Externalizing the Internality

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Behavioral Economics

- People are time inconsistent
  - Might over borrow
  - Might undersave
  - Might “overweight” small hassle costs in decisions
    - FAFSA forms
- Attention is limited
  - Shrouded attributes
  - Reminders (or failures to remind) matter

How should policy respond?

Deeper Question

- How will the market respond to these biases?

Market Reaction to Bias

Outcome	Behavioral Assumption	Examples
Cater/Exploit	Naive about bias **Maximize "decision utility"**	DellaVigna/Malmendier (2004) - Gyms Gabaix/Labison – Shrouded Attributes Ellison (2005) - Obfuscation Mullainathan/Shleifer – Media bias Lee and Malmendier (2011) Heidaus and Koszegi (2011) – Credit cards
Help Debias	Consumers demand/value debiasing **Decision utility includes demand for debiasing**	Laibson (1998) – Savings Ashraf, Karlan and Yin – commitment savings Karlan and Zinman – commitment to quit smoking Glaeser (2003) Kaur, Kremer and Mullainathan – self control at work

Spiegler (2011) great review

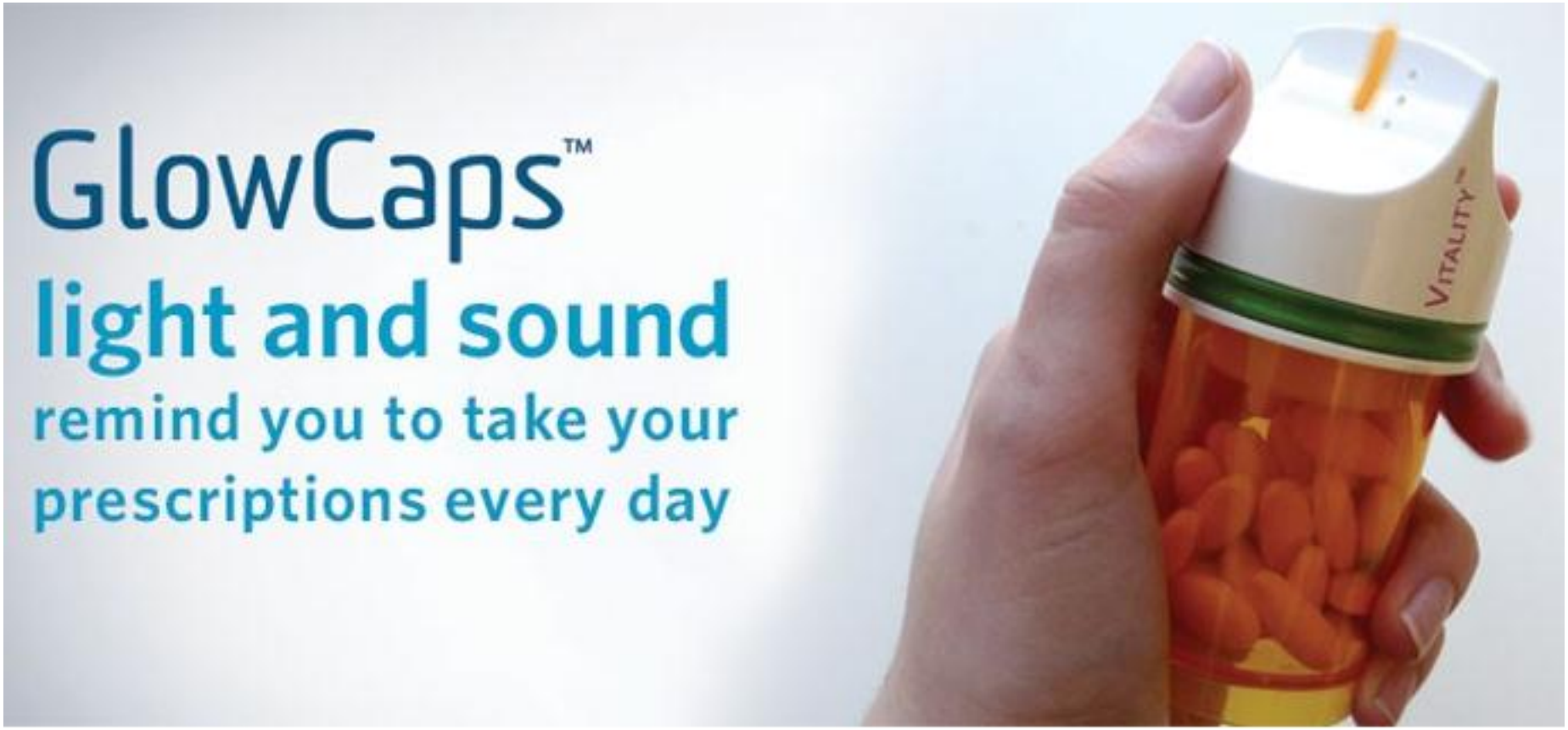
An Interesting `Bias'

- Diabetes serious disease

- Broad consensus of how to treat
  - Insulin to control- pills and injections
  - Highly effective
- Yet adherence rates very low (65%)
  - Sporadic adherence (take some, not others)
  - Severely increases complication risk (Sokol et al. 2005)

