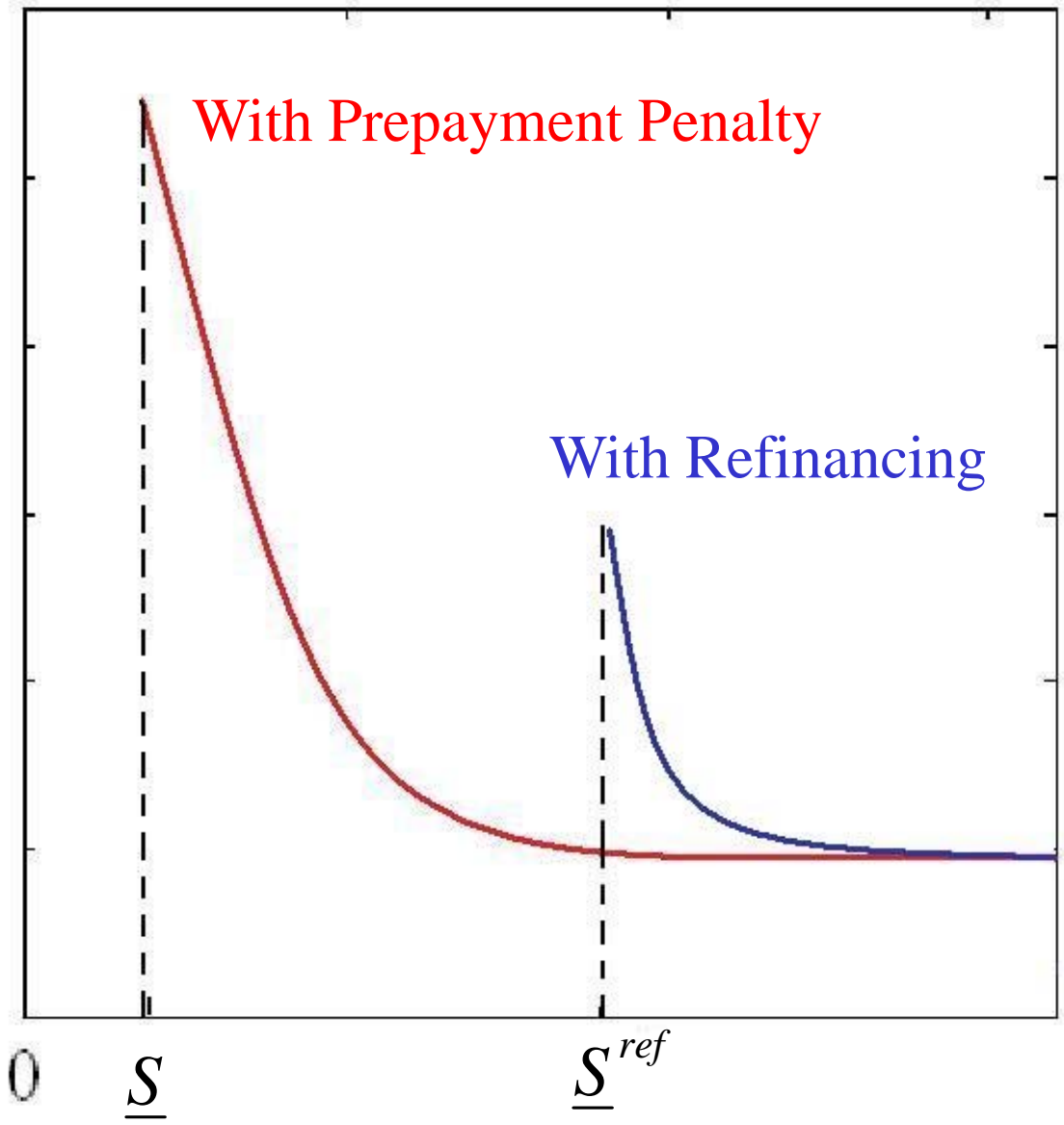


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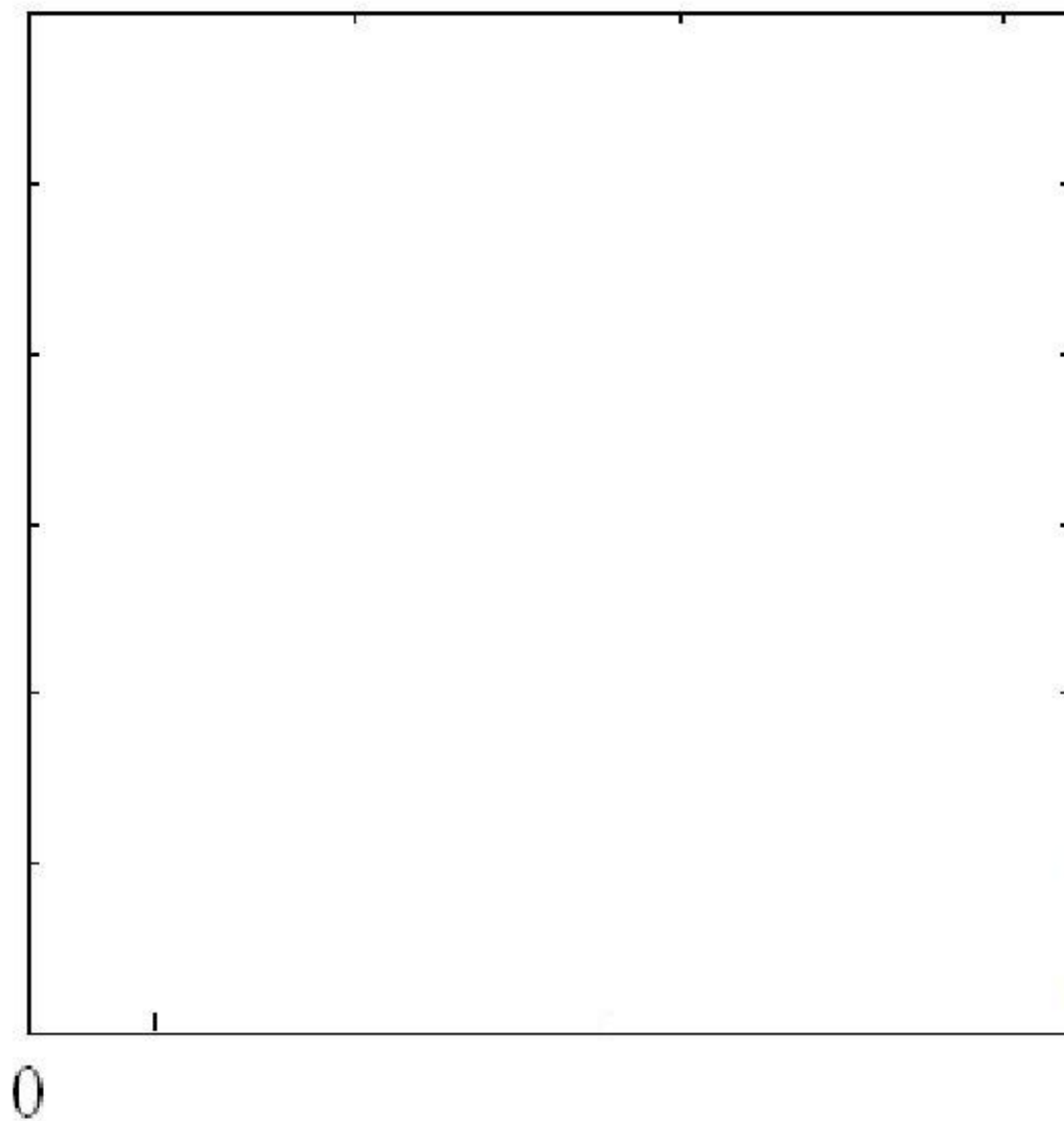
