Revealed Preferences, Normative Preferences and Behavioral Welfare Economics

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Outline:

- Normative preferences
- Revealed preferences
- Active decisions
- Mechanism design example

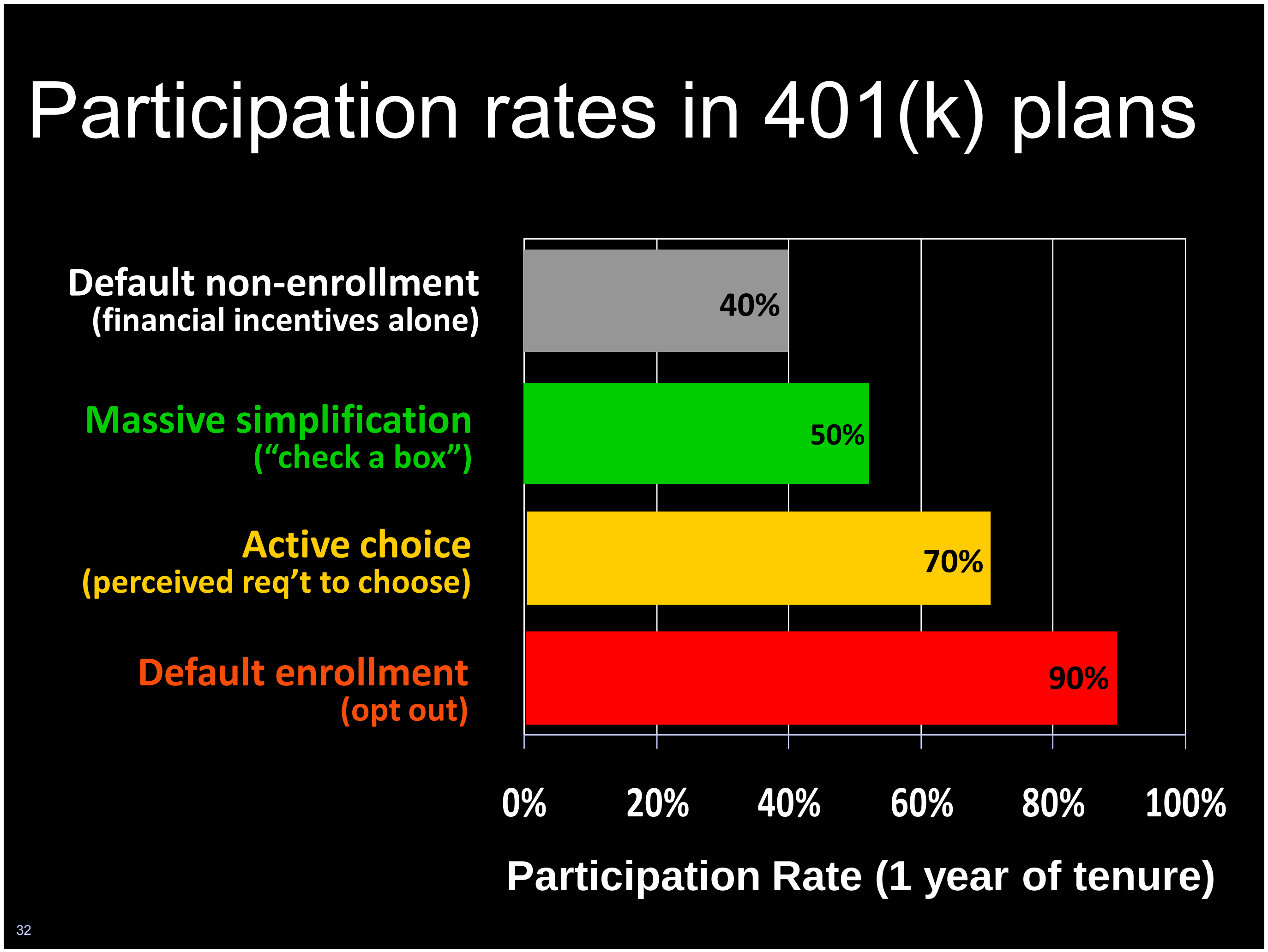
Normative preferences

- Normative preferences are preferences that society (or you) *should* optimize
- Normative preferences are philosophical constructs.
- Normative debates can’t be settled with only empirical evidence.

Positive Preferences (aka Revealed Preferences)

- Positive preferences are preferences that predict my choices
- Positive preferences need not coincide with normative preferences.
- What I do and what I should do are potentially different things (though they do have some connections).
- Equivalence between normative preferences and positive preferences is a philosophical position (for a nice defense of this view, see Bernheim and Rangel 2009).

An example:



These are all positive preferences.

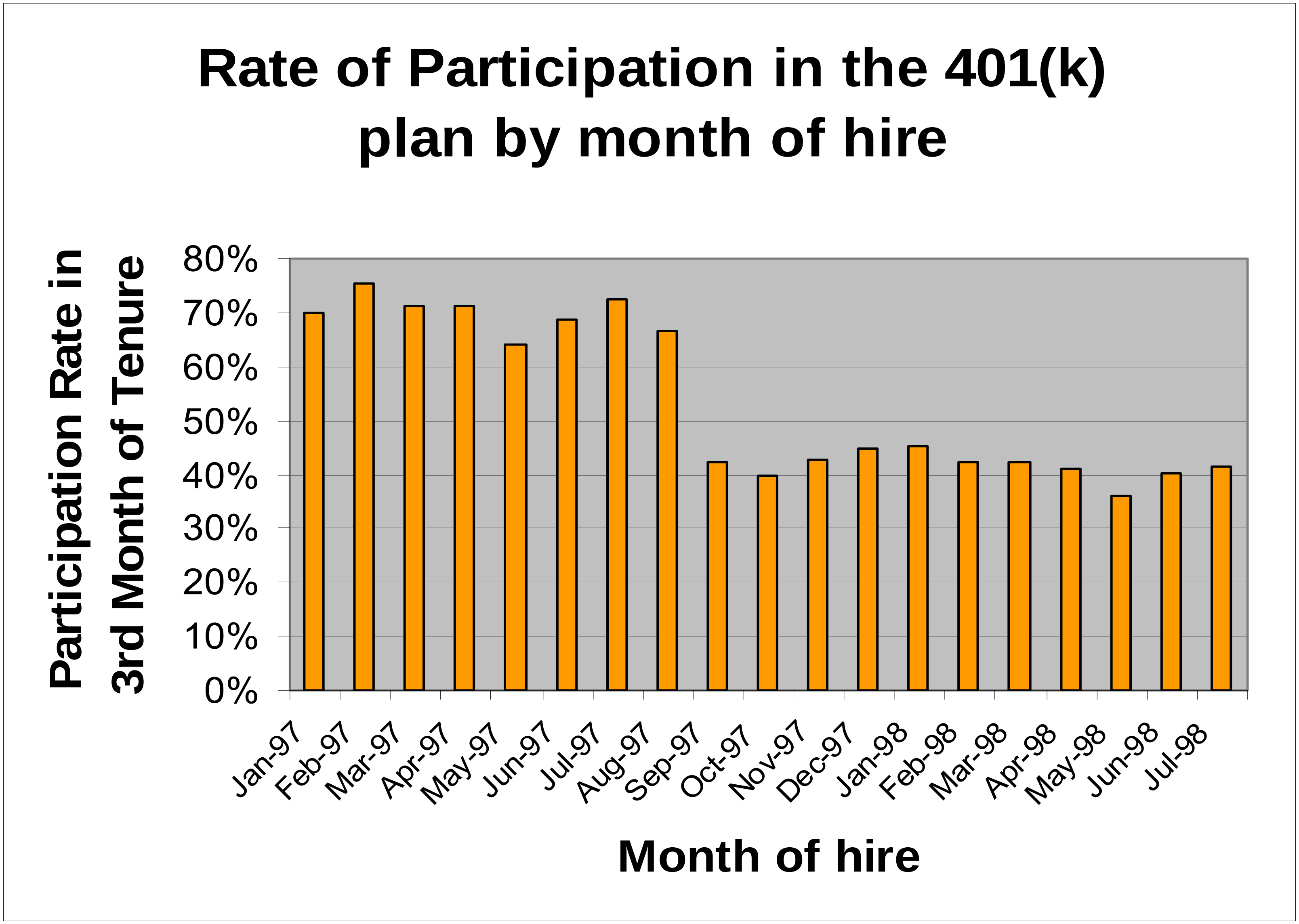
Which is the normative preference?