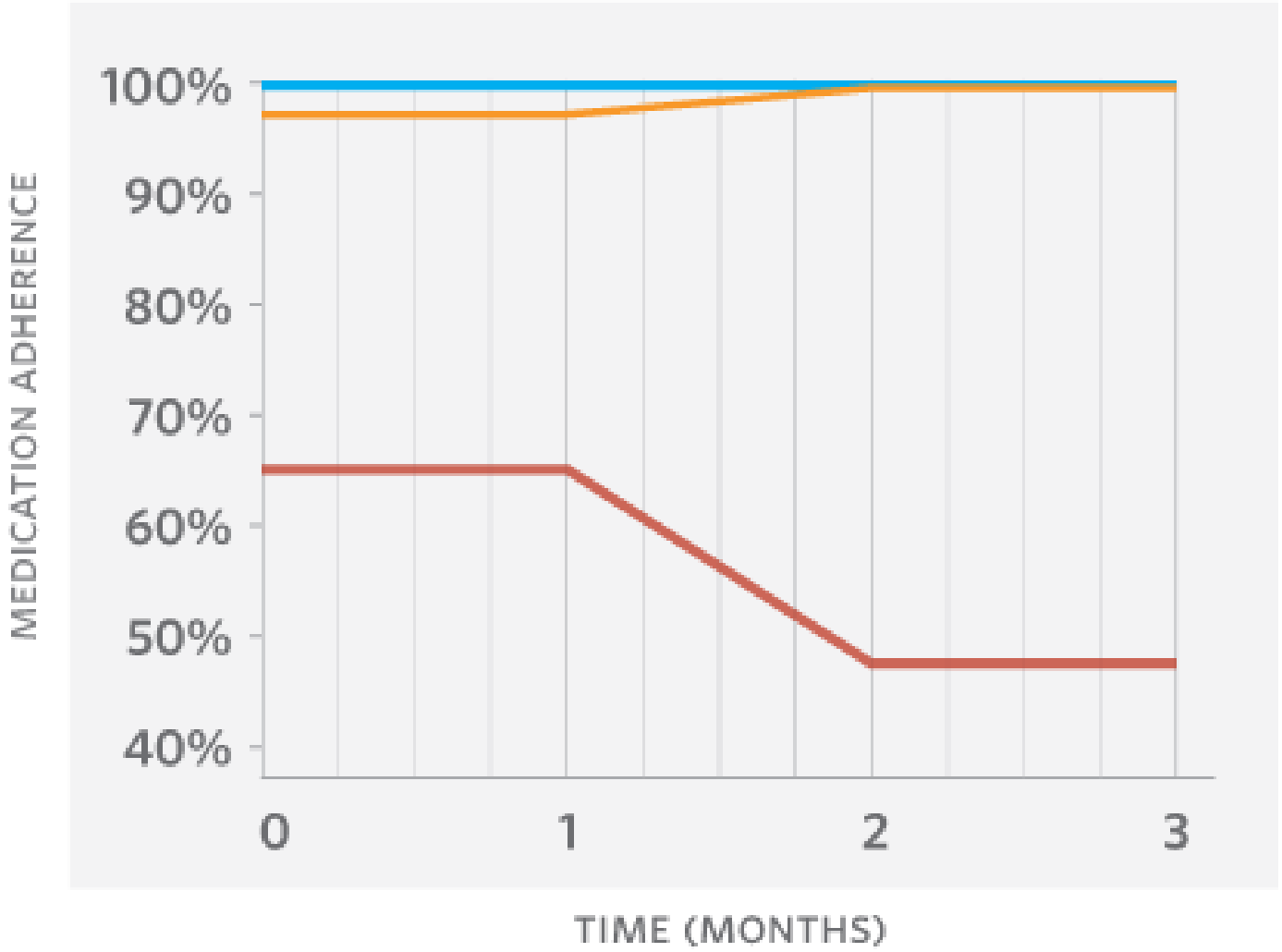
Non-adherence Bias

Drug	Benefits	Adherence Rates
Statins	Reduce all cause mortality (Relative Risk .90), cardiovascular disease mortality (RR .8), fatal myocardial infarction (RR.82), non-fatal MI (RR.74), and strokes (RR .86)	Adherence < 70%
Beta-blockers	Reduce mortality by 25% post heart attack	Adherence < 70%
Anti-asthmatics	Reduced Hospital Admissions (OR .58). Improvement in airflow obstruction (OR .43)	Adherence < 50%
Glucose conrol	Decrease of cardiovascular mortality (OR .74); risk of hospitalization halved	Adherence < 65%
Immunosuppresants	Reduction in the risk of organ rejection seven-fold	Adherence < 66-75%


GlowCaps™
light and sound
remind you to take your
prescriptions every day
VITALITY™

GLOWCAP RESEARCH RESULTS

PERCENT OF ADHERENT* PARTICIPANTS IN EACH GROUP



Slightly misleading: adherence = > 25 days of month

PARTNERS HEALTH CARE SYSTEM

Market Reaction to Bias

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Demand for Glowcaps

Market Outcome	Behavioral Assumption	Who would demand Glowcaps
Cater/Exploit	Naiive about bias **Maximize "decision utility"**	No one?
Debias	Consumers demand/value debiasing **Decision utility includes demand for debiasing**	Consumers

Actual Demand for Glowcaps

- Large employers with health plans
- Medicare
- Pharmacy industry
- Why?

Externalizing the Internality

- Internality felt by the individual
  - Failure to adhere
- A third party also feels some consequences
  - Non-adherence drives up future health costs
  - Non-adherence drives down demand for drugs
- This market situation *externalizes* the internality
- Independent profit motive to affect the internality

A Broader Framework

- Consumer makes choice *L* (buy treadmill?)
  - True benefit depends on type *y* (how much will I use?)
  - Utility u(L,y)
- Consumer mistake:
  - Act as if benefit is type y' (I'll use a lot!)
  - Optimizes utility u(L,y') instead of u(L,y)
  - So instead of choosing L*(y) he would like L*(y')
- Tension between *stated value* and *true value*

Catering – Internality not Externalized

Firms care only about Y, not *y*

$L^*(y')$	$u(L^*(y'))-u(L^*(y))$
Direct Surplus	Internality
Value treadmill	Unused treadmill

Treadmill seller profits do not additionally depend on this

Catering

- Market doesn't differentiate between *y* and *y'*
  - True value vs willingness to pay
- No incentive to second guess your value
- Will not sort/screen on true value (*y)*.