Creditworthiness (initial wealth)

Mortgage Premia



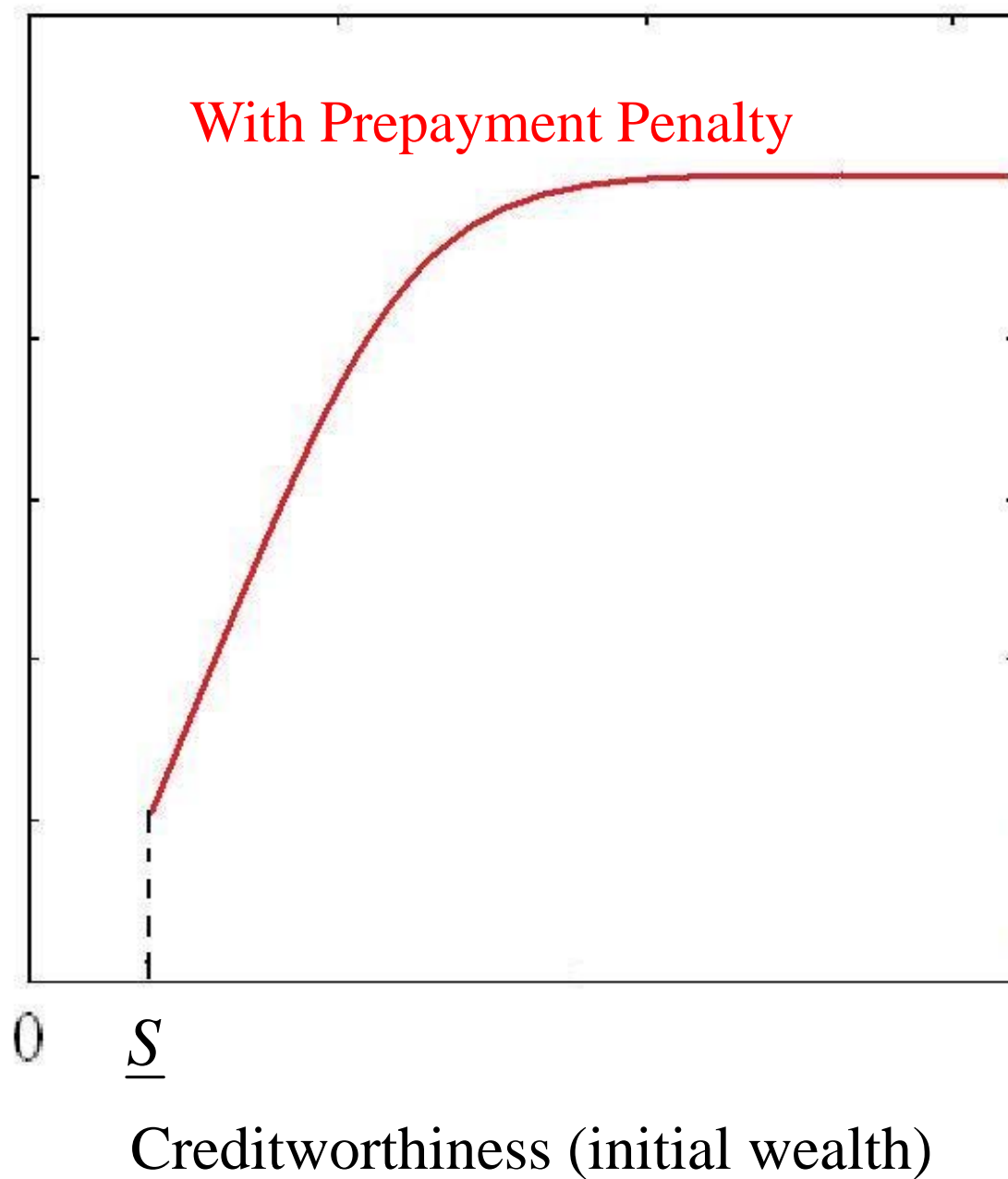
Creditworthiness (initial wealth)

