Present Bias Unconstrained: Consumption, Welfare, and the Present-Bias Dilemma

by Peter Maxted

Discussion by Taha Choukhmane
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NBER Behavioral Finance Working Group
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MANAGEMENT
SLOAN SCHOOL

Introduction

Fantastic paper, full of insights, can’t do justice in a short presentation:

Read the paper!

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My main take-away:

Most of my (your?) intuitions about
Present Bias are wrong*

* Under some assumptions

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II. Individuals behavior

III. Optimal Policy

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$$u_t + \beta\delta\,(u_{t+1} + \delta u_{t+2} + \delta^2 u_{t+3} + \cdots)$$

Naivete + finite horizon:

$\Rightarrow$ Simple and tractable model

$\Rightarrow$ **Most applications of the model rely on this setup!**

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Pathologies (discontinuities etc.)

+ multiple Markov equilibria

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Matters for macro & finance !

Simple Model

$$u(c_1) + \beta\delta\big(u(c_2) + \delta u(c_3)\big)$$

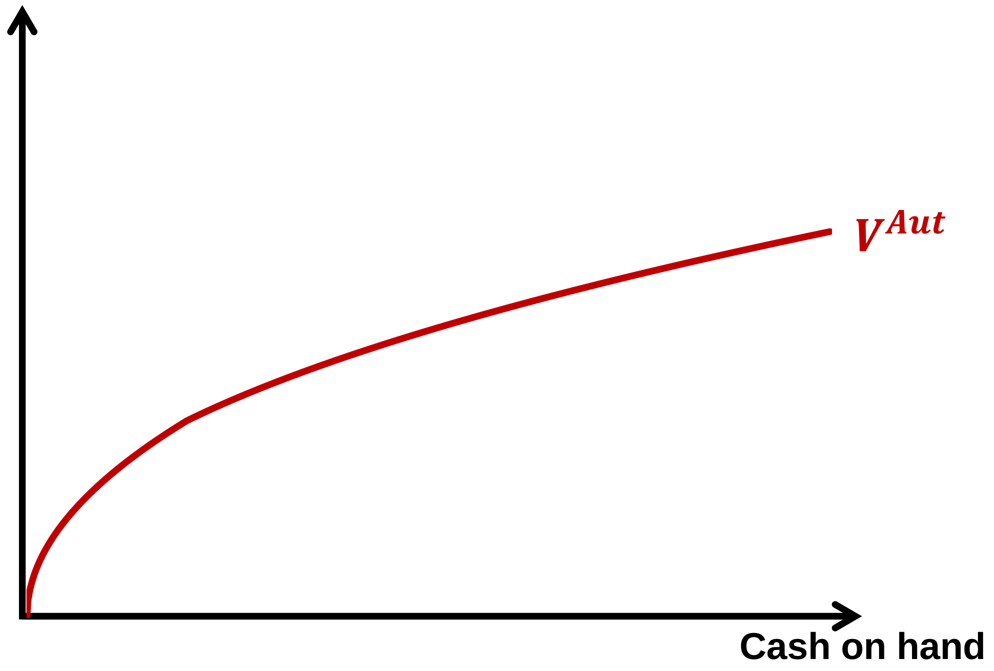
Setting:

- Sophisticated Present Bias
- Discrete time 3 periods
- CRRA utility
- Endowment w in each period
- No risk

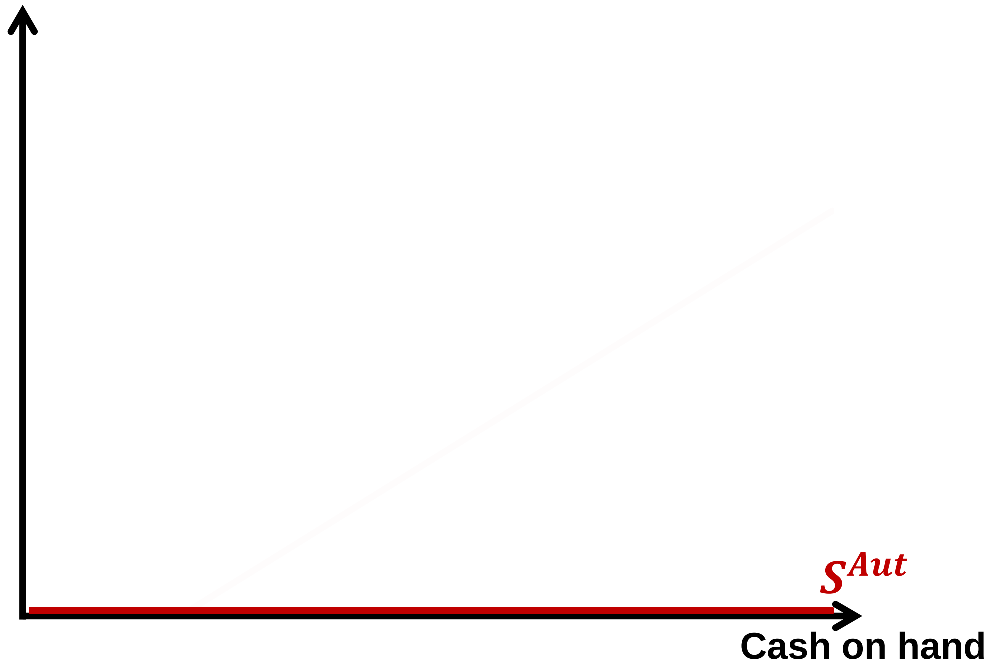
Step 1: Financial Autarky

$$u(x) + \beta\delta\big(u(\boldsymbol{w}) + \delta u(\boldsymbol{w})\big)$$

Value function (t=1)



Saving function (t=1)