Active decisions

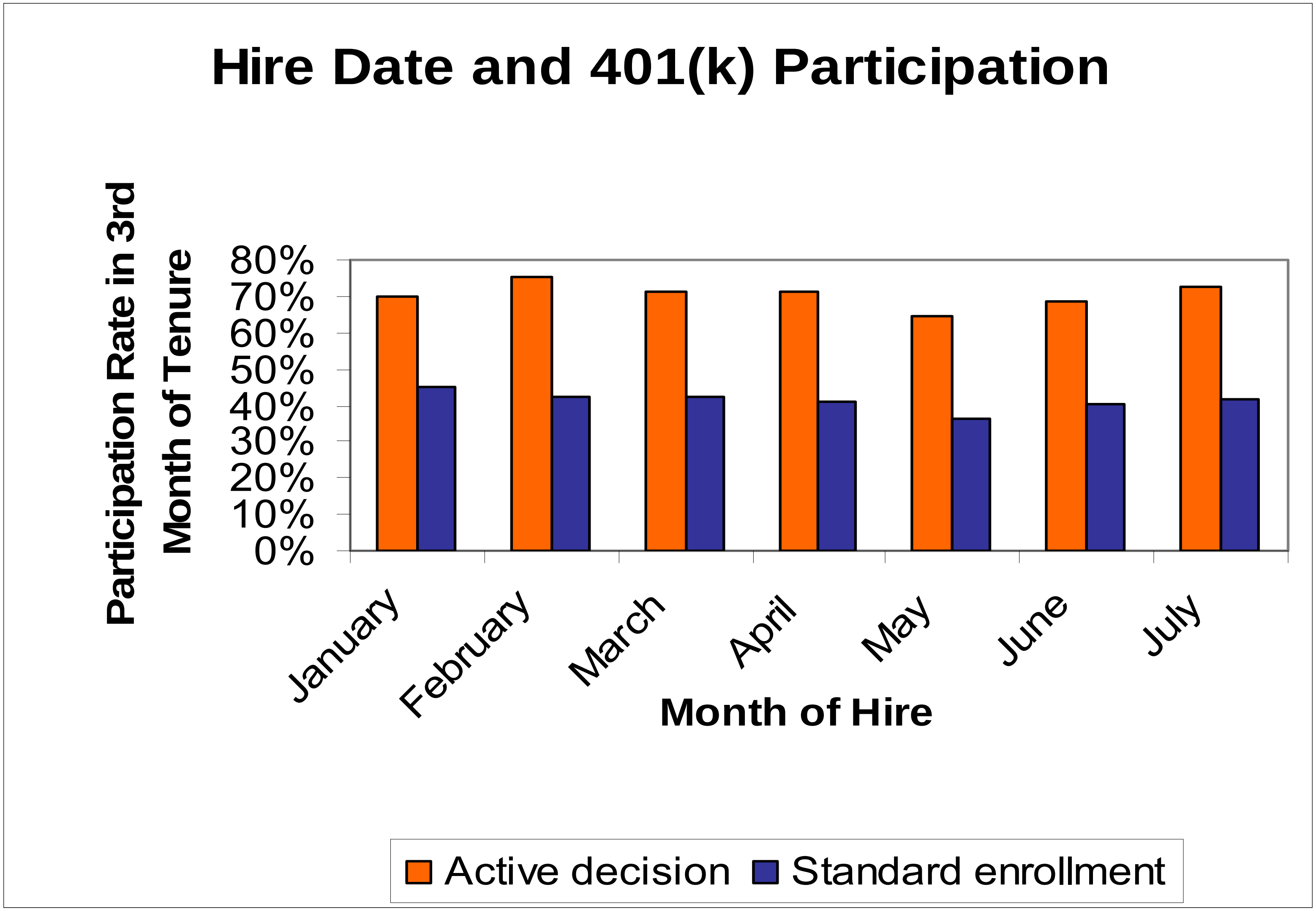
Carroll, Choi, Laibson, Madrian, Metrick (2009)

Active decision mechanisms require employees to make an active choice about 401(k) participation.

- Welcome to the company
- You are *required* to submit this form within 30 days of hire, *regardless* of your 401(k) participation choice
- If you don't want to participate, indicate that decision
- If you want to participate, indicate your contribution rate and asset allocation
- Being passive is *not* an option



Rate of Participation in the 401(k) plan by month of hire
Participation Rate in 3rd Month of Tenure
80%
70%
60%
50%
40%
30%
20%
10%
0%
Jan-97
Feb-97
Mar-97
Apr-97
May-97
Jun-97
Jul-97
Aug-97
Sep-97
Oct-97
Nov-97
Dec-97
Jan-98
Feb-98
Mar-98
Apr-98
May-98
Jun-98
Jul-98
Month of hire



Hire Date and 401(k) Participation
Participation Rate in 3rd Month of Tenure
80%
70%
60%
50%
40%
30%
20%
10%
0%
January
February
March
April
May
June
July
Month of Hire
Active decision
Standard enrollment