Borrower's Net Utility Gain from Homeownership

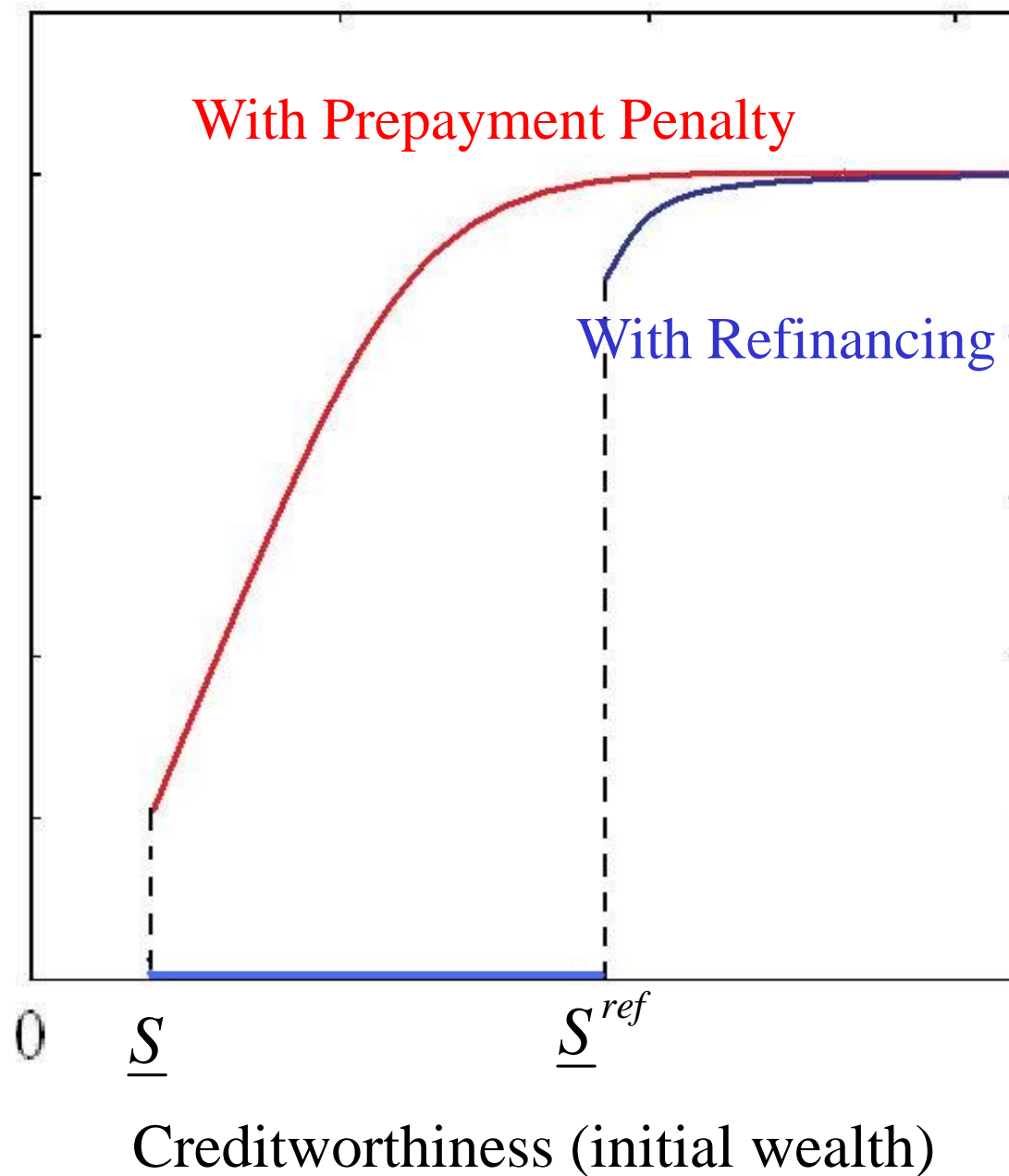


Creditworthiness (initial wealth)