Exploit the bias – Internality Positively Externalized

Firms care about *y* in the wrong direction

$L^*(y')$	$u(L^*(y'))-u(L^*(y))$
Direct Surplus	Internality
Sign up for gym (front loaded cost)	Unused gym membership

Gym profits higher if gym used *less*

Market Exploitation

- Market cares about true value
  - But makes more money the bigger the internality
- The market is not neutral about the bias but will exaggerate it if it can

- *Notice difference between catering and exploitation*

Market Discipline-
Internality Negatively Externalized

Firms care about *y*

$L^*(y')$ $u(L^*(y'))-u(L^*(y))$

Direct Surplus Internality

Take medication Health consequences

Some insurer profits depend on health consequences

Market Discipline

- Market now cares about true value as well
  - Do not just set copay and let whoever wants to take medication take it
  - Interested in ensuring that high (health) return individuals take the medication
- Undertake activities to reduce internality $y - y'$

Deeper Insights

- Can conceptualize behavioral biases as internality

- Creates a new policy lever
  - Externalize the internality
  - Pigouvian Behavioral Economics

Overview of Talk

- One example in detail

- Briefly sketch a few other illustrative examples

Two caveats about this talk

- Will not spend time…
  - Defending that there is a bias
- Will not spend time…
  - On the welfare problem (Bernheim and Rangel 2009)
- Both important but beyond today's scope

Useful Expenditure
No cash

Get income y

1

2

Bank can lend

Person can repay
Psychic costs of default

Lending Market

- Bank can provide a loan *L* at rate r
  - Credit is uncollateralized.
- Borrower incentives to repay modeled as non-monetary costs of default
  - Future cost of credit record
  - Harassment costs

- Utility if he borrows L and repays *l*

$$L + \delta[u(y-l) - \max\{d(L(1+r)-l), 0\}]$$

First Best

- Enough credit to equalize marginal utility of spending tomorrow with marginal utility of the durable

$$\delta(1+r)u'(y-L)=1$$

- Some simplifications for today:
  - *δ=1, r=R=0* (without loss of generality)
  - *u(x) = ln(x)*
- First best is now:

$$L=y-1$$

Market Outcome

- Competitive firms (zero-profit condition)

$$\max_{L,l} L + u(y - l)$$

$$s.t.$$

$$l = \arg\max_{0 \le l \le L} u(y - l) - d(L - l)$$

$$l = L$$

Borrower Utility

Repayment constraint

Zero Profit Constraint

Repayment incentives

- Utility

$$\ln(y-l)-d(L-l)$$

- First order condition for log utility:

$$\frac{1}{l-y}=-d$$

$$l=y-\frac{1}{d}$$

Market Outcome

- Competitive firms

$$\max_L L + \ln(y - l)$$

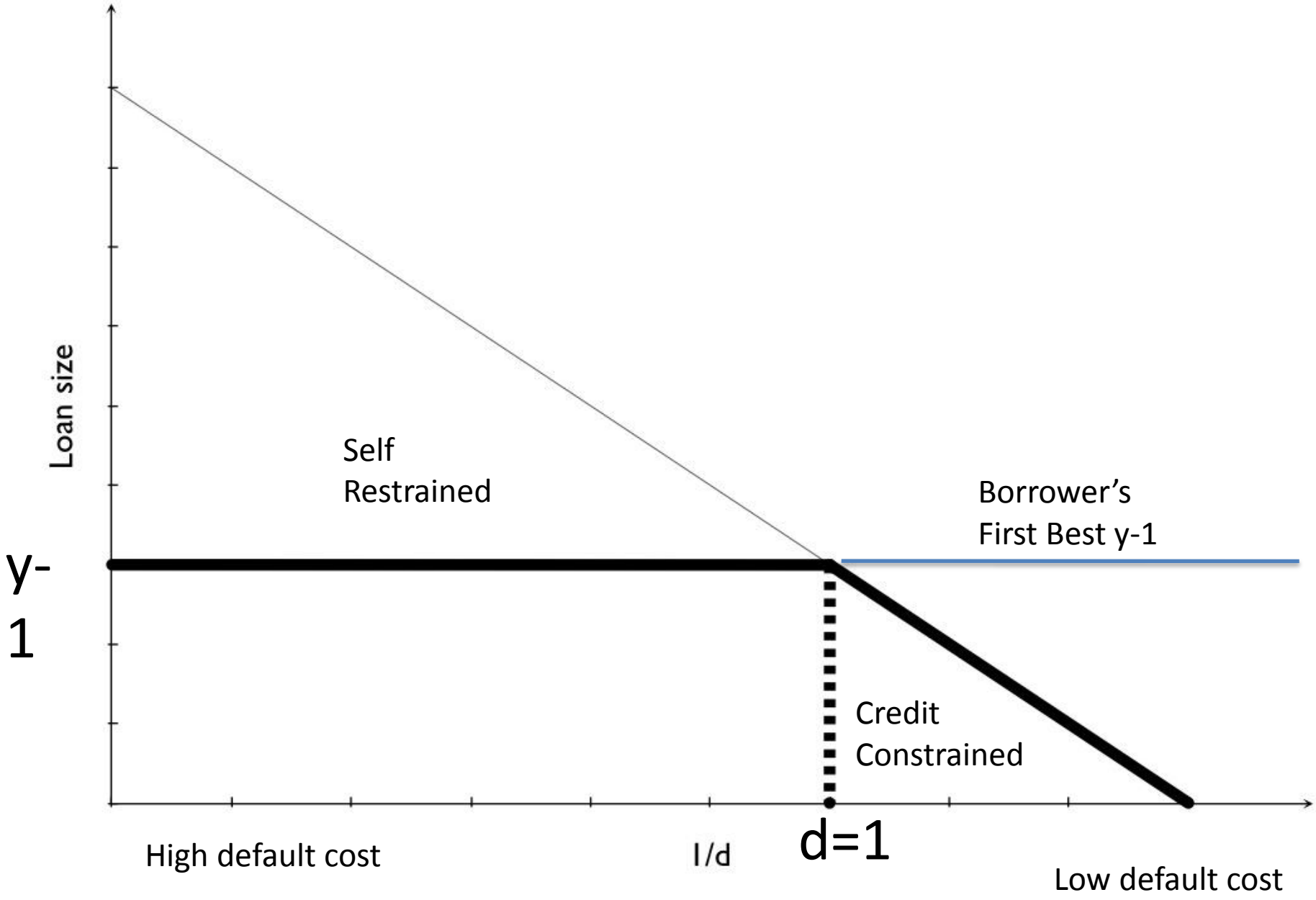
$$s.t.$$

$$L \leq y - \frac{1}{d}$$

Rational Borrowers

- First best:
  - Borrower gets y – 1
- Realized outcome
  - Borrower only allowed to borrow y – 1/d
  - Borrower takes min{y-1,y-1/d}

- Standard moral hazard credit market failure
  - Obvious implication: increases in d (weakly) increases welfare
  - **The more difficult to default on credit the better**


Loan size
Self
Restrained
Borrower's
First Best y-1
y-
1
Credit
Constrained
High default cost
I/d
d=1
Low default cost

Behavioral Bias

- Borrowers borrow as if income is higher tomorrow than it is
  - Overconfidence
  - Misunderstanding terms of credit
  - Impulsivity
- Consumers act as if they will earn $Y > y$

Firm's Problem

- Competitive firms (zero-profit condition)