Step 2: Saving technology s_1 btw t=1 → t=2

$$u(x - s_1) + \beta\delta\big(u(w + s_1) + \delta u(w)\big)$$

$$s.t.\ \ s_1 \geq 0$$

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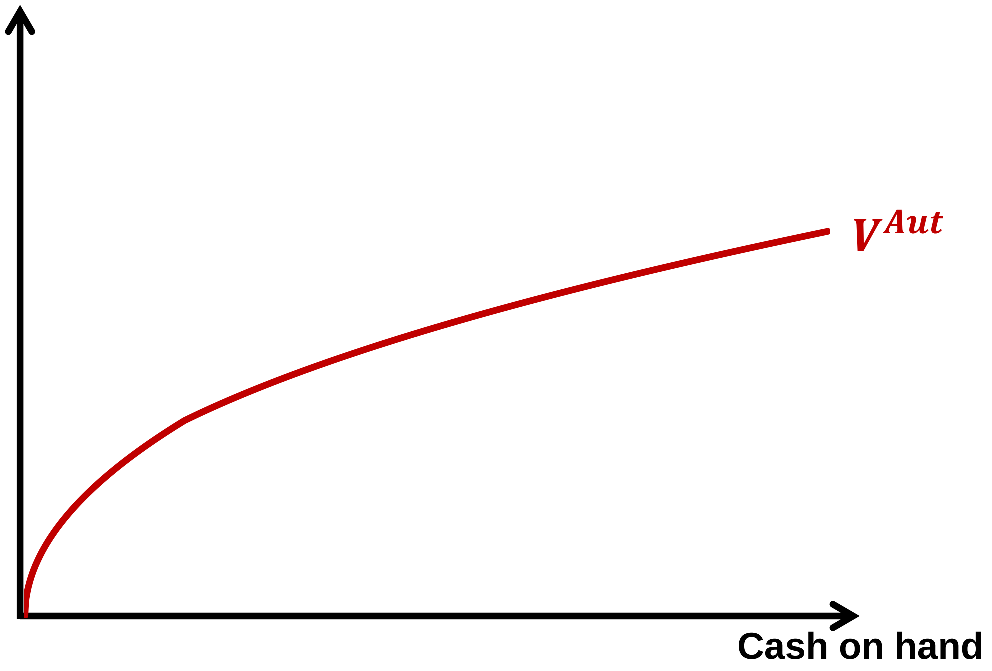

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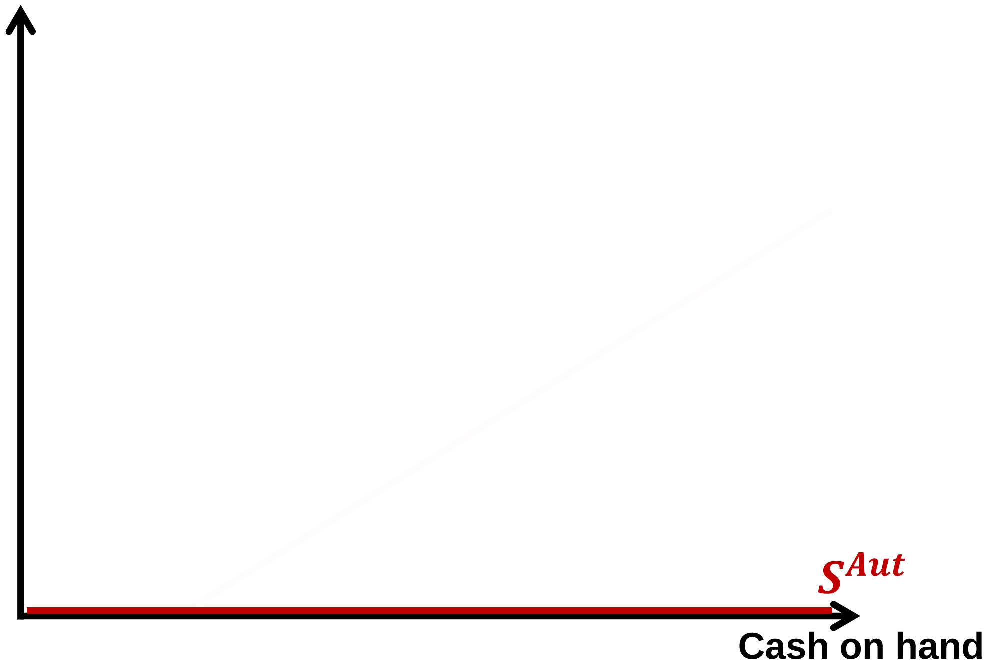

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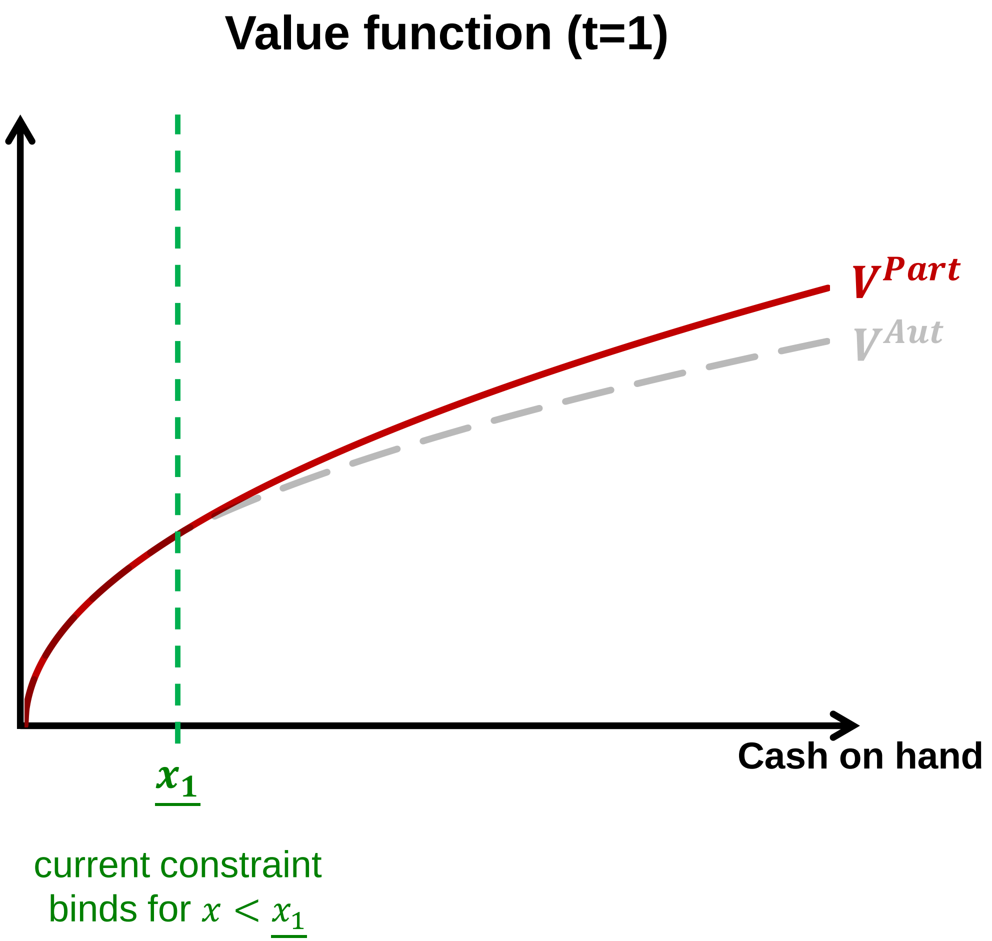