Borrower's Net Utility Gain from Homeownership



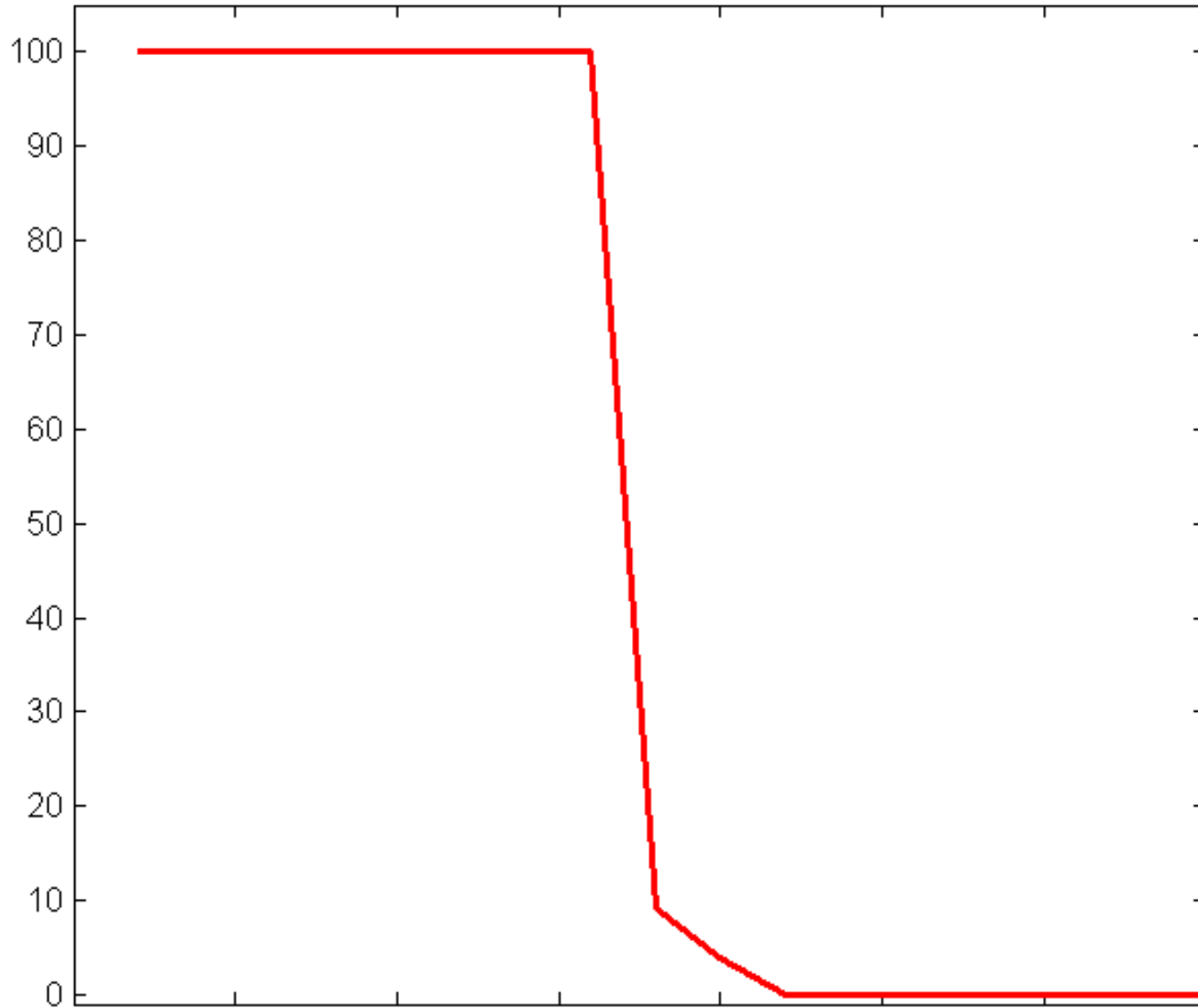
Borrower's Net Utility Gain from Homeownership



Mobility

- Some borrowers may value mobility/flexibility.
- For the safest borrowers, the benefits of having a prepayment penalty are small (e.g., a relatively small rate reduction)
- Safest borrowers may choose not to have a prepayment penalty