$$\max_{L,l} L + u(Y - l)$$

$$s.t.$$

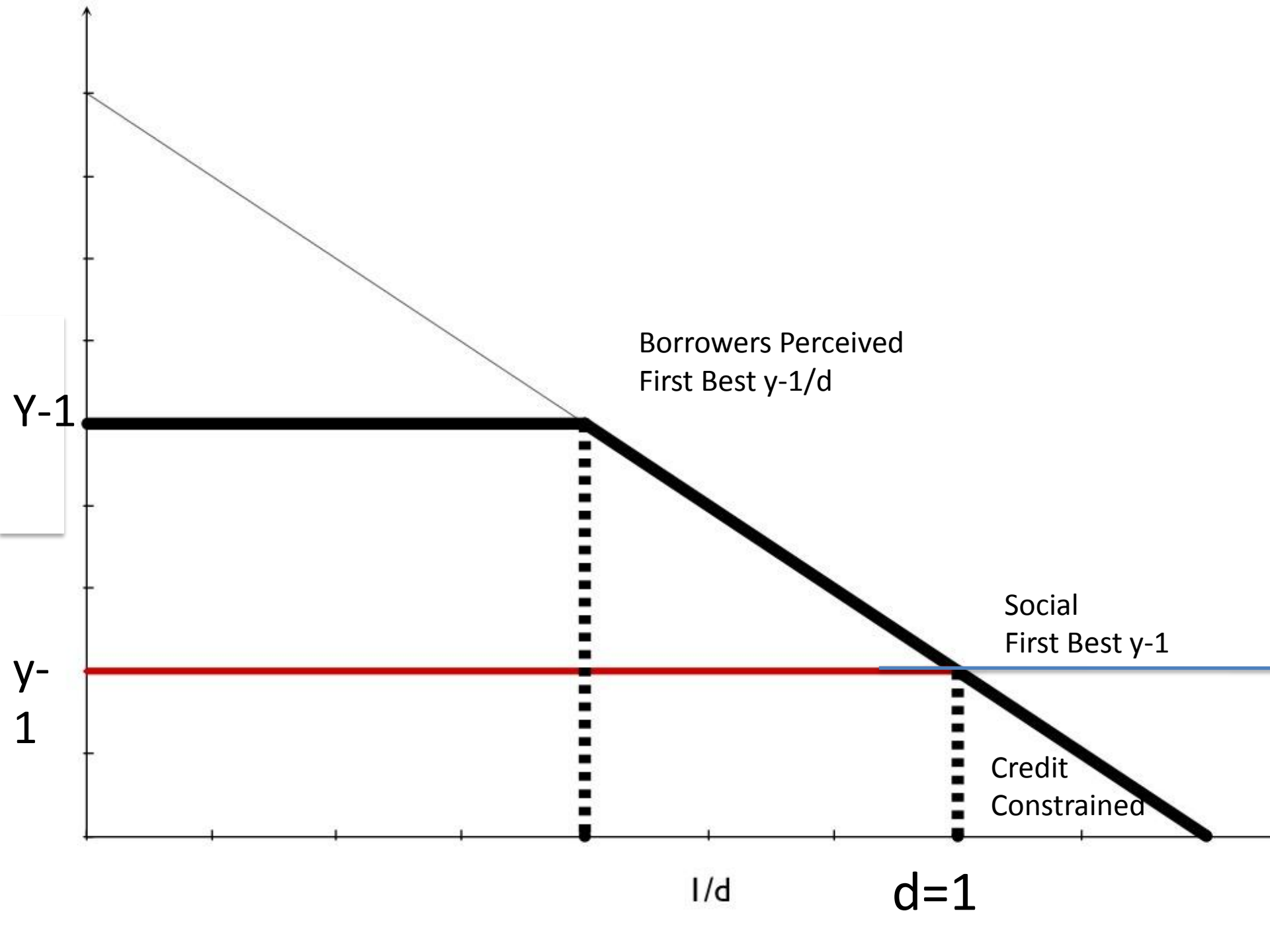
$$l \leq y - \frac{1}{d}$$

Perceived income

Actual income

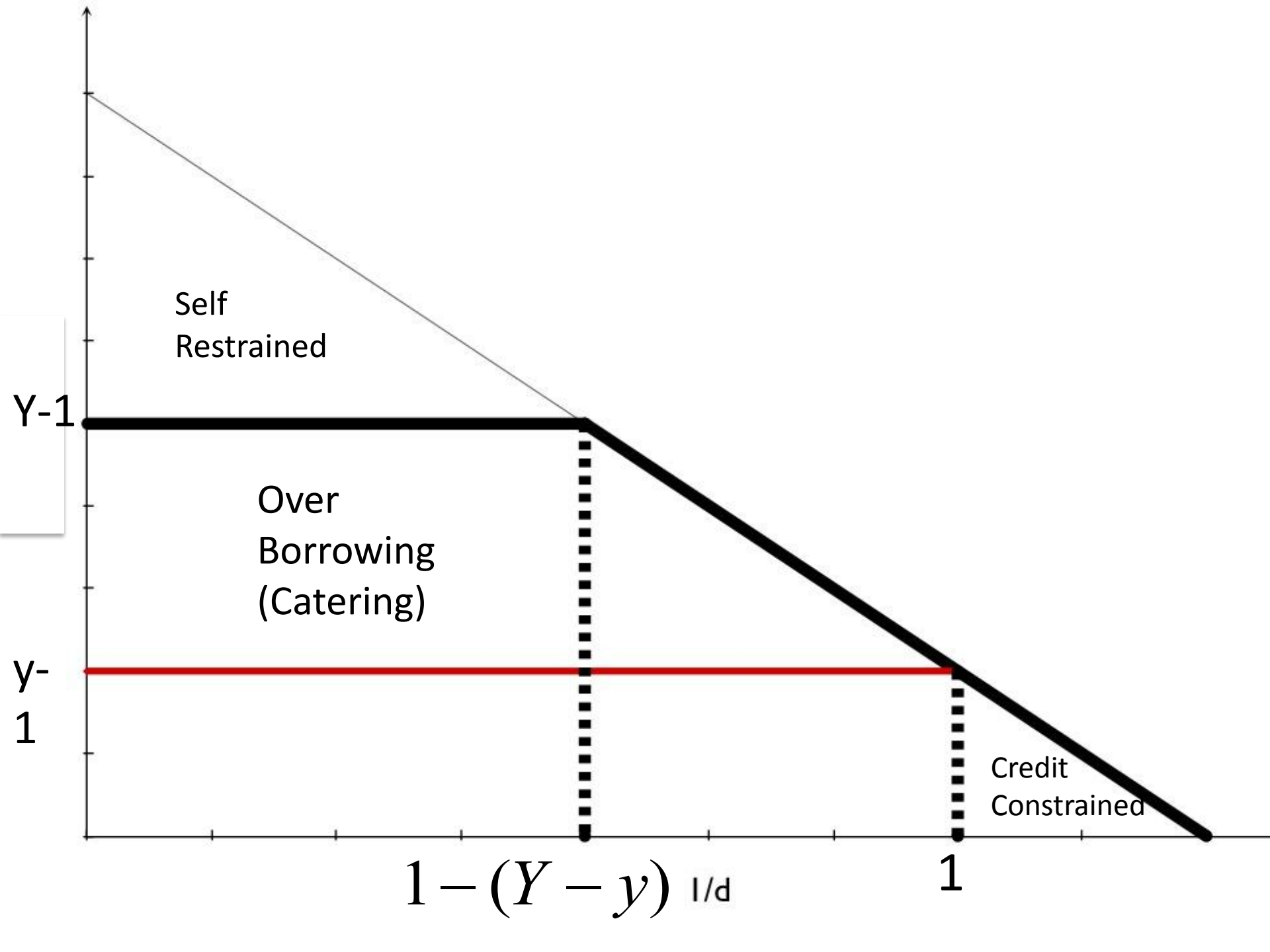
Outcome

- First best
  - Borrower borrows y - 1
- Realized outcome
  - Borrower only allowed to borrow y-1/d
  - Borrower takes min{Y-1,y-1/d}
    - Note: Rational borrower only takes min{y-1,y-1/d}


Borrowers Perceived
First Best y-1/d
Y-1
Social
First Best y-1
y-
1
Credit
Constrained
I/d
d=1