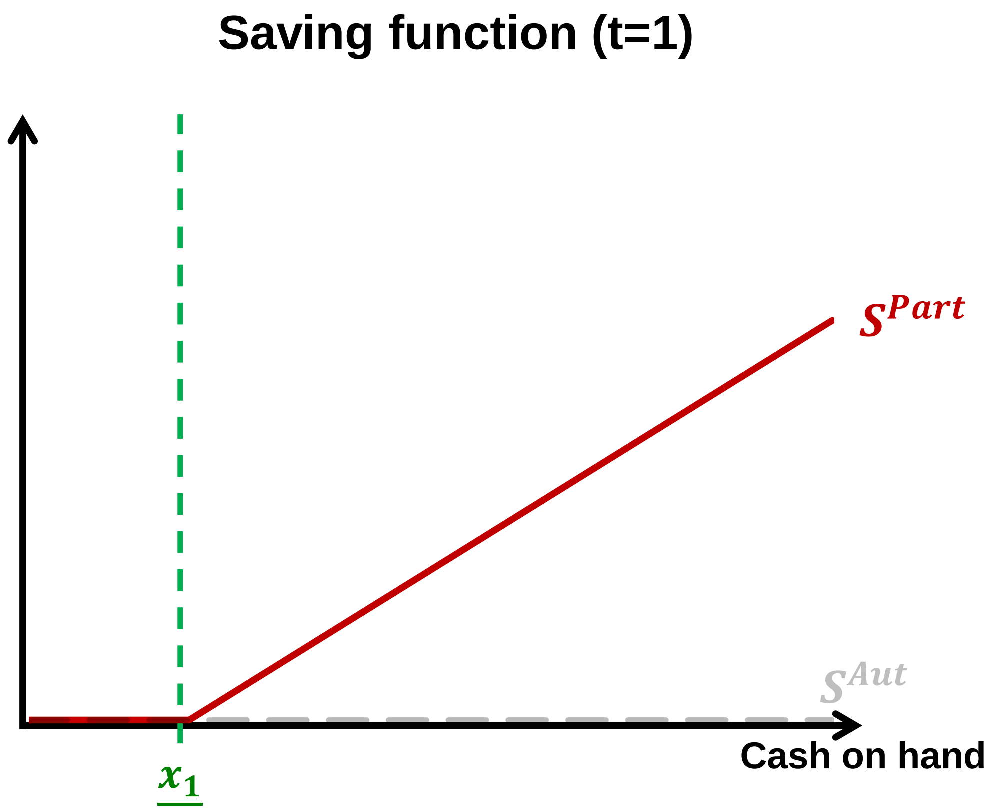

Step 3: Saving technology $\boldsymbol{s_2}$ btw t=2 → t=3

$$u(x - \boldsymbol{s_1}) + \beta\delta\big(u(w + \boldsymbol{s_1} - \boldsymbol{s_2}) + \delta u(w + \boldsymbol{s_2})\big)$$

$$s.t.\ \ \boldsymbol{s_1} \geq 0\ \ \&\ \boldsymbol{s_2} \geq 0$$

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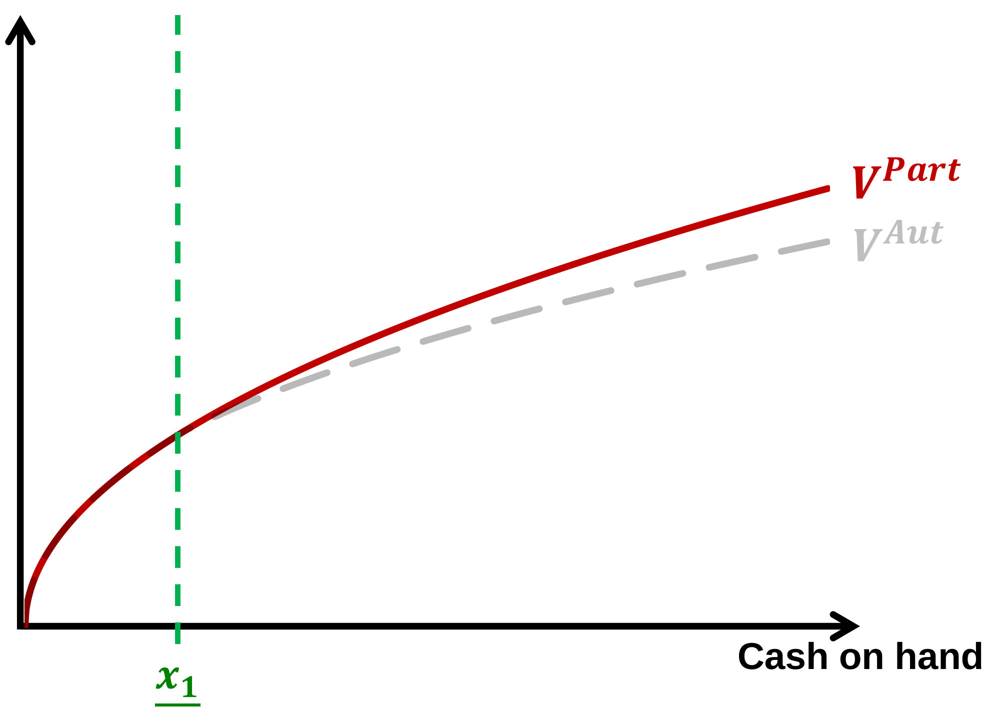
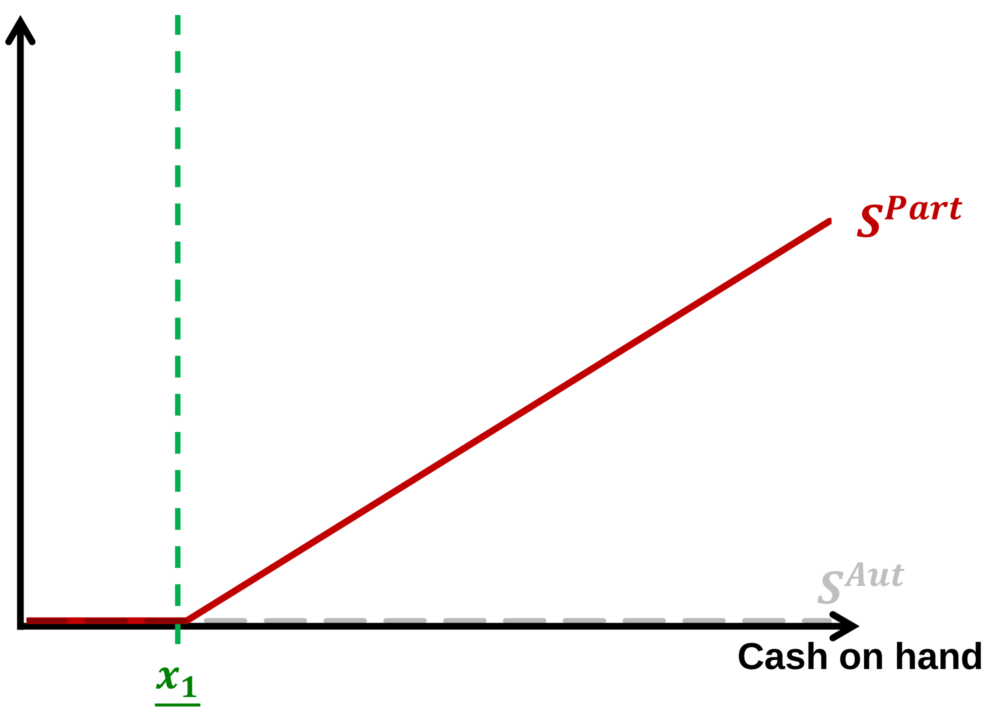