Percent of mortgages with prepayment penalty



Creditworthiness

Empirical Predictions

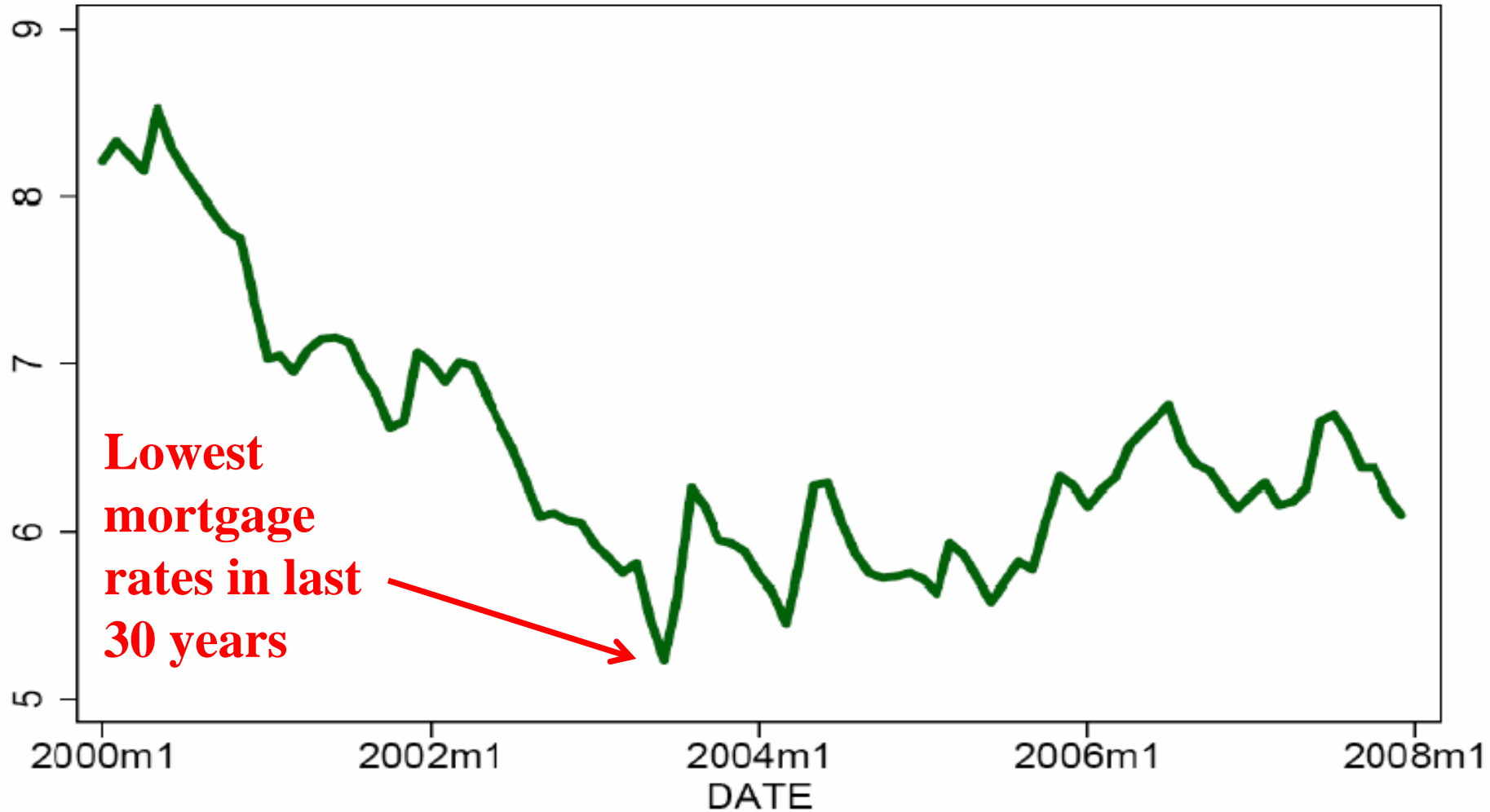
- ❑ *P1: Borrowers who receive (unexpected) positive credit shocks are more likely to prepay their mortgages, the more so the riskier they are.*
- ❑ *P2: Prepayment penalties should be most prevalent among the riskiest borrowers.*
- ❑ *P3: Conditional on the borrower's type, a mortgage with prepayment penalty commands a lower premium, the more so the more risky is the borrower.*
- ❑ *P4: Conditional on the borrower's type, a mortgage with prepayment penalty has lower likelihood of default.*

Empirical Strategy and Data

- Changes in house prices as a proxy for ex-post credit shocks.
- **LoanPerformance database**, focus only on:
 - 30 year term mortgages
 - Fixed rate mortgages
 - Known prepayment penalty status
 - Located in MSAs with house price index (HPI) data
 - Collateralized by an owner-occupied home,
 - Originated in June 2003 (tracked till September 2007).

Average Rates for 30-Year Fixed Rate Conforming Mortgages

Monthly, 2000:1 to 2008:1



Mean 30 Yr. Mortgage Rate
Source: Federal Reserve Economic Data
Sample: Fixed rate mortgages originated between 2000 and 2007

TABLE 4

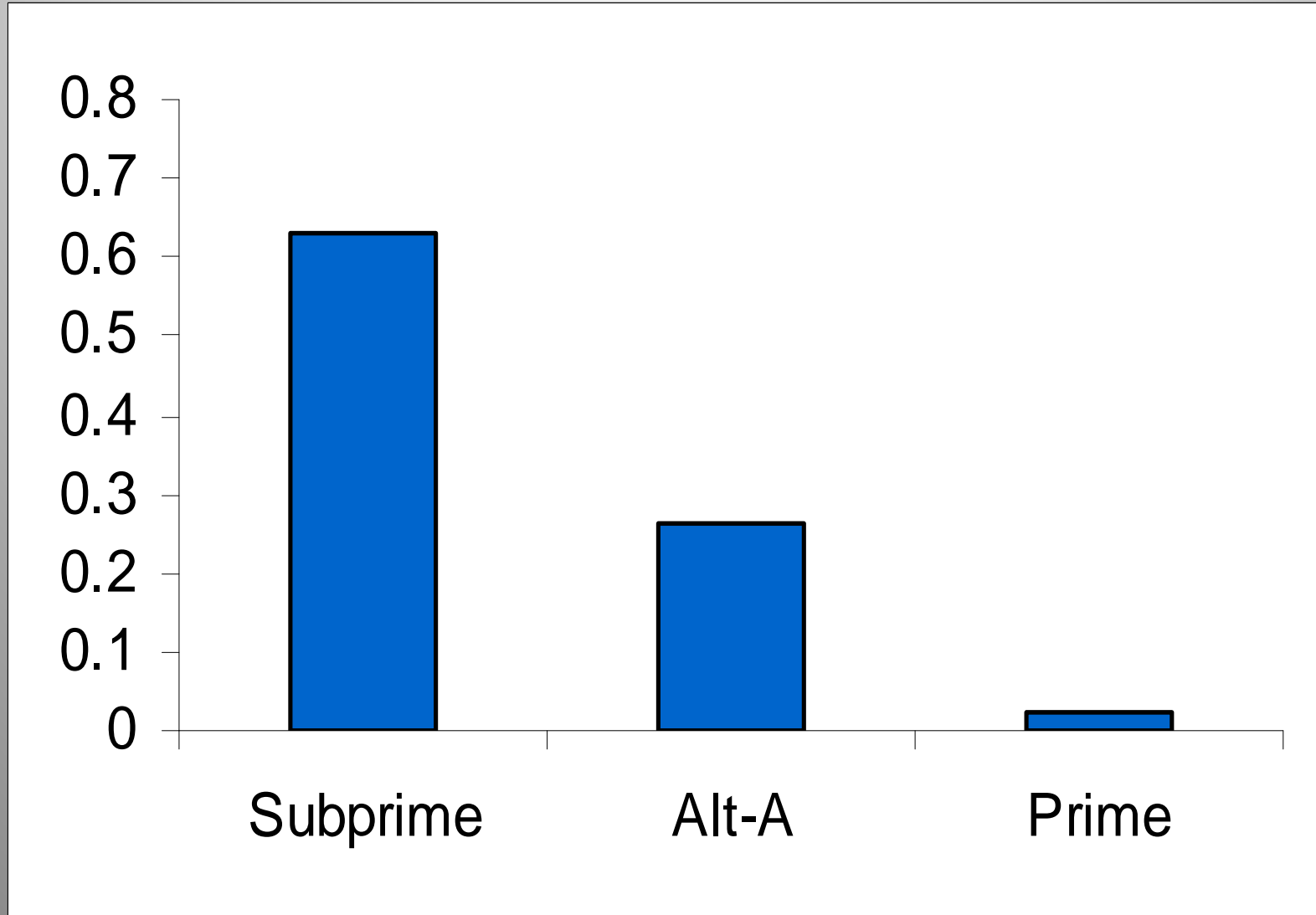
Logit Regression of Payoff on House Price Growth
(Fixed Rate Mortgages without Prepayment Penalties)