401(k) participation increases under active decisions

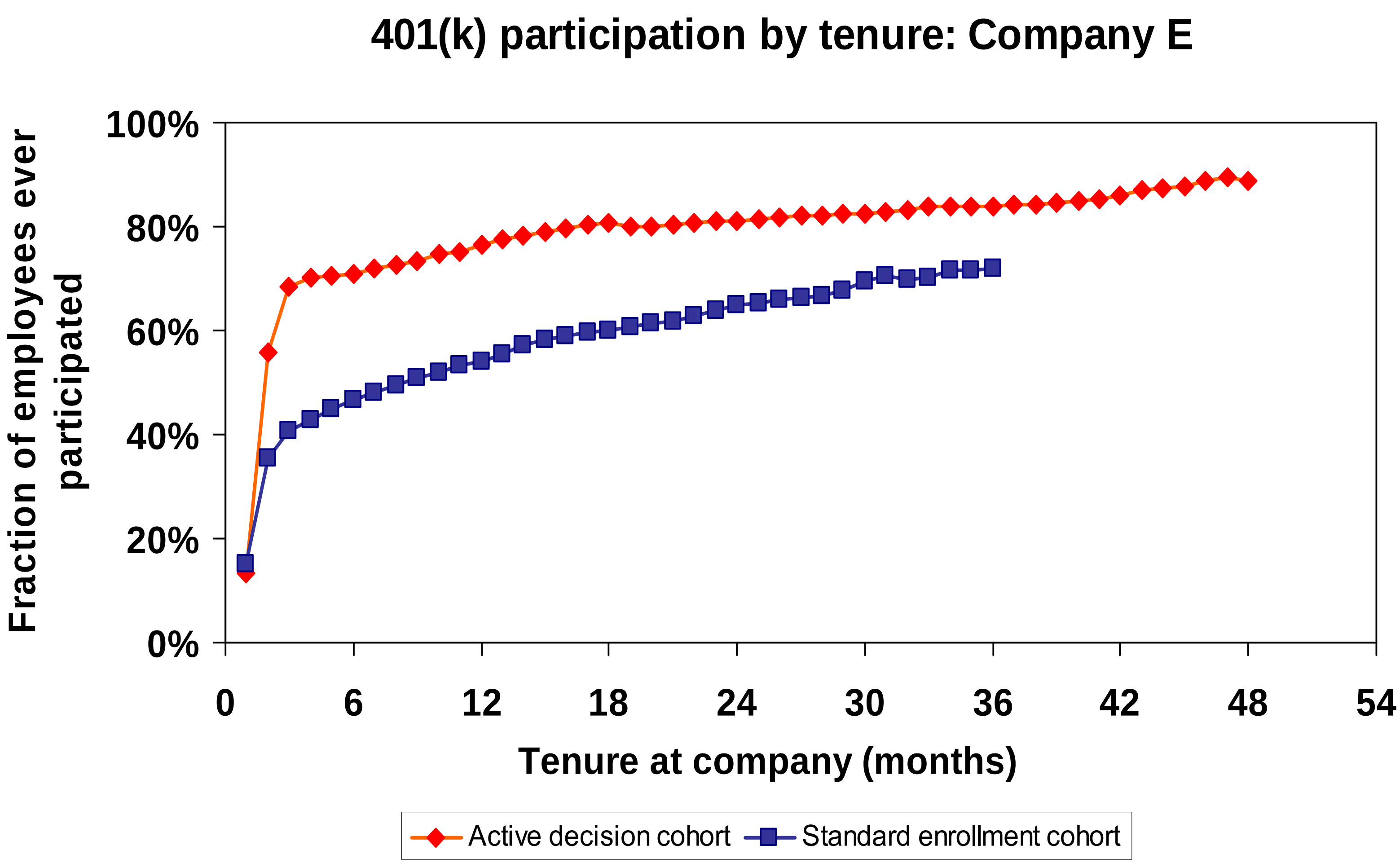
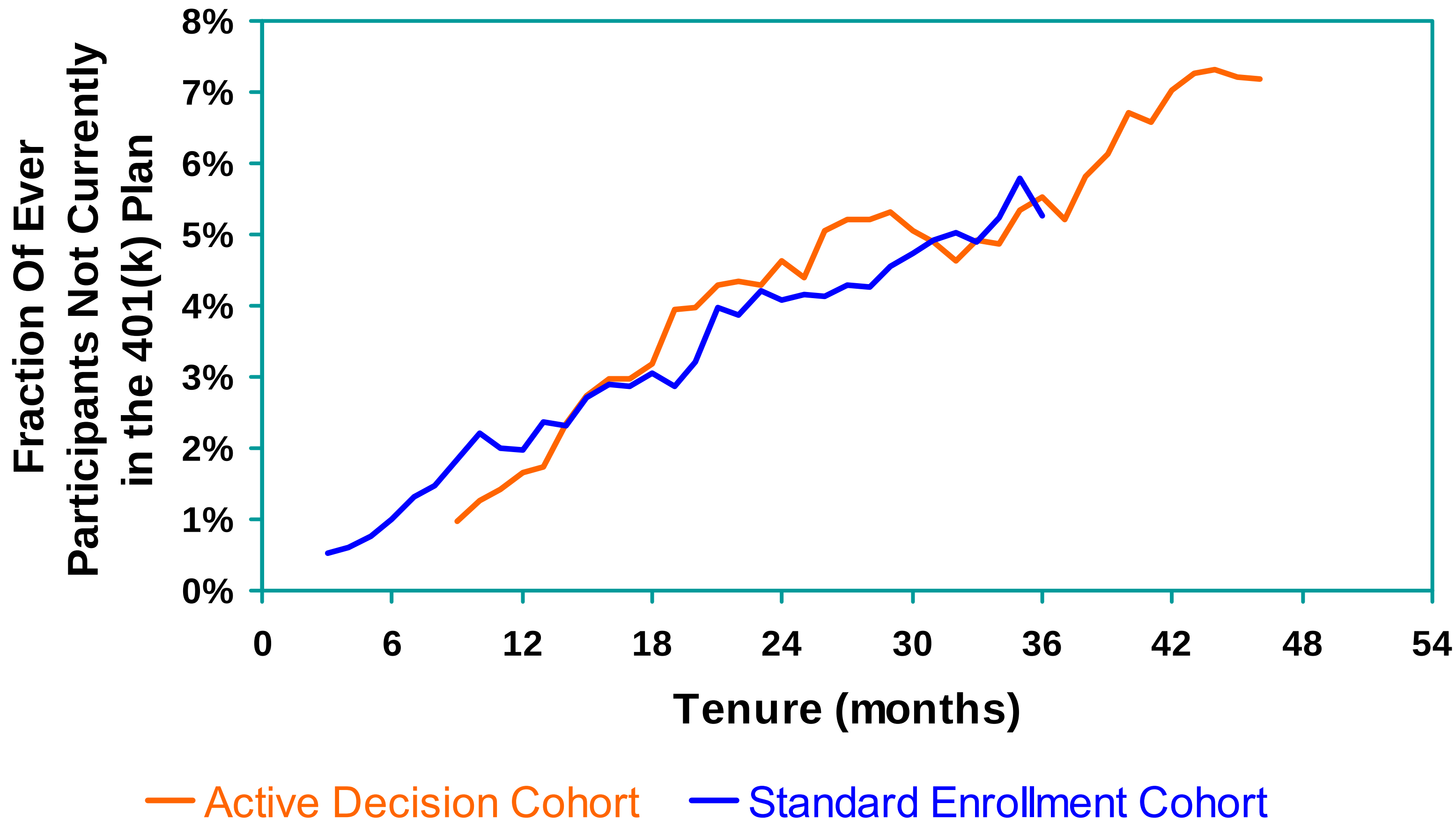


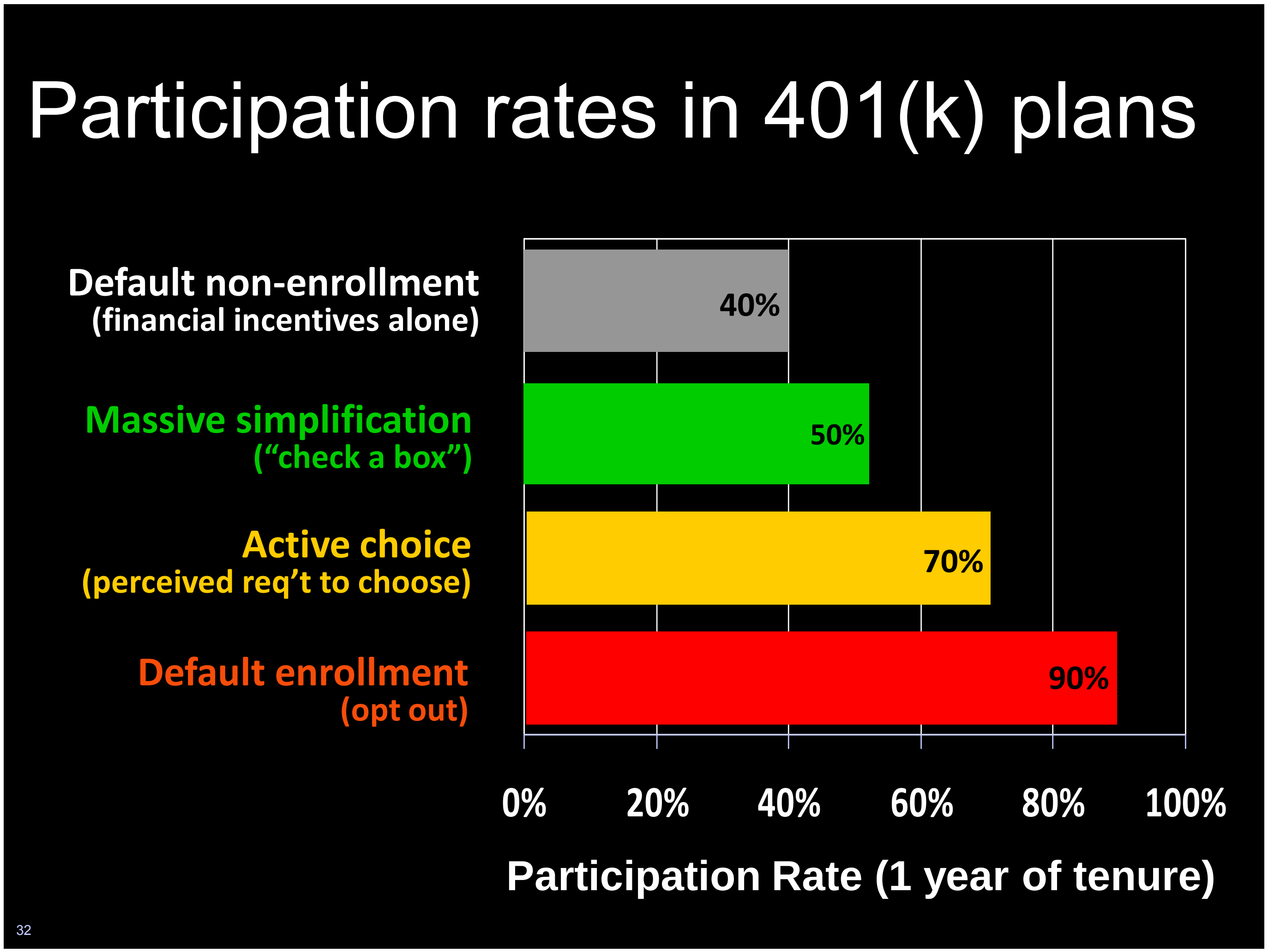
FIGURE 4. The Likelihood of Opting Out of 401(k) Plan Participation by Tenure