current constraint
binds for $x < \underline{x_1}$

Saving function (t=1)



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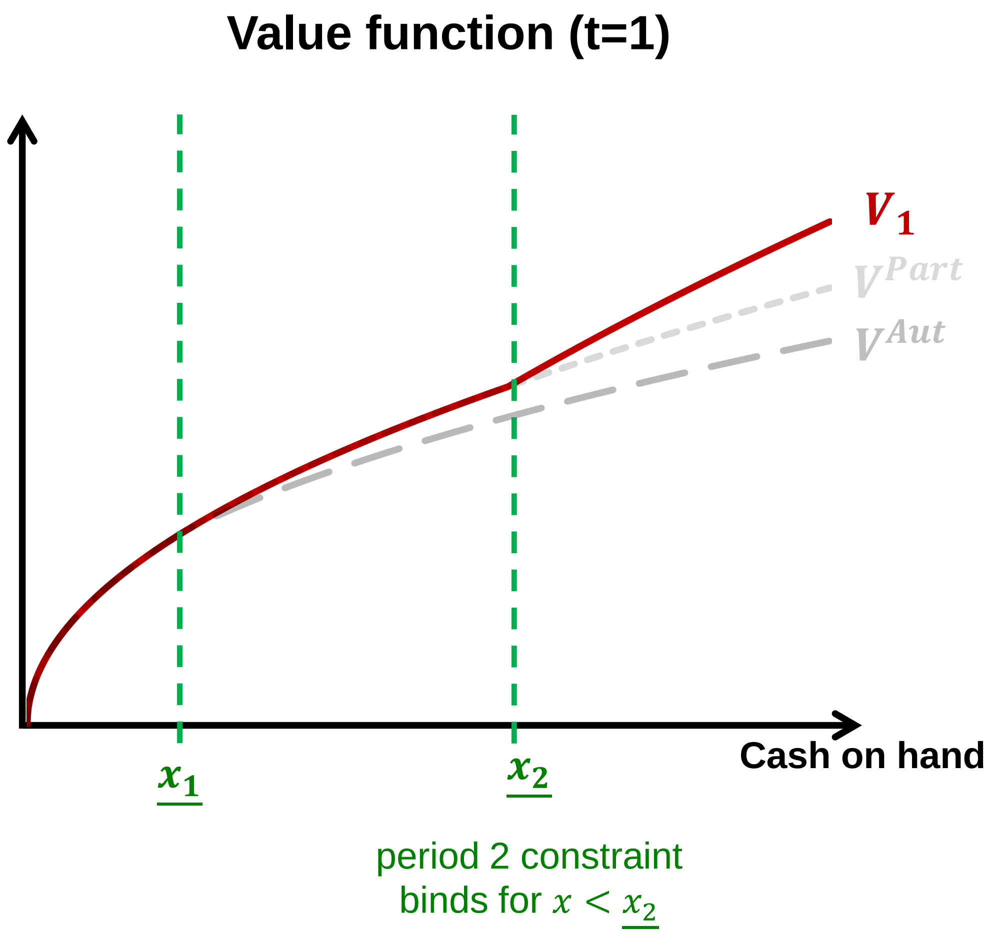

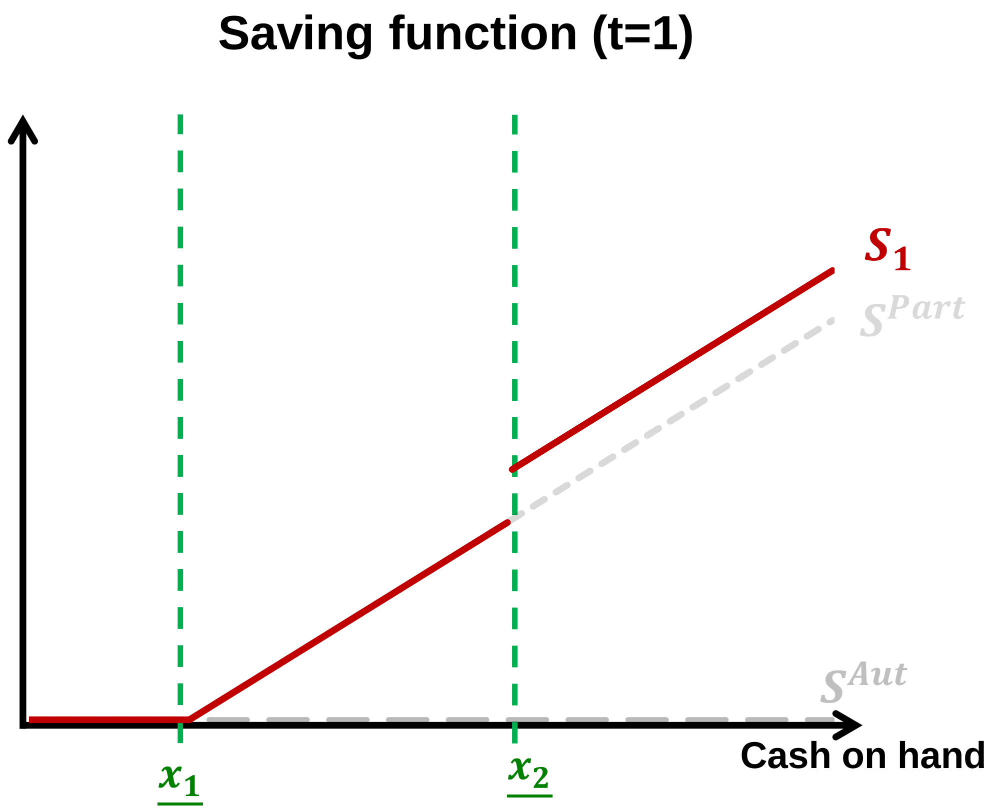

Why does the saving policy jump?