Dependent variable: Loan Pays off (=1)

	Prime		Alt A		Subprime	
Mean	0.32		0.55		0.68	
17 Quarter HPI Growth	0.018** (2.54)		0.083** (7.35)		0.126** (10.41)	
Predicted 17Q HPI Growth		0.016* (1.95)		0.039** (3.17)		0.071** (7.30)
Residual 17Q HPI Growth		0.018** (2.40)		0.080** (7.09)		0.107** (10.15)
Observations	10,630	10,630	9,601	9,601	8,715	8,715

Fixed Rate Mortgages

Fraction of Loans with Prepayment Penalties



**Figure 4: Fixed Rate Subprime Mortgages
Fraction of Loans with Prepayment Penalties by FICO score**

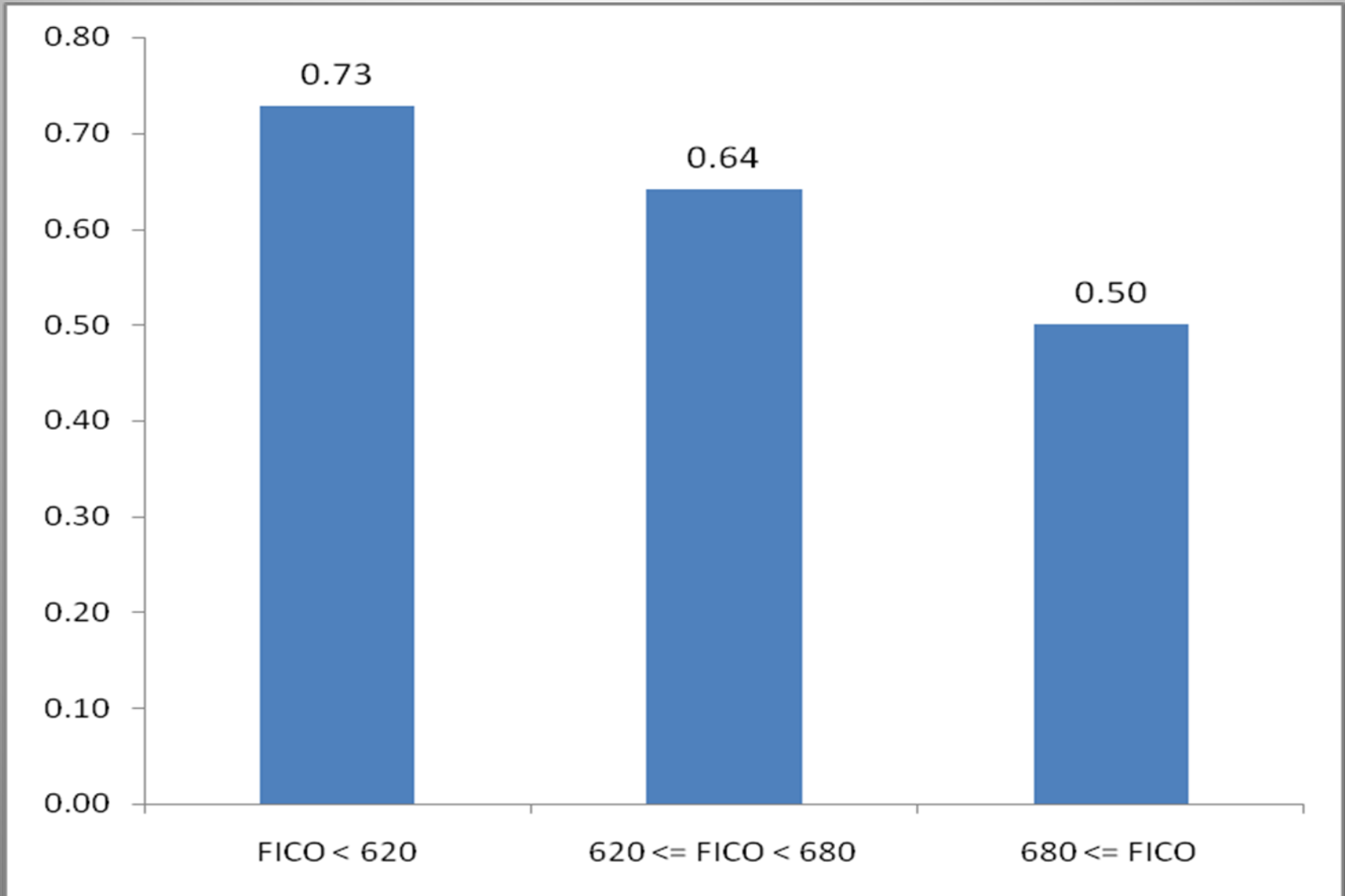


TABLE 6:
OLS Regression of Coupon Rate on Prepayment Penalty
(Fixed rate subprime mortgages)

	Full Sample	For Purchase Loans
Dependent Variable: Coupon Rate	8.00 (1.83)	8.72 (2.02)
Prepayment Penalty [PP PEN] at FICO < 620 (d)	-0.681** (-18.79)[8.691]	-0.797** (-7.76)[9.977]
PP PEN at 620 <= FICO < 680 (d)	-0.677** (-16.31)[8.467]	-0.588** (-8.47)[9.318]
PP PEN at 680 <= FICO (d)	-0.505** (-9.06)[7.977]	-0.444** (-4.39)[8.07]
Observations	23,633	6,703