Credit constraint

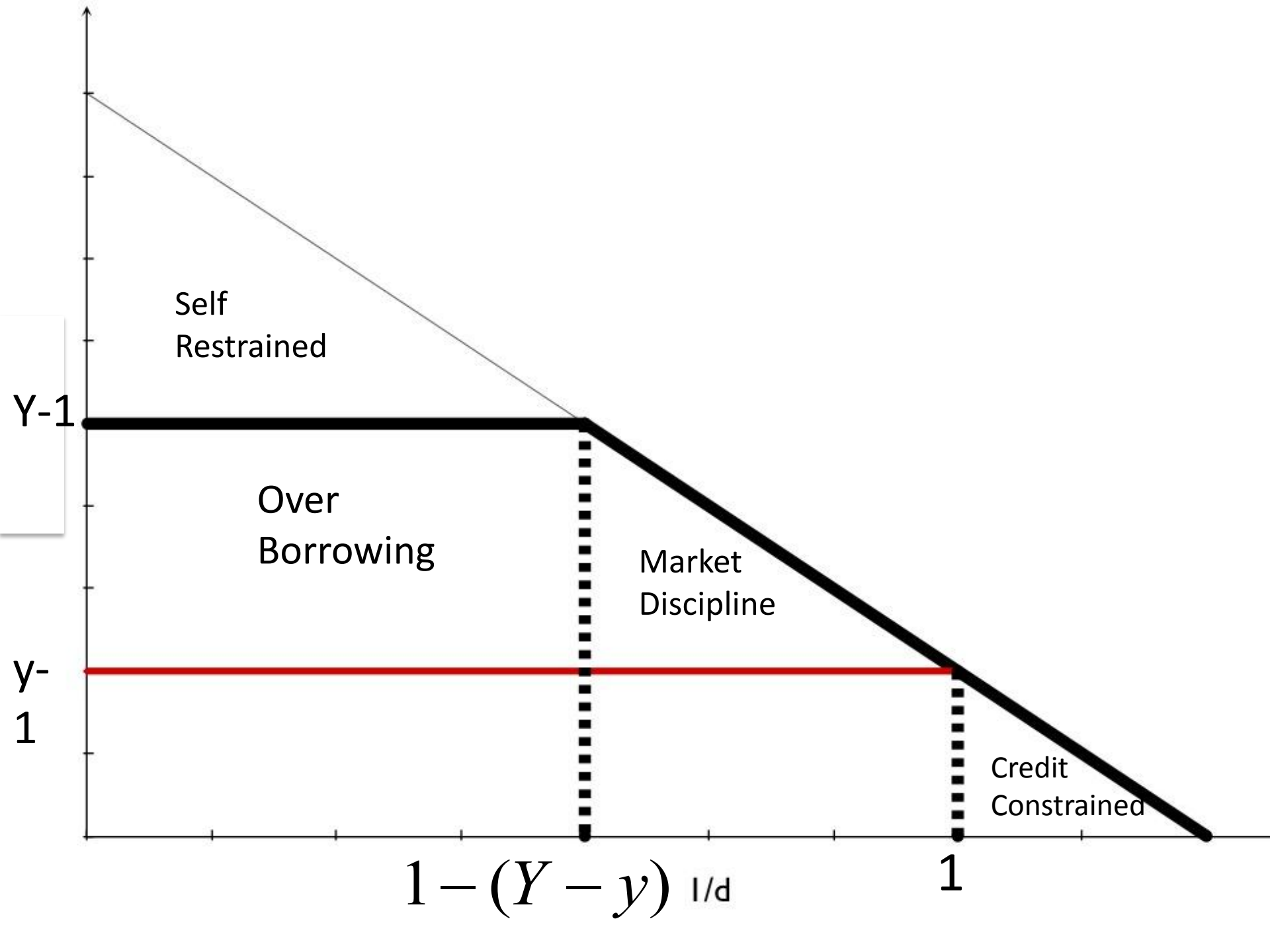
- When $d < 1$:
  - Borrower still borrows less than first best $L < y-1$
- Same as before:
  - Low psychic cost of default also produces inefficient low credit access


Self
Restrained
Y-1
Over
Borrowing
(Catering)
y-
1
Credit
Constrained
$1-(Y-y)$ l/d
1

Catering

- When $d > 1/(1-(Y-y))$:
  - Borrower allowed to borrow up to Y-1
- Will therefore over-borrow

- This is the usual idea that markets cater to the bias of individuals.
- If the person wants to borrow foolishly, the market will happily lend it as long as they can repay
  - *NOTE: Not exploitation*. Market is no more interested in increasing bias than in increasing loan demand


Self
Restrained
Y-1
Over
Borrowing
Market
Discipline
y-
1
Credit
Constrained
$1-(Y-y)$ l/d
1

New Result: Market discipline

- When $1<d< 1/(1-(Y-y))$
  - Market provides some discipline
  - The borrower gets a loan smaller than how he would spend his own cash $L < Y-1$
- Moreover notice that as cost of default *d* diminishes…
  - The over-borrowing goes down
  - At one point the borrower is at the first best (d=1)

Market Discipline

$$\frac{\partial U^*}{\partial d} < 0 \quad \text{for } 1 < \mathrm{d} < \frac{1}{1-(Y-y)}$$

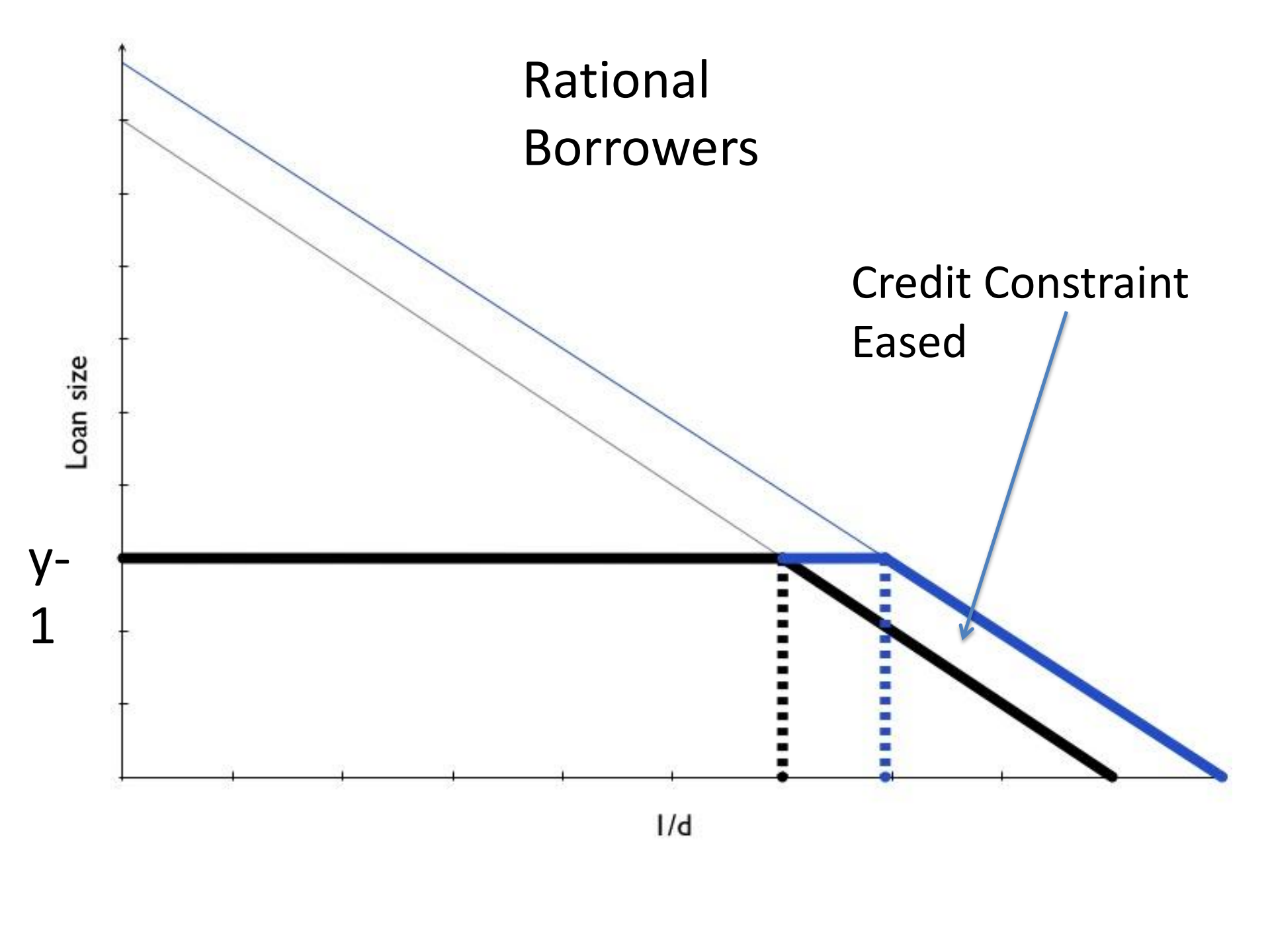
- When *d* high repayment ability independent of *y*
  - Lender's profits independent of mis-forecast
- For modest *d* repayment ability depends on *y*
  - Lender now
- Scrutiny of repayment ability can help to reduce consumer biases
- **The more difficult to default on credit the worse**