$$\max_{s_1 \geq 0} \quad u(x - s_1) + \beta\delta \Big[\underbrace{u(w + s_1 - s_2^*) + \delta u(w + s_2^*)}_{=V_2} \Big]$$

When period-2 self is credit constrained $\left(cash \quad on \quad hand < \underline{x_2}\right)$**:**

$$\frac{dV_1}{ds_1} = \underbrace{-\frac{\partial u(c_1)}{\partial s_1}}_{marg.\ cost\ of\ s_1} + \underbrace{\beta\delta \left(\qquad \frac{\partial u(c_2)}{\partial s_1} \qquad \right)}_{marg.\ benefit\ from\ s_1}$$

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When period-2 self is not constrained $(cash \quad on \quad hand > \underline{x_2})$:

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Envoloppe theorem doesn't not apply b/c s_2^* optimized according to period-2 preferences $\frac{\partial V_2}{\partial s_2}(s_2^*) > 0$

Marginal value of additional saving **jumps** at $\underline{x_2}$!

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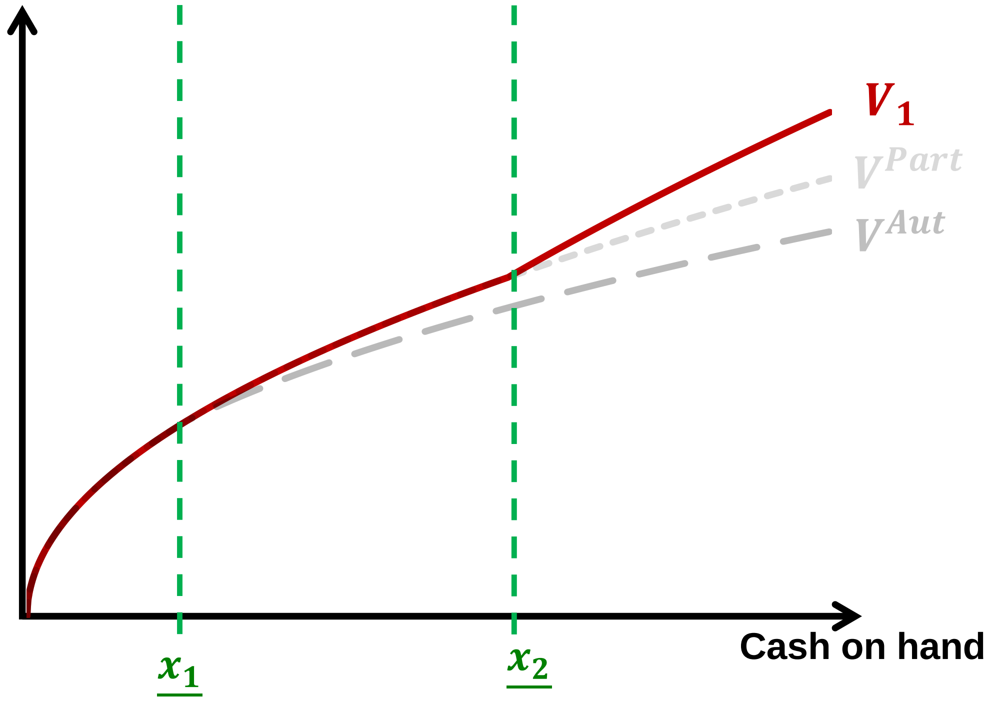
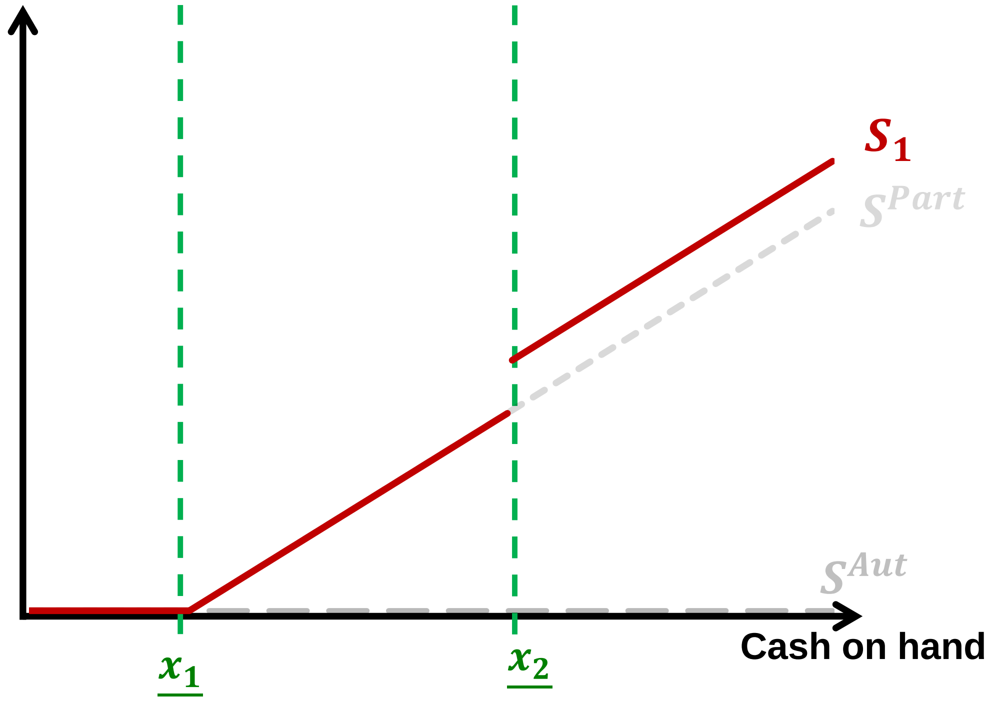


period 2 constraint binds for $x < x_2$

Saving function (t=1)



Step 4 : **Step back one period** (t=0)

$$u(x - \boldsymbol{s_0}) + \beta\delta\big(u(w + \boldsymbol{s_0} - \boldsymbol{s_1}) + \delta u(w + \boldsymbol{s_1} - \boldsymbol{s_2}) + \delta^2 u(w + \boldsymbol{s_2})\big)$$