Active decisions

- Active decision raises 401(k) participation.
- Active decision raises average savings rate by 50 percent.
- Active decision doesn’t induce choice clustering.
- Under active decision, employees choose savings rates that they otherwise would have taken three years to achieve. (Average level *as well as* the entire multivariate covariance structure.)

An example:



These are all positive preferences.

Which is the normative preference?

Which system should society adopt?

The limits to "revealed preferences"

Behavioral economists are particularly skeptical of the claim that positive and normative preferences are identical. Why?

- Agents may make cognitive mistakes
  - I hold all of my retirement wealth in employer stock, but that does not mean that I am risk seeking; rather it really means that I mistakenly believe that employer stock is less risky than a mutual fund (see survey evidence).
  - I choose AD (see KT example) rather than BC
- Agents may have dynamically inconsistent preferences (there is no single set of preferences that can be measured).
- But in both cases, we can still use behavior to infer *something* about normative preferences.

Positive Preferences ≠ Normative Preferences
But…
Positive Preferences shed light on Normative Preferences

Identifying normative preferences? (No single answer.)

- Empirically estimated structural models that include both true preferences and behavioral mistakes (Laibson et al, MSM lifecycle estimation paper, 2005)
- Asymptotic (empirical) choices (Choi et al, 2003)
- Active (empirical) choices (Choi et al "Active Decision" 2009)
- Survey questions about ideal behavior (Choi et al 2002)
- Expert choice (Kotlikoff's ESPlanner; Sharpe's Financial Engines)
- Philosophy, ethics

Example: Normative economics with present-biased preferences

Possible normative preferences:

- Pareto criterion treating each self as a separate agent (this does not identify a unique optimum)
- Self 0's preferences: basically exponential δ discounting
- Preferences at a distance: exponential δ discounting
- Preferences that persist: exponential δ discounting
- Exponential discounting: θ^t $(\theta = \delta?)$
- Unit weight on all periods
- Mortality discounting

Remark: these are all nearly the same (in practice)

An algorithm for Behavioral Welfare Economics

1. Write down a positive model of behavior (e.g., present-biased preferences)
2. Estimate the model's parameters
3. Confirm that the model explains the available observations about behavior
4. Make assumptions about the relationship between the positive model and normative preferences (e.g., β is a bias and δ is legitimate discounting)
5. Design institutions (mechanism design) that maximize normative preferences, assuming that agents respond to the institutions according to the predictions of the positive model

Some examples

- Asymmetric/cautious paternalism (Camerer et al 2003)
- Optimal Defaults (Choi et al 2003)
- Libertarian paternalism (Sunstein and Thaler 2005)
- Nudge (Sunstein and Thaler 2008)
- Active Decisions and Optimal Defaults (Carroll et al 2009)

Optimal policies for procrastinators
Carroll, Choi, Laibson, Madrian and Metrick (2009).

- It is costly to opt out of a default
- Opportunity cost (transaction costs) are time-varying
  - Creates option value for waiting to opt out
- Actors may be present-biased
  - Creates tendency to procrastinate

Preview of model

- Individual decision problem (game theoretic)
- Socially optimal mechanism design (enrollment regime)
- Active decision regime is optimal when consumers are:
  - Well-informed
  - Present-biased
  - Heterogeneous
- Otherwise, defaults are optimal

Model setup

- Infinite horizon discrete time model
- Agent decides when to opt out of default s_D and move to time-invariant optimum $s*$
- Agent pays stochastic (iid) cost of opting out: c
- Until opt-out, the agent suffers a flow loss

$$L(s_D, s*) \geq 0$$

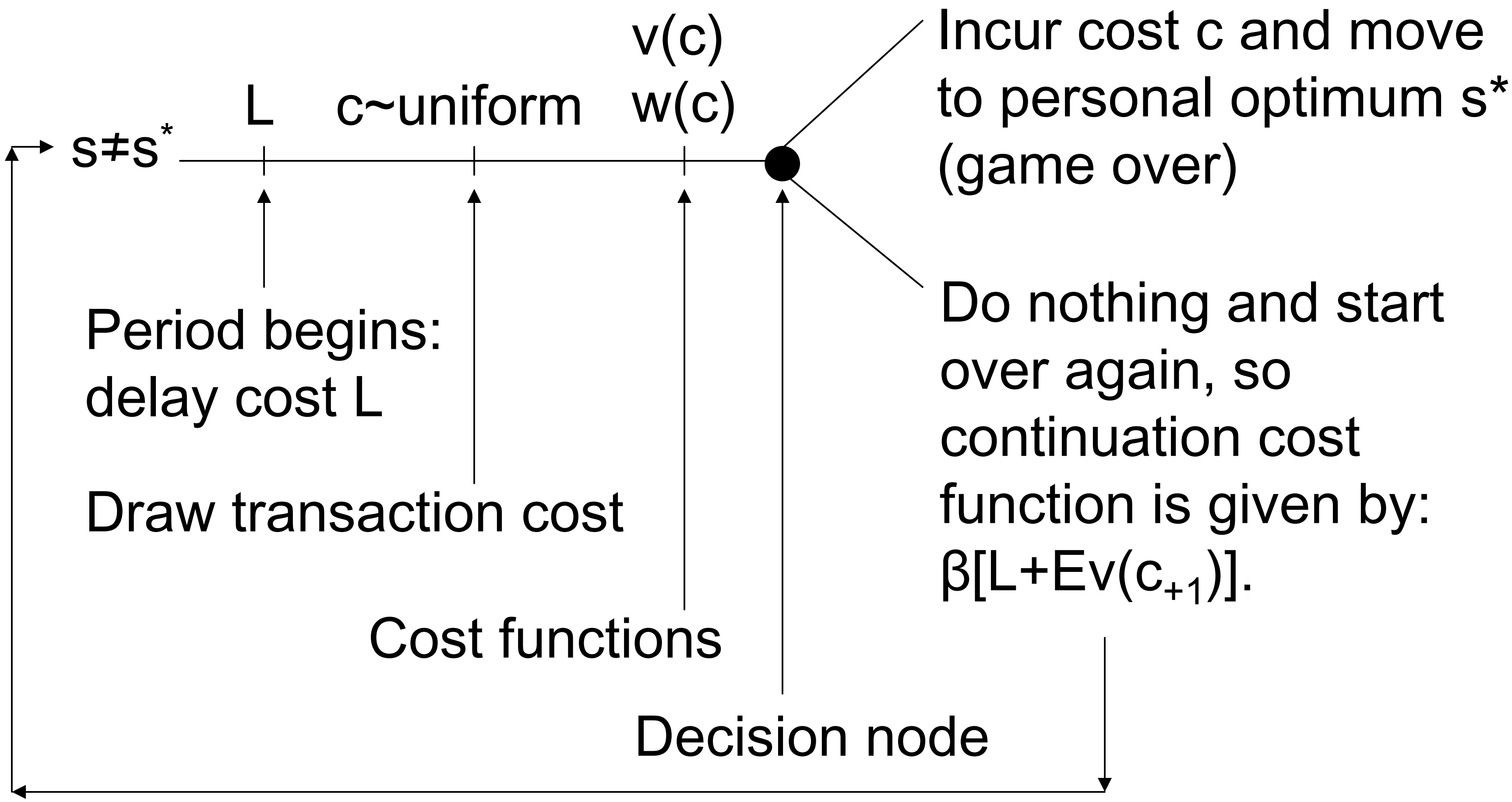
- Agents have quasi-hyperbolic discount function:

$$1, \beta\delta, \beta\delta^2, \ldots \text{ where } \beta \leq 1$$

- For tractability, we set $\delta = 1$:

$$1, \beta, \beta, \ldots$$

Model timing



Agent's action

Equilibrium solves the following system:

$$w(c_t, s^*, s_D) = \min\left\{ c_t,\ \beta\left[L + E_t v(c_{t+1}, s^*, s_D) \right] \right\}$$

$$v(c_t, s^*, s_D) = \begin{cases} c_t & \text{if } c_t \le c^* \\ L + E_t v\left(c_{t+1}, s^*, s_D\right) & \text{if } c_t > c^* \end{cases}$$

$$c^* = \beta\left[L + E_t v\left(c_{t+1}, s^*, s_D\right) \right]$$

Solution of model:

1. Solve agent's problem (given arbitrary default s_D)
2. Confirm predictions of model (e.g., people who opt out earliest, move the furthest from default)
3. Planner picks default to maximize average welfare of agents, using normative preferences as the planners welfare criterion ($\beta=1$)

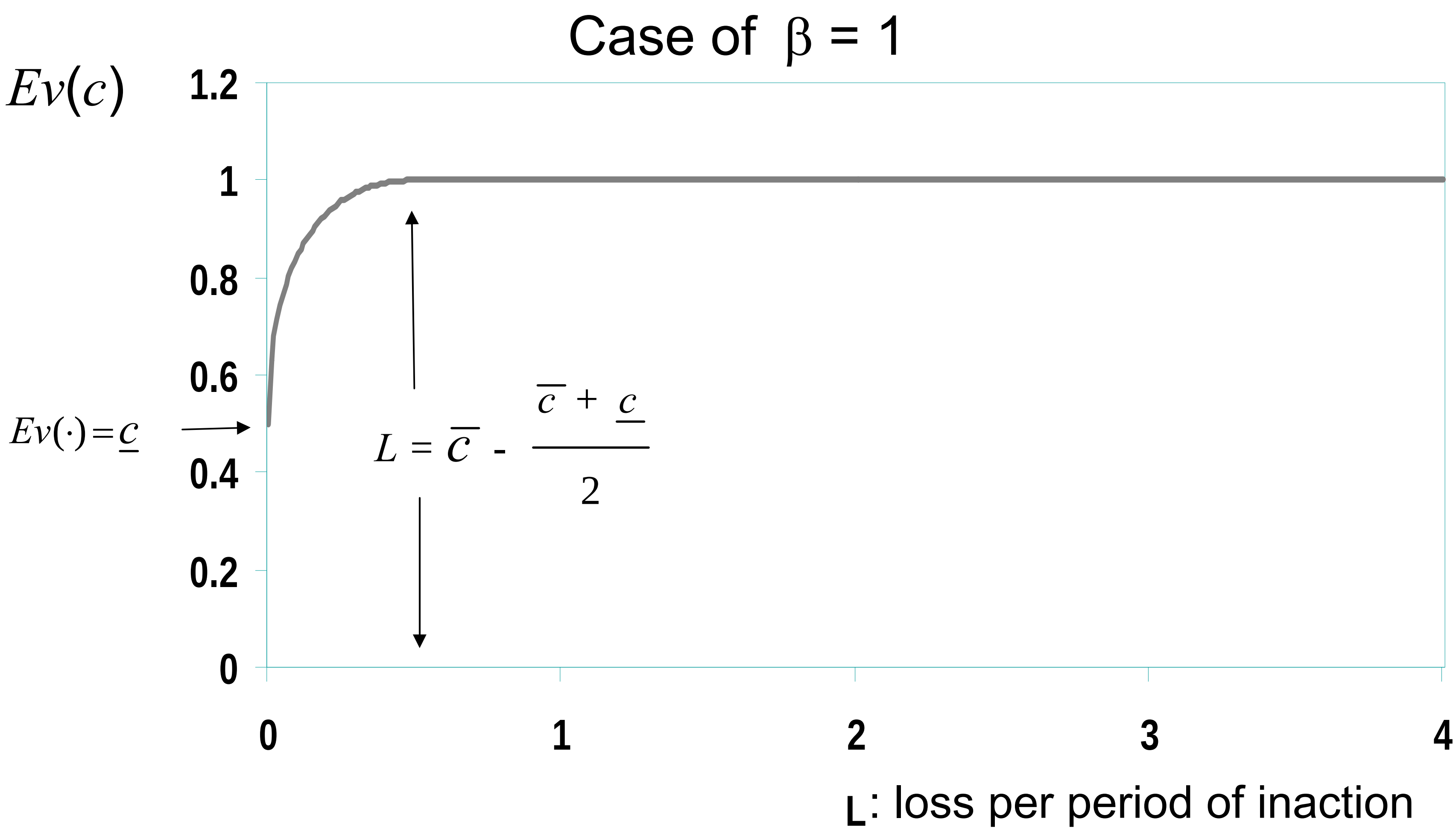
Action threshold and loss function

$$c^* = \frac{\underline{c} + \sqrt{\underline{c}^2\left[1 - \beta\left(2 - \beta\right)\right] + 4\beta\left(1 - \frac{\beta}{2}\right)\left(\bar{c} - \underline{c}\right)L}}{2 - \beta}$$

Threshold is increasing in β, increasing in L, and decreasing in the support of the cost distribution (holding mean fixed).