Some observations

1. Internality not fully externalized
   - Pay until u'(y-l) = d
   - Overborrowing felt partly in default but partly in under-consumption tomorrow.
   - This internality not felt by lender
   - d=1 is coincidental knife edge case
2. Catering case is special case
   - Only when transactions are narrow.
   - Where there is little or externalization of internality
     - Gyms, Hotels (shrouded attributes),

Securitization

- Suppose that the originator of the loan is not fully incentivized
- Richer model would include three party contracting – owner of loan, originator and borrower
  - Would fully model incentive problem
- Let's focus instead on a simple change:
  - The originator due to moral hazard gives more credit than he ought to
  - Borrower given credit up to $y-1/d + k$

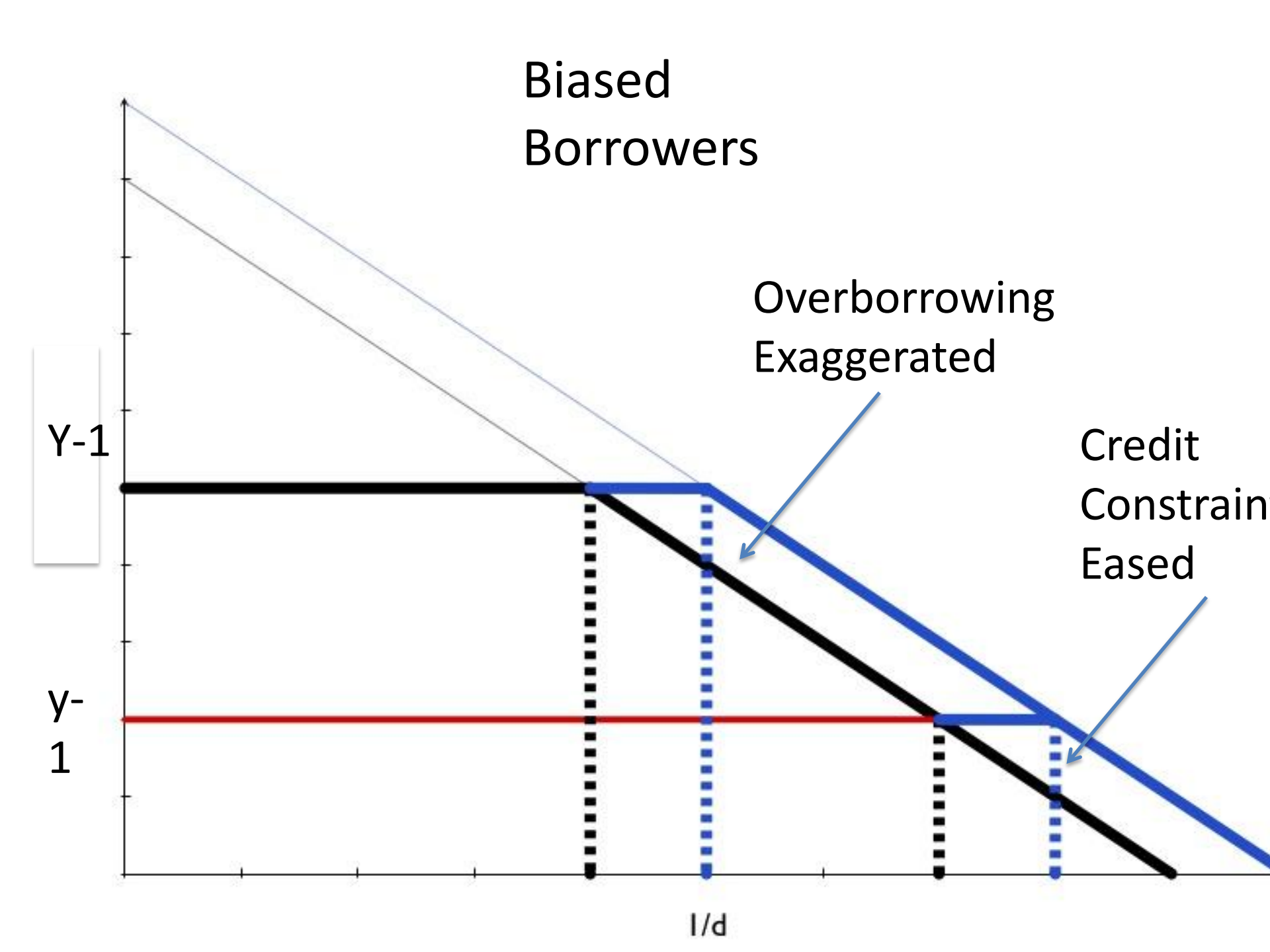

Rational
Borrowers
Credit Constraint
Eased
Loan size
y-
1
I/d

Securitization

- Originator moral hazard
  - Perverse incentives on loan quality
  - Greater incentive to give out high default loans
- An effect on securities purchasers
  - For d<1, loans earn negative profits
  - Standard effect: pecuniary externality
  - They will trade off moral hazard against other benefits (e.g. diversification)

Securitization

- As far as borrower is concerned it is welfare enhancing
- Key cost of securitization (unmodeled here) is higher default rate
- But this is a pecuniary externality that loan owner would be contracted away (traded off against other gains)


Biased
Borrowers
Overborrowing
Exaggerated
Credit
Constrain
Eased
Y-1
y-
1
I/d

Securitization

- Originator moral hazard
  - Perverse incentives on loan quality
  - Greater incentive to give out high default loans
- An effect on securities purchasers
  - Standard effect: pecuniary externality
  - They will trade off moral hazard against other benefits (e.g. diversification)
- An effect on homeowners
  - Less of the internality is externalized
  - Overborrowing is exaggerated

The Mortgage Crisis

- Borrowers take loan to buy house
  - They must forecast how much home they can afford
  - Bias here is in borrower buying too big a home
- Securitization facilitated subprime borrowing
  - Expansion of credit
- In this view downside of expansion of credit
  - Borrowers could have been made worse off
  - No check on borrowers' natural bias

Some observations

- Different picture if borrowers were *unbiased*
  - Would have provided second check on foreclosure/default
    - Especially for first time purchases, not as clear for refinance
- Securitization can change relationship between default rates and borrowers own skin in the game
- Micro model of Y (the error) could produce a feedback effect
  - Wtp for homes could depend on housing price trajectory

Student Loan Market

- Students must estimate value of schooling
  - Potential for bias here is clear
- Government covers 90% of the loan. Remaining 10% comes from another lender
- Note: Subsidy by government has perverse effect
  - Lowers incentives and thereby can worse schooling choices
  - As with securitization, a different consequence than in traditional model

Another Effect