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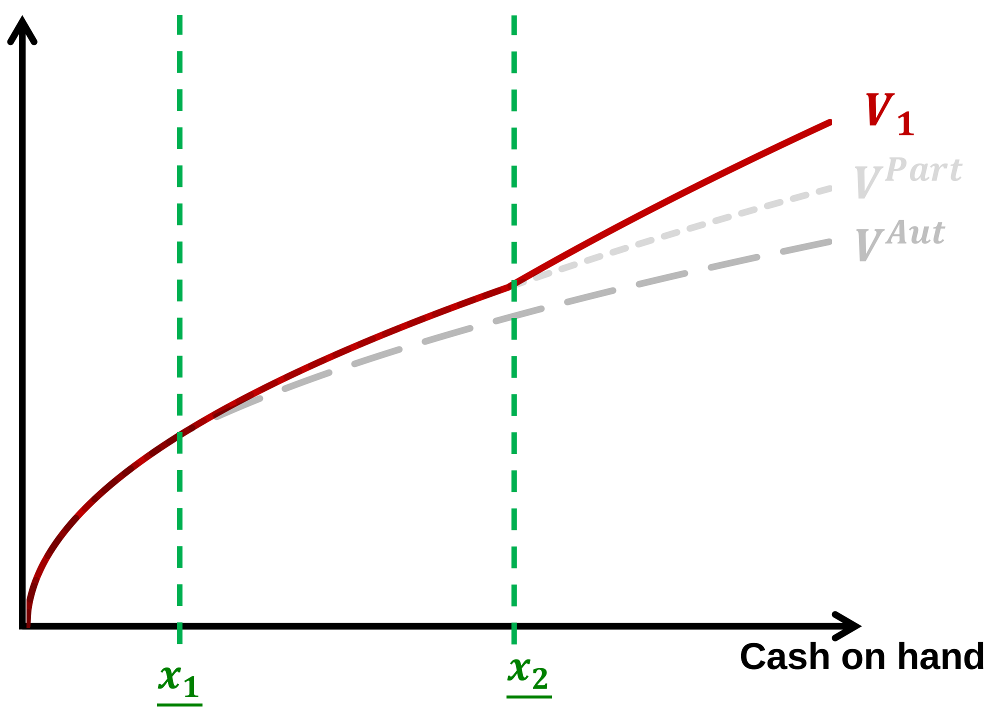
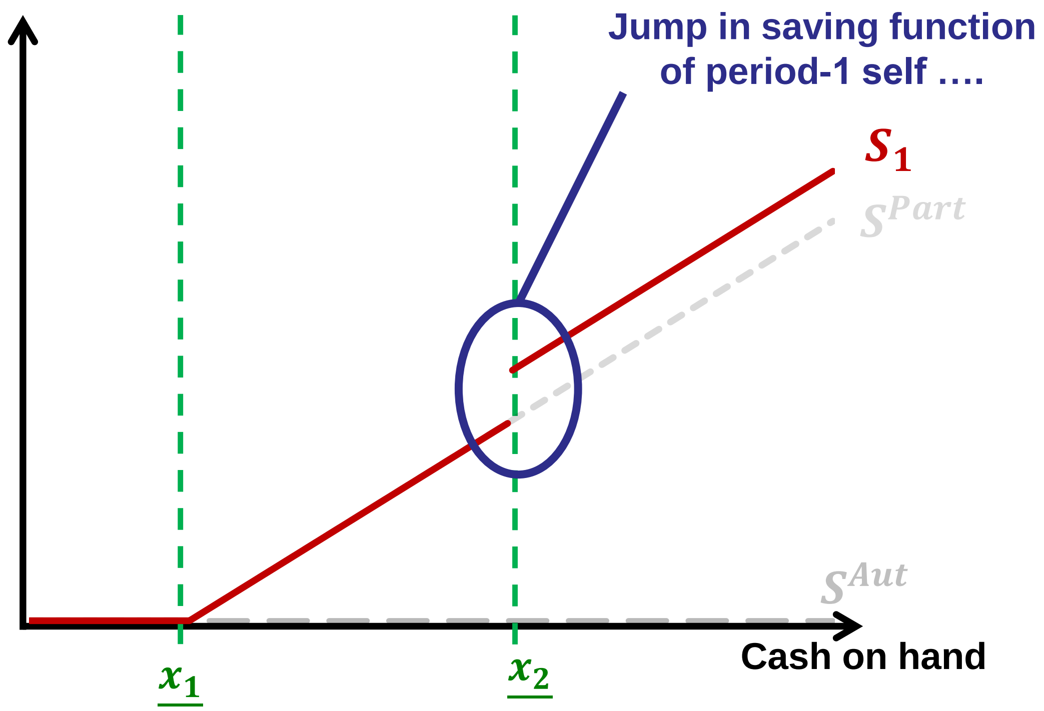


period t+1 constraint binds for $x < \underline{x_2}$

Saving function (t=1)



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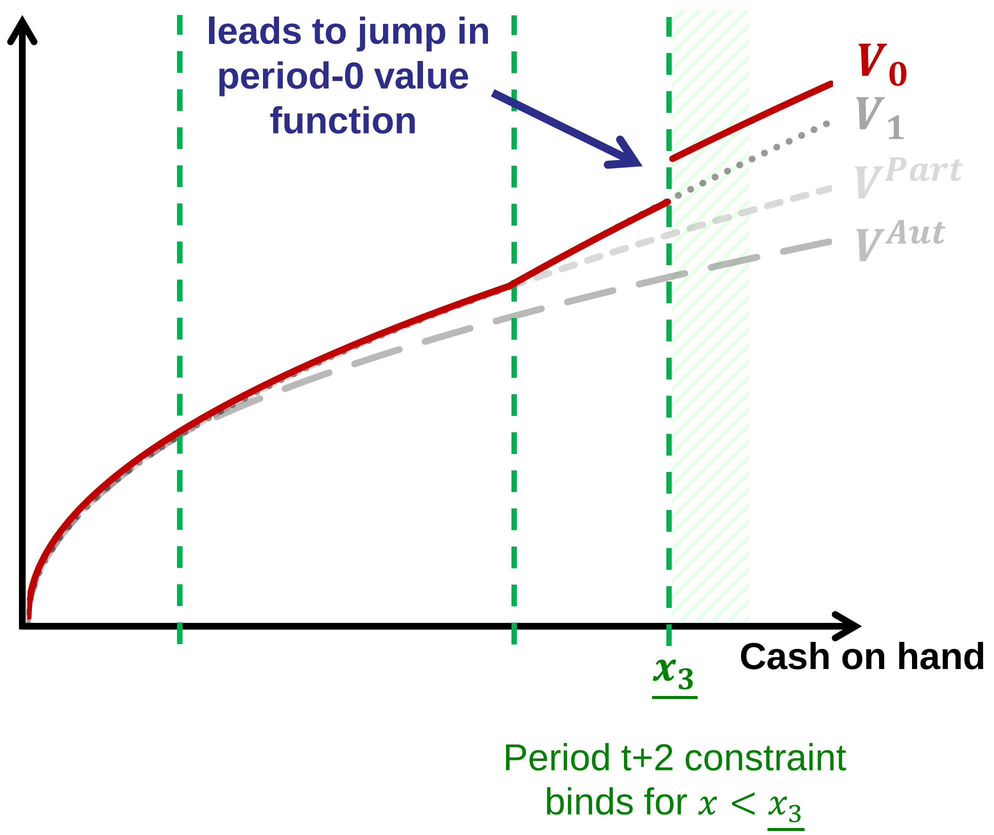