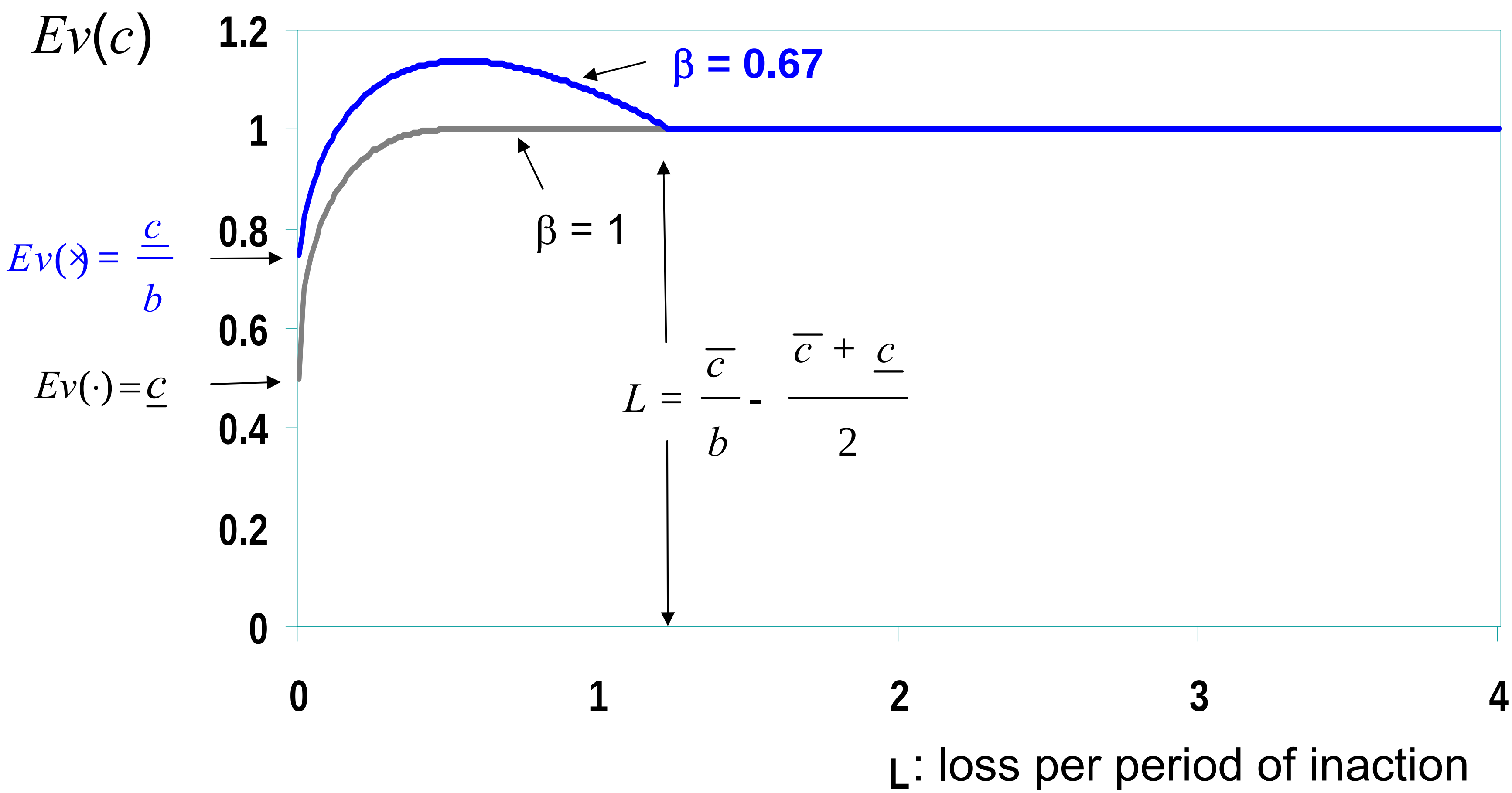
$$E\,v(\cdot) = \begin{cases} \dfrac{\sqrt{2\left(\bar{c} - \underline{c}\right)\beta\left(2 - \beta\right)L + \underline{c}^2\left(1 - \beta\right)^2}}{\beta\left(2 - \beta\right)} - L + \dfrac{\underline{c}}{\beta\left(2 - \beta\right)} & \text{if } 0 < L < \dfrac{\bar{c}}{\beta} + \dfrac{\bar{c} + \underline{c}}{2} \\ \dfrac{\bar{c} + \underline{c}}{2} & \text{otherwise} \end{cases}$$

Graph of expected loss function: $Ev(c)$



Key point: loss function is monotonic in cost of waiting, L

Graph of loss function: $Ev(c)$



Key point: loss function is not monotonic for quasi-hyperbolics.

Why is the loss function non-monotonic when β < 1?

- Because the cutoff c^* is a function of L, we can write the loss function as $Ev(c^*(L), L)$
- By the chain rule,

$$\left.\frac{dEv}{dL^{-}}\right|_{c^*(L)=\bar{c}} = \frac{\partial Ev}{\partial c^*}\frac{\partial c^*}{\partial L} + \frac{\partial Ev}{\partial L} < 0$$

- + 0

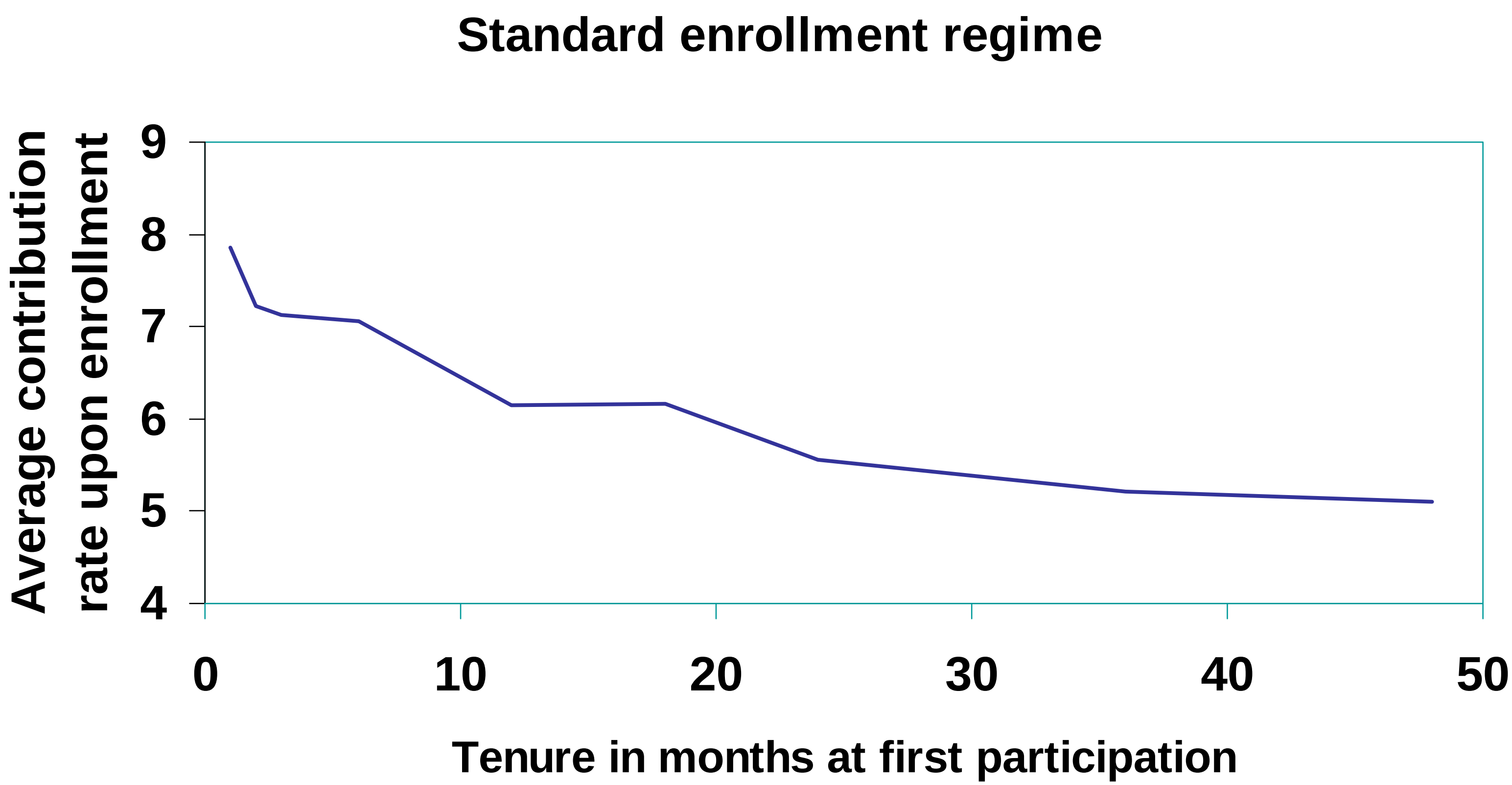
- Intuition: pushing the current self to act is good for the individual, since the agent has a bias against acting. When acting is very likely, this benefit is not offset by the cost of higher L.