**Figure 5: Coupon rate on fixed rate mortgages
With and without prepayment rate by FICO score**

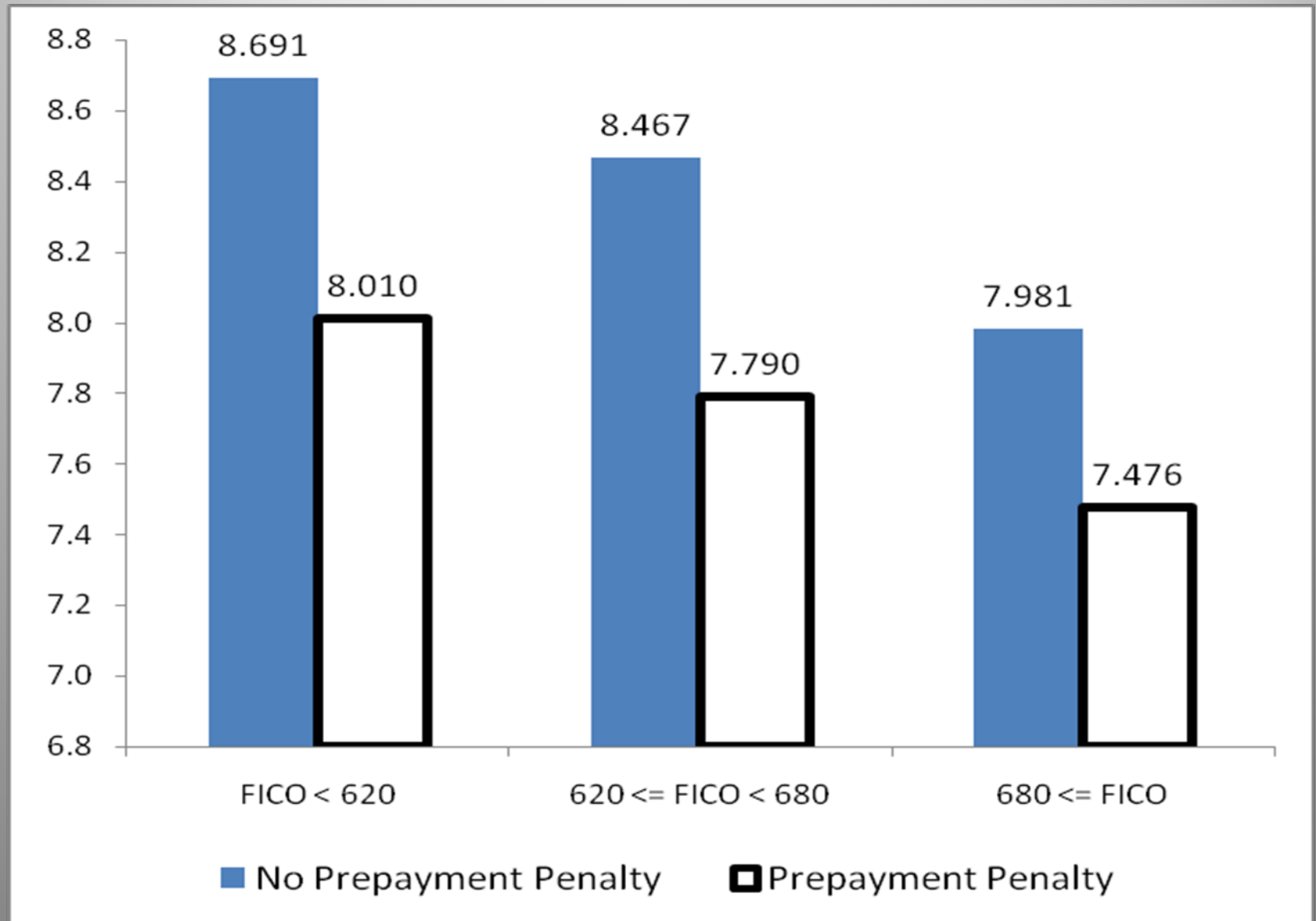


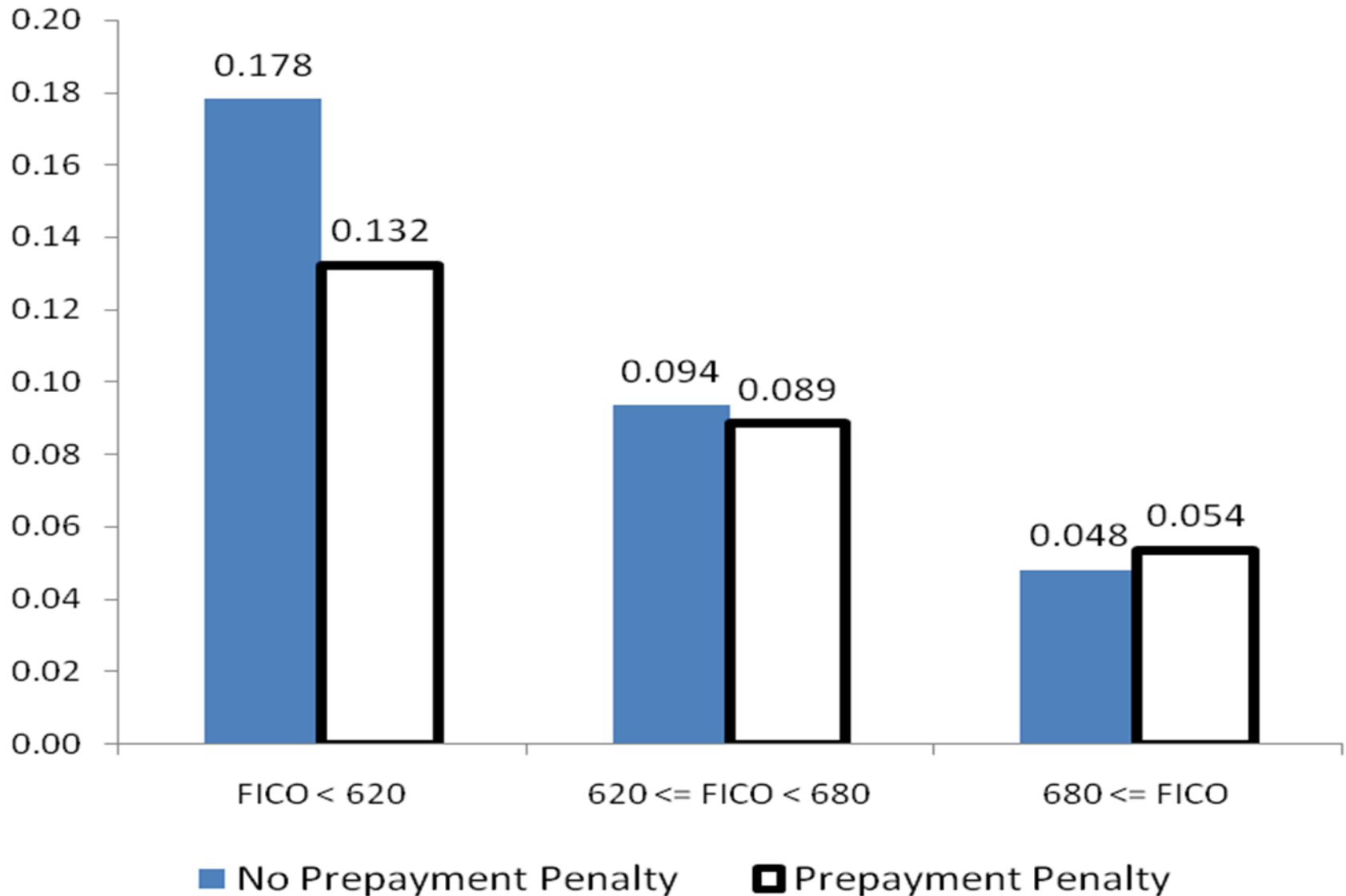
TABLE 7

**Logit Regression of 90 Day past due or foreclosure
(Fixed Rate Subprime Mortgages)**

Dependent variable: Loan ever at least 90 days delinquent (=1)

	Full Sample	For Purchase Loans
Dependent Variable: 90 Days Past Due	0.097	0.126
Prepayment Penalty [PP PEN] at FICO < 620 (d)	-0.049** (-4.90)[0.162]	-0.052** (-2.20)[0.246]
PP PEN at 620 <= FICO < 680 (d)	-0.005 (-0.89)[0.078]	-0.013 (-1.16)[0.112]
PP PEN at 680 <= FICO (d)	0.004 (0.80)[0.041]	0.021** (2.44)[0.043]
Observations	23,633	6,703

**Figure 6: Default rate on fixed rate mortgages
With and without prepayment rate, by FICO score**



Conclusion

- **Refinancing penalties are efficient:**
 - allow borrowers to commit to a current lender (exclusivity)
 - allow lenders to cross subsidize (insure reclassification risk)
 - lower likelihood of socially costly default
 - particularly beneficial to risky borrowers (subprime)
- Thus high concentration of refinancing penalties among risky borrowers can be economically efficient
- Ban on refinancing penalties can have unintended consequences

Instead of protecting would-be homeowners from predatory lending, the new laws might end up protecting them from credit