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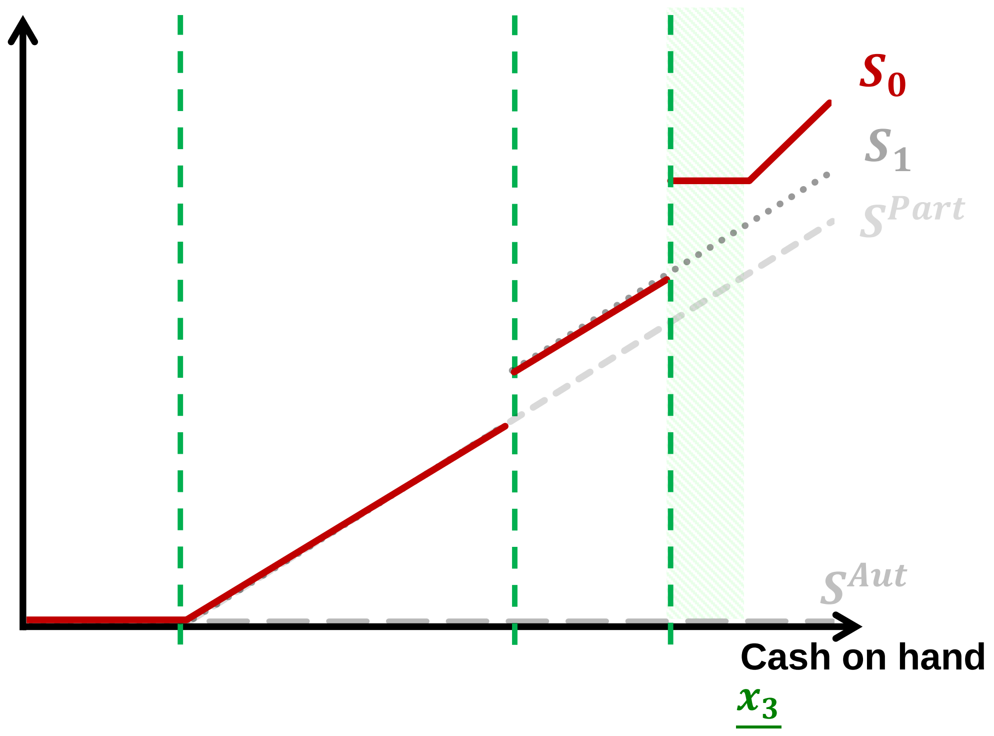

The Methodological Contribution

Significant challenge:

- Can’t rely on standard local numerical methods
- Difficult to incorporate sophistication in quantitative models

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- Model is tractable in region of state space where **constraints never bind**

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Peter 2nd methodological contribution :

- Model is tractable w/ arbitrary interest rate schedule (e.g. borrowing APR 10,000%)

  => result **does not apply** in simple **discrete-time** model

- **Continuous time:** always borrow a small amount at soft constraint (for all interest rates)

  => smooth saving function makes model more tractable (?)

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… are wrong*

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Irrelevance of β for behavior

Surprising predictions about the behavior of present-biased agents!

S1 - Illiquidity does not promote the saving of PB consumers
(e.g. retirement accounts, mortgages, etc.)

S2 – Sophistication may not create a demand for commitment

S3 – Regardless of the interest rate, PB consumers always borrow at 0 wealth

A Modigliani-Miller analogy

To break irrelevance of β some model **assumption must fail**!

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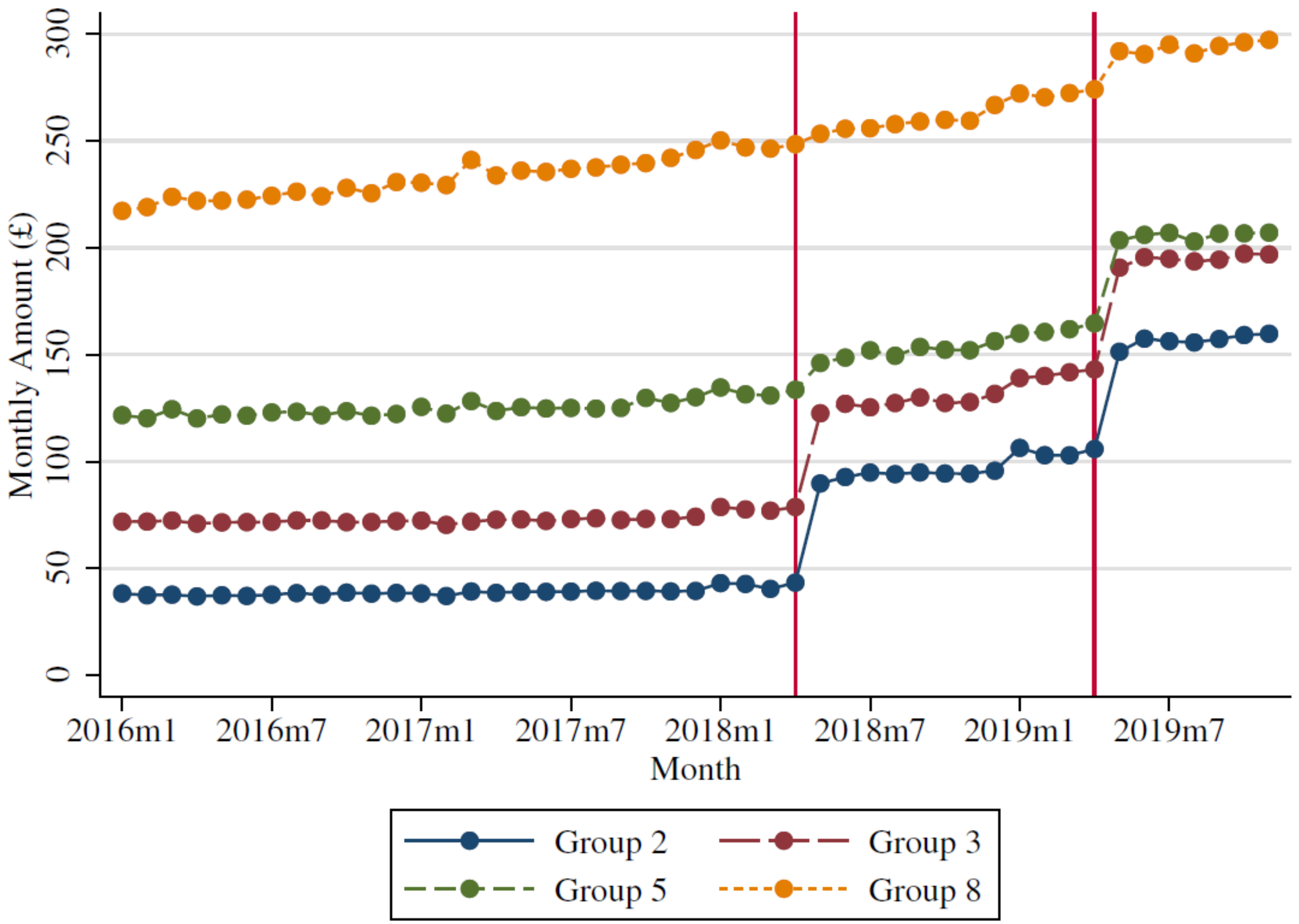
Choukhmane, Palmer (work-in-progress)