Model predictions

- In a default regime, early opt-outs will show the largest changes from the default
- Participation rates under standard enrollment will be lower than participation rates under active decision
- Participation rates under active decision will be lower than participation rates under automatic enrollment

Model predictions

People who move away from defaults sooner are, on average, those whose optima are furthest away from the default



Model predictions

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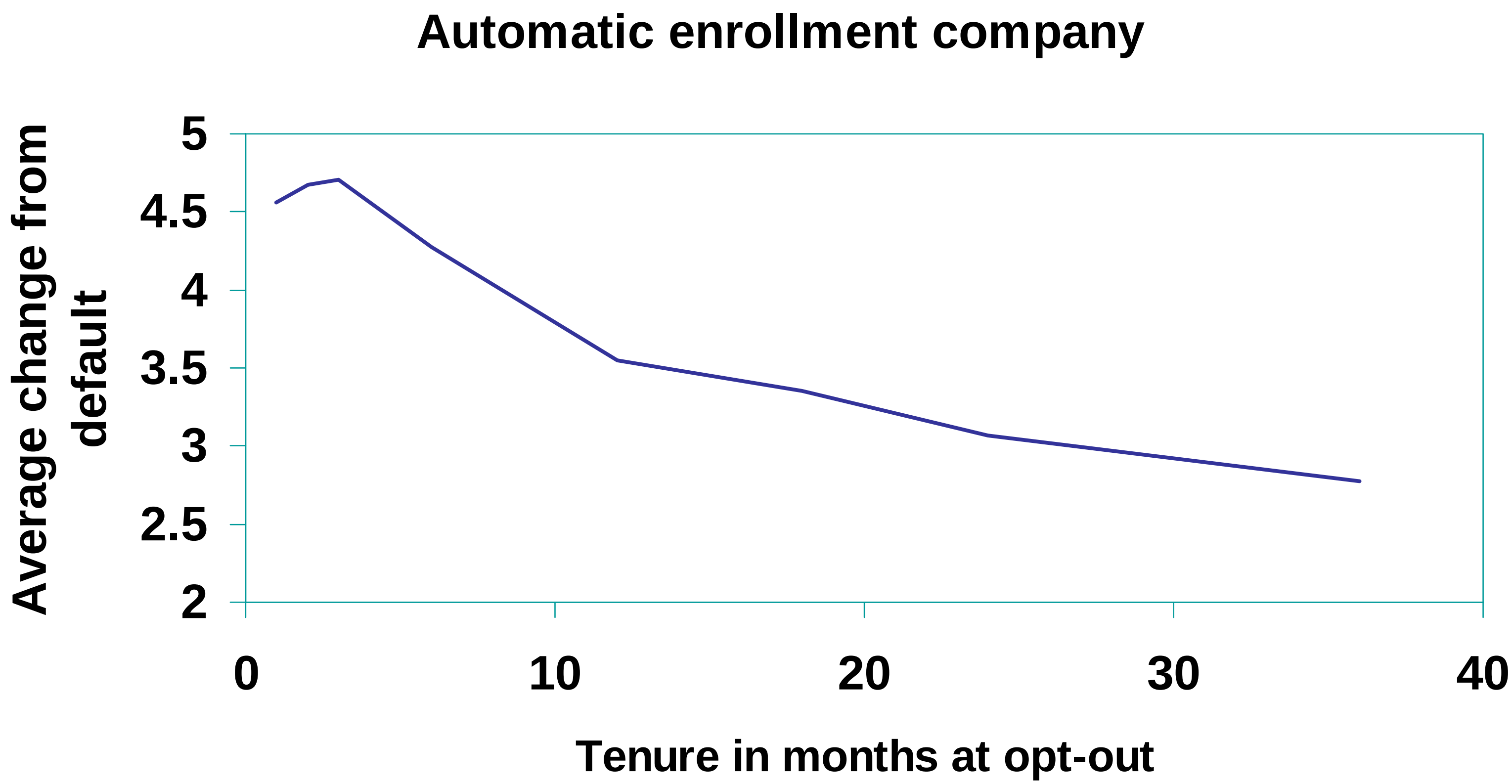


The benevolent planner's problem

- A benevolent planner picks the default s_D to minimize the social loss function:

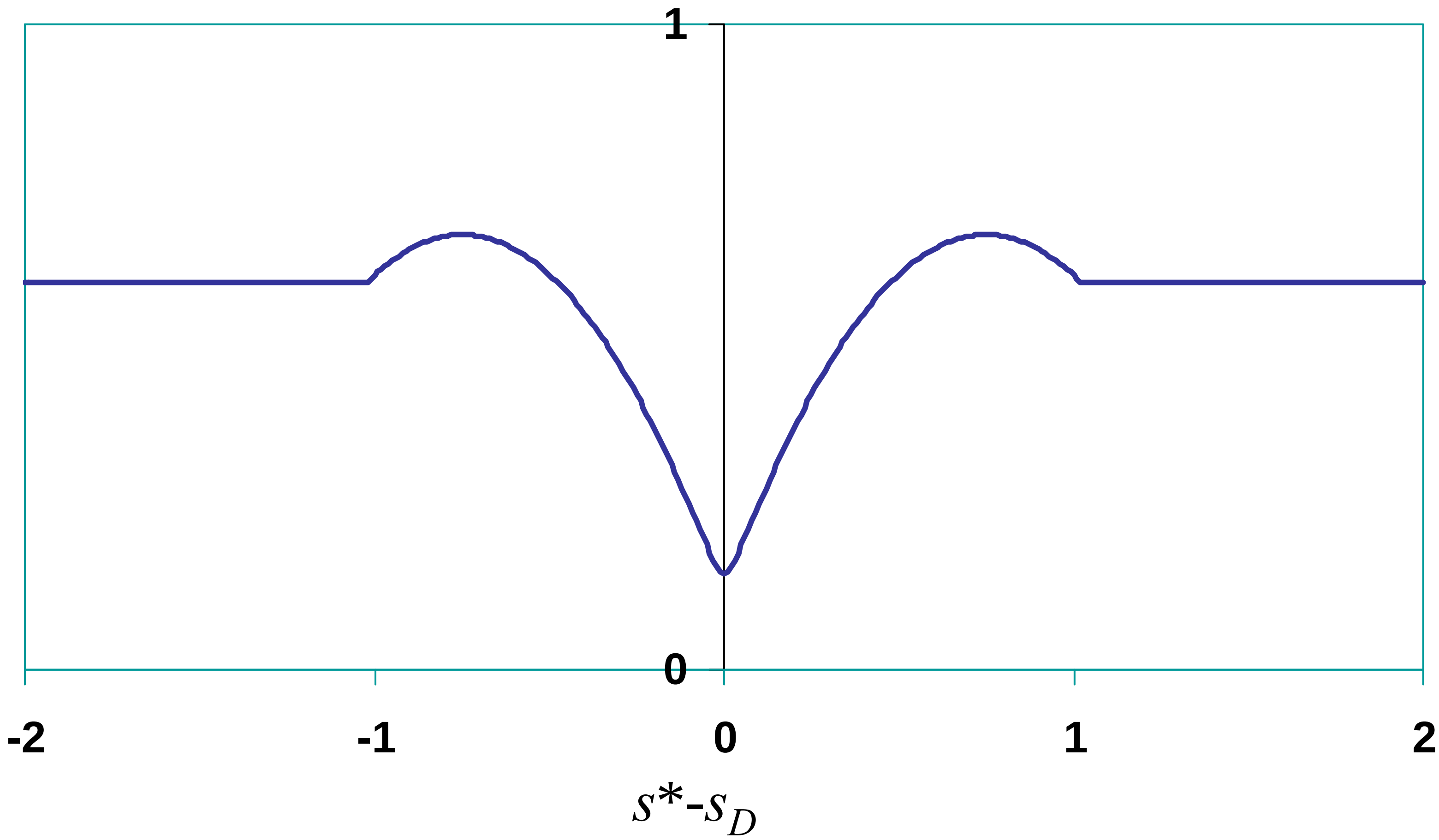
$$\int_{s^*=\underline{s}}^{\overline{s}} E_t v\left(c_t, s^*, s_D\right) dF\left(s^*\right)$$

- We adopt a quadratic loss function:

$$L(s_D, s^*) = k\left(s^* - s_D\right)^2$$

- To illustrate the properties of this problem, we assume s^* is distributed uniformly.