- Who provides the 10%?
- Two kinds of players:
  - Independent third party lender
  - The school itself

Bundling

- When the lender is also a seller of the good purchased with the loan…
  - Greater willingness to lend (at higher default)
  - Exactly as in securitization case
- Can exaggerate over-borrowing
  - In a richer model, would produce worse schooling choices
- Data suggests that students borrowing bundled loan have much higher default rates
  - Some suggestive evidence that they may be making "worse" choices
- Other examples:
  - Buy here/pay here

Take Up Example

- Individuals fail to take up many government programs for which they are eligible
- Two examples:
  - College financial aid
  - Earned income tax credit
- Data suggests that both of these failures are at least partly behavioral
  - Bettinger et. al. - FAFSA
  - Bhargava and Manoli: EITC
  - Reducing “hassle costs” of take-up increases take-up

The Role of a Tax Preparer

- Program to sign up for
  - Benefit *b* tomorrow. Cost of sign up *c* today
- Utility b-c > 0
  - Myopic agents underweigh future benefits
    - Act as if $\beta < b$
  - Internality: b-β. Those with $\beta < c$ don't sign up

Internality Externalized

- Tax preparer could offer upfront payment
- Would remove the internality
- Refund anticipation loan

When does this work?

- Tax preparer able to charge individuals *directly from the EITC refund*
  - Their profit depends on the internality (the benefit) and they can capture some of it
- This is only feasible because the government allows tax preparers to direct deposit refunds into their account

Rethinking Refund Anticipation Loan

- Traditional argument against
  - High interest, expensive loans
  - “Exploit” customers (we would say catering)
- This model suggests important twist
  - Limiting refund anticipation loans would *reduce* enrollment incentives for tax preparers
  - There is now a tradeoff

Rough Data

- The time series suggests an increase in EITC enrollment
- Correlational data suggests tax preparers are correlated with sign up
- Anecdotal evidence suggests outreach efforts high

Contrast with Financial Aid

- No direct way for the tax preparer to benefit from this
- Unlike EITC payments, the tax preparer cannot move the benefits up in time
  - No way to capture financial aid payments
- We see little effort by tax preparers to sign people up at scale

Take Up of Benefits

- Sign up by employers
- Sign up on Medicaid by hospitals

Other Policy Lessons

- Make subsidies "capturable" by firms
  - Example: Tax subsidy to 401(k) or IRAs
- Can sharpen targeting
  - Slight tweak to CAFE standards
- Create third party incentives
  - Example: Positive healthy behaviors.
  - Why on individuals and not on *insurers?*

Policy Approach

- Broad Implication:
  - Can correct internalities in a Pigouvian way
- Identify ways to incentivize firms with proxies for the internality
- Compare to the “nudge” approach
  - Governments create psychologically motivated policy levers (“nudges”) to debias
  - Problem: Firms can often nudge back
    - If the profit motive remains unchanged, firms can sometimes (often) work around nudge