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Present-Bias and Time-Inconsistency II: Applications

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Thaler and Benartzi's (2004 *JPE*) "Save More Tomorrow" plan

Recent shifts in the U.S. and other countries from defined benefit to defined contribution retirement plans have left employees with more flexibility and much more responsibility for their retirement savings.

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Thaler and Benartzi's "Save More Tomorrow" plan ("Save More Tomorrow: Using Behavioral Economics to Increase Employee Saving," 2004 *JPE*) allows employees to decide now allocate a portion of their future salary increases toward retirement savings:

"Our goal was to design a program to help those employees who would like to save more [for retirement], but lack the willpower to act on this desire. [The] plan gives workers the option of committing themselves now to increase their savings rate later. Once employees join, they stay in the plan until they opt out."

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- An employee can opt out of the plan at any time.

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And not distorting choices of those who have no self-control problems:

"Libertarian paternalism" (but libertarians still don't like it).

Results from the first tests with individual employers:

- A high proportion of employees, 78%, joined the plan.
- 80% stayed in through their fourth pay raise.
- Over 40 months, average saving rates increased from 3.5% to 13.6%.

Several subsequent implementations of the SMT plan have taken place.

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Heidhues and Kőszegi studied lenders' loan contracts and borrowers' repayment behavior and welfare in a model of a competitive market for credit contracts where borrowers are present-biased and may be naive.

(Studying competitive markets is a natural rhetorical choice here, but the results would be very similar for a monopolistic market.)

Recall the notions of naiveté and sophistication previously introduced (O'Donoghue and Rabin 2001 *QJE*):

- Naifs falsely believe future selves will maximize today's preferences.
  - Solution concept: maximization (mispredict future discount rates)
- Sophisticates have rational expectations.
  - Solution concept: subgame perfect equilibrium in game among selves.
- Partial naiveté.
  - Solution concept: subgame perfect equilibrium, using $\hat{\beta}$ such that $\beta < \hat{\beta} < 1$. (Naifs use $\hat{\beta} = 1$ and sophisticates use $\hat{\beta} = \beta$.)

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Heidhues and Kőszegi assume present bias and partial naiveté.

They focus on the effects of present bias and partial naiveté by assuming that competing lenders know everything about borrowers; and borrowers know everything about firms and themselves, except that partially naïve borrowers don’t know their own true βs.

In a standard model of credit contracting (competitive or monopolistic), the lender proposes a contract and the borrower says Yes (under competition, to the best contract that any firm has offered) or No:

Yes yields a binding contract, and No ends the process without a contract. (Richer models yield similar outcomes.)

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Therefore, for non-present-biased, time-consistent borrowers (naïve or sophisticated) or present-biased but sophisticated borrowers, equilibrium contracts (competitive or monopolistic) are Pareto-efficient; and rules prohibiting abusive credit practices are nonbinding and unnecessary.

In Heidhues and Kőszegi's model, there are three periods: 0, 1, and 2.

If the borrower borrows $c \geq 0$ in period 0 and repays $q \geq 0$ and $r \geq 0$ in periods 1 and 2, self 0's utility is $c - k(q) - k(r)$, where $k(\cdot)$ repayment cost.

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Thus self 0 believes self 1 will maximize $-k(q) - \hat{\beta} k(r)$ for some $\beta \leq \hat{\beta} \leq 1$.

$\hat{\beta} = \beta$ is perfect sophistication and $\hat{\beta} = 1$ is perfect naiveté.

(Heidhues and Kőszegi allow heterogeneous naiveté, but not important.)

A competitive market is cleared by contracts in period 0, with borrowers' 0 selves either choosing among the contracts offered by the lenders or choosing no contract, which yields them an exogenous reservation utility.

In equilibrium with homogeneously naïve borrowers:

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Thus we solve via backward induction in any case.

But only sophisticated borrowers' decisions are in subgame-perfect equilibrium in the game among their selves, and only sophisticated borrowers' decisions are time-consistent.

Heidhues and Kőszegi restrict attention to non-redundant contracts.

We can then think of a lender as selecting borrower's consumption c and a "baseline" repayment schedule borrower's self 0 expects to choose, and a sophisticated borrower actually would choose; plus the alternative repayment schedule a partially naïve borrower actually will choose.

Recall that competing lenders are assumed to know everything about borrowers; and borrowers to know everything about lenders and themselves, except partially naïve borrowers don't know their true βs.

In equilibrium each lender chooses the contract that maximizes profit, given how the borrower actually behaves, subject to constraints:

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- Lenders' contracts must yield zero profit (otherwise a lender could compete away all borrowers by slightly improving its contract terms).

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- Naïve borrowers are induced to back-load repayment, thereby incurring large and unanticipated penalties.

In judging welfare, Heidhues and Kőszegi focus on the borrower's self 0, which in their model has no present bias.

(In other models, present bias is usually kept out of welfare judgments.)

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Some such regulations can benefit naïve borrowers without affecting sophisticated borrowers: "libertarian paternalism" again.