Context: National Auto-Enrollment policy for all U.K private sector employees

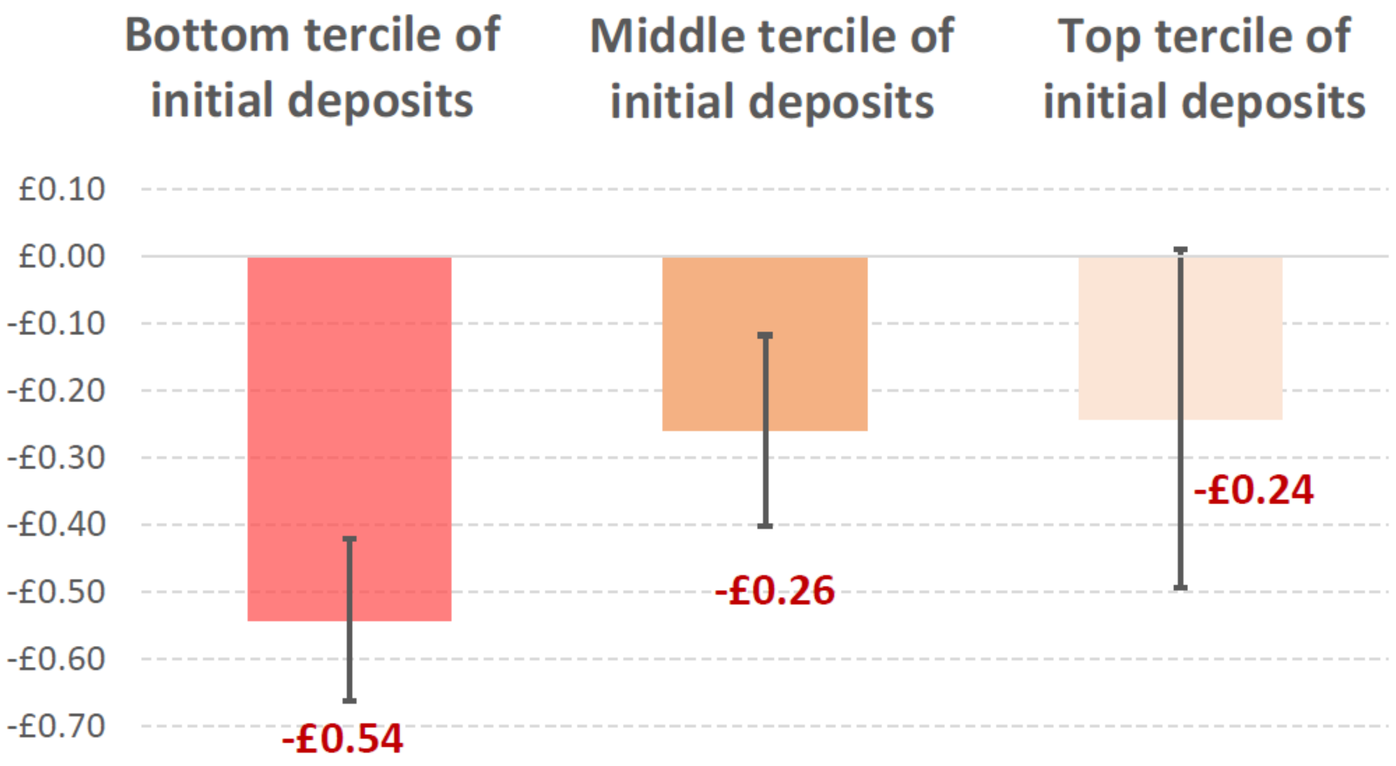
Variation: min. defaut contribution rate stepped up in April 2018 and April 2019



Choukhmane, Palmer (work-in-progress)

Pension ↑ by £1/month => take-home pay ↓ 67cts/month

Heterogeneity: ↓ 54cts for those w. little initial deposits vs ↓ 24cts for high initial deposits



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A2: Borrowing technology is exogenous

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Precommitments for Financial Self-Control? Micro Evidence from the 2003 Korean Credit Crisis

SungJin Cho

Seoul National University

John Rust

Georgetown University

We analyze high-frequency micro panel data on customers of a major Korean credit card company before and after the 2003 Korean credit crisis and find evidence of pervasive precommitment behavior that is difficult to explain using standard economic theories: (1) customers voluntarily reduce their credit card borrowing limits without any compensation, (2) customers turn down interest-free installment loan offers with high probability, and (3) of the small fraction of customers who do accept interest-free loan offers, most precommit to pay off the loan over a shorter term than the maximum allowed term under the offer.

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A3: Equilibrium is Markov

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Irrelevance of β for **Policy**

Present bias irrelevant for whether policy changing **income process, interest rates, and illiquidity** is welfare improving

Examples:

- Moving from monthly to annual pay
- Regulating payday loan interest rates
- Heavily tax second mortgages
- Increasing the penalty on 401k withdrawals

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Alternatives? Gul and Pesendorfer (2001) Temptation model:

Aligns with (my) intuition + tractable in discrete time + can accommodate naivete (Ahn et al, 20)

Conclusion

Important (and very insightful) paper!

A must-read if you want to better understanding Present Bias

Opens up new opportunities for studying Present Bias in quantitative models (e.g. Laibson, Maxted, Moll, 2021)