Loss function in s^*-s_D space



Lemma:

The individual loss at each boundary of the support of s* must be equal at an optimal default.

$$\frac{\partial}{\partial s_D}\int_{\underline{s}}^{\bar{s}} Ev(s^*, s_D)\,dF(s^*) = \frac{\partial}{\partial s_D}\int_{\underline{s}}^{\bar{s}} Ev(s^* - s_D)\,ds^*$$

$$= \frac{\partial}{\partial s_D}\int_{\underline{s} - s_D}^{\bar{s} - s_D} Ev(x)\,dx$$

$$= Ev(\underline{s} - s_D) - Ev(\bar{s} - s_D)$$

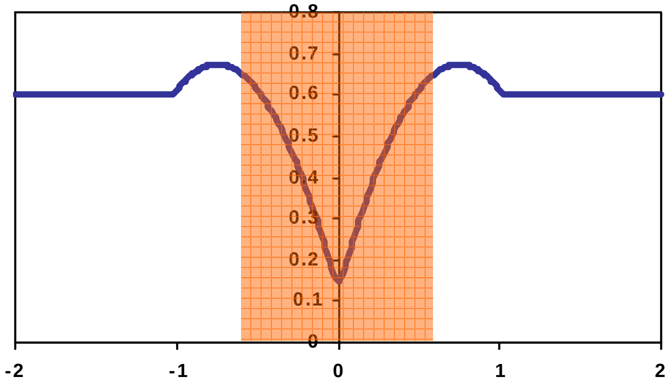
$$= Ev(\underline{s}, s_D) - Ev(\bar{s}, s_D)$$

$$= 0$$

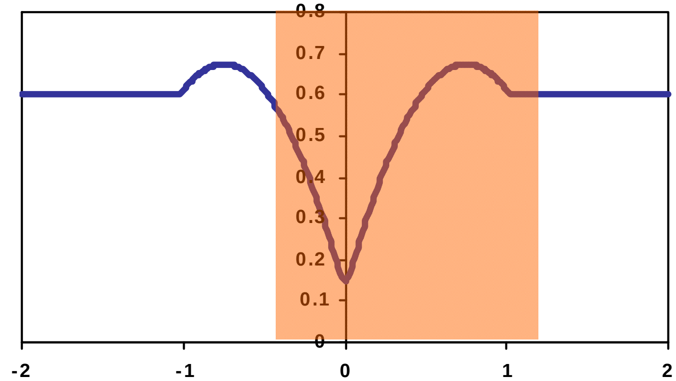
Proposition:

There are three defaults that satisfy Lemma 1 and the second-order condition.

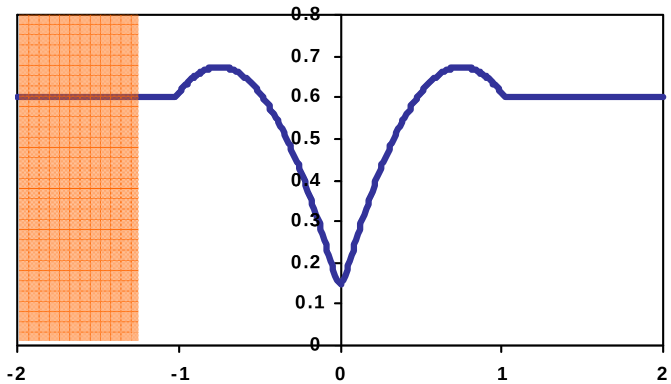
Center



Offset



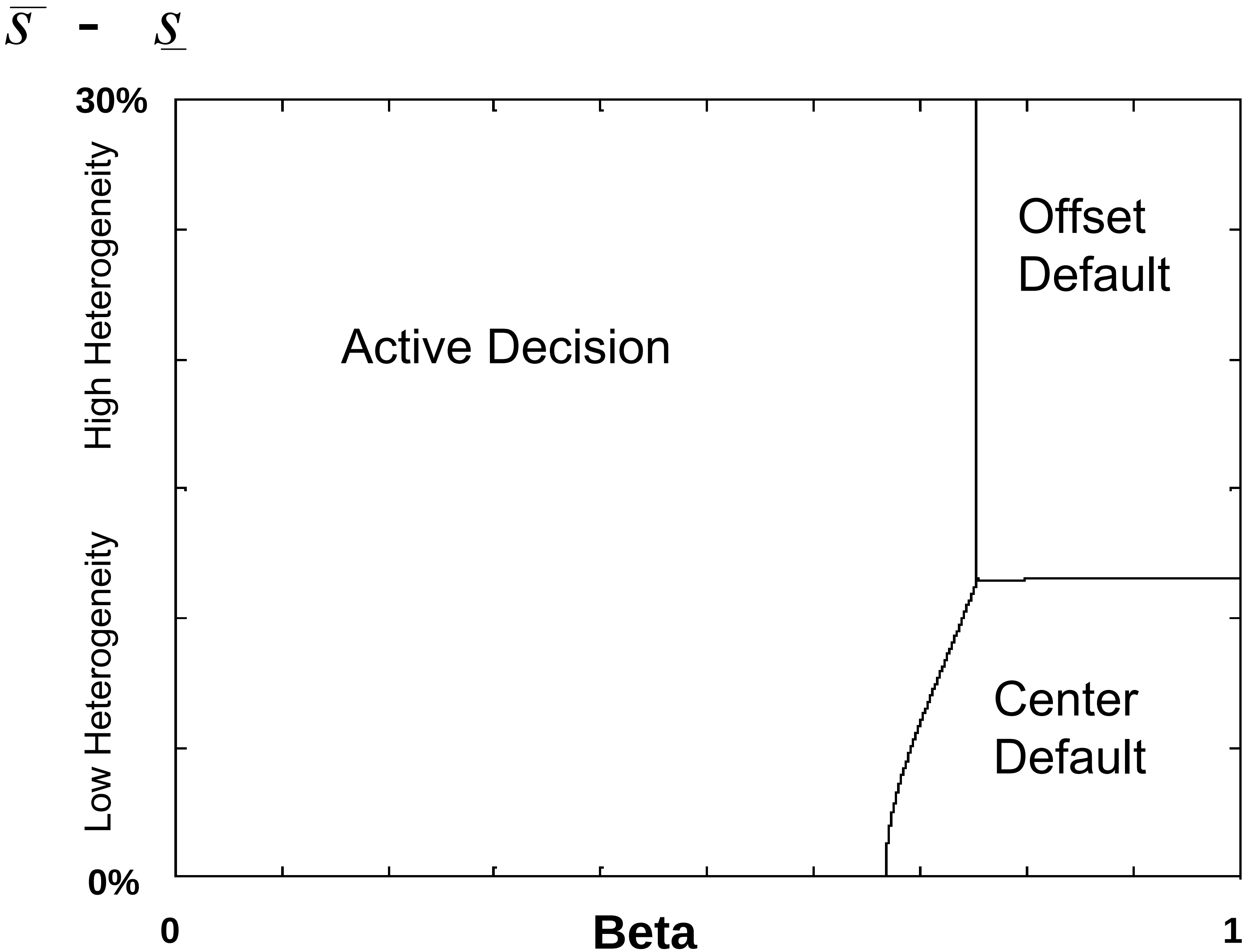
Active decision



Proposition:

Active decisions are optimal when:

- Present-bias is large --- small β.
- Average transaction cost is large.
- Support of transaction cost is small.
- Support of savings distribution is large.
- Flow cost of deviating from optimal savings rate is large (for small β).


$\overline{S}$ - $\underline{S}$
30%
High Heterogeneity
Low Heterogeneity
0%
Active Decision
Offset Default
Center Default
0
Beta
1

Naives:

Proposition: For a given calibration, if the optimal mechanism for sophisticated agents is an active decision rule, then the optimal mechanism for naïve agents is also an active decision rule.

Example: Summary

- Model of standard defaults and active decisions
  - The cost of opting out is time-varying
  - Agents may be present-biased
- Active decision is socially optimal when…
  - β is small
  - Support of savings distribution is large
- Otherwise, defaults are optimal

Talk summary
Alternative to revealed preferences

- We should no longer rely on the classical theory of revealed preferences to answer the fundamental question of what is in society's interest.
- Arbitrary contextual factors drive revealed preferences.
- Revealed preferences are not (always) normative preferences.
- We can do welfare economics without classical revealed preferences

Conclusions

- It’s easy to dramatically change savings behavior
  - Defaults, Active Decisions
- How should we design socially optimal institutions?
  1. Write down a positive model of behavior
  2. Estimate the model’s parameters
  3. Confirm that the model’s empirical accuracy
  4. Make assumptions about the relationship between the positive model and normative preferences
  5. Design institutions that maximize normative preferences, assuming that agents respond to the institutions according to the positive model