Applications of Behavioral Economics

ADEC781001: Empirical Behavioral Economics

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Recap

- Through most of the lectures so far we have covered some applications
  - remember "don't wrap all the presents in one box"?!
- Here I just want to add some additional applications
  - Good habits (or, promoting self-control)
  - Education

Further reading

- Chetty, Raj. "Behavioral economics and public policy: A pragmatic perspective." American Economic Review 105, no. 5 (2015): 1-33.
- Croson, Rachel, and Nicolas Treich. "Behavioral environmental economics: promises and challenges." Environmental and Resource Economics 58, no. 3 (2014): 335-351.
- Gneezy, Uri, Stephan Meier, and Pedro Rey-Biel. "When and why incentives (don't) work to modify behavior." Journal of Economic Perspectives 25, no. 4 (2011): 191-210.
- DellaVigna, Stefano. "Psychology and economics: Evidence from the field." Journal of Economic literature 47, no. 2 (2009): 315-72.

Good Habits

Demands for deadlines

Ariely and Wertenbroch (2002)

- Lab study: 60 students complete 3 proofreading assignments within 21 days
  - control: turn in each assignment at any time
  - treatment 1: choose three deadlines (i.e. endogenous)
  - treatment 2: face three equally-spaced deadlines (i.e. exogenous)
- Self-set deadlines improve performance over control (50% more errors corrected)
- But endogenous deadline setting is not optimal
- Students with exogenous deadlines performed best
- People recognize they have self-control issues and demand commitment devices
- So supply those commitment devices!

Savings

- Under-saving imposes negative externalities
  - People with fewer savings depend more on loans/welfare
- How do you increase savings?
  - Traditional approach: subsidies
  - U.S. spends +$100b per year on tax cuts to 401(k)s
- Opt-out vs opt-in 401(k)
  - Many firms give employees choice to opt into a retirement plan
  - Instead: put employees in a retirement plan and let them opt-out of it
  - It works really well: significant increase in 401(k) participation
    - Madrian and Shea (2001), Choi et al. (2002), Benartzi and Thaler (2004)
  - Why? exploits status quo bias
- But does opt-out actually increase savings?
  - Do larger retirement contributions crowd-out savings in non-retirement accounts?
  - Or do actually they induce individuals to consume less? (and thus save more)

Savings

Chetty et al. (2014): incentives

- 41 million observations on the savings of all Danish citizens from 1995-2009
- Denmark has two types of tax-deferred savings accounts:
  - 1. capital pensions that are paid out as a lump sum upon retirement and 2) annuity pensions that are paid out as annuities
- Intervention
  - "In 1999, the Danish government reduced the tax deduction for contributing to capital pension accounts from 59 cents per Danish Kroner (DKr) to 45 cents per DKr for individuals in the top income tax bracket"
- Standard model predicts contributions will go down in response to reduction in subsidy
- Finding: most people don't change their contributions
  - "80.7% of individuals are passive savers who are unresponsive to changes in marginal incentives"
  - What about the 19% who responded to incentives?
  - They moved contributions from capital pension to annuity pension and taxable accounts (e.g. bank savings)
  - Meaning they just the same amount of savings around

Savings

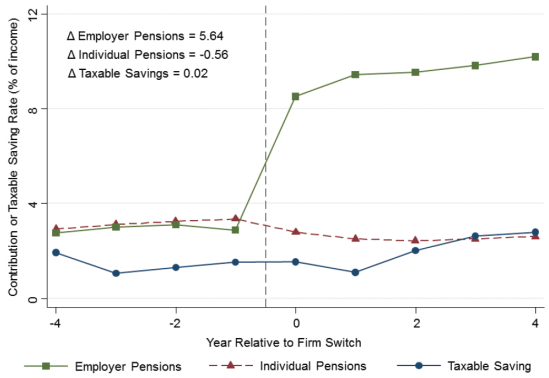
Chetty et al. (2014): crowding out

- Authors resolve crowding-out confounder
  - Data show savings in all accounts
  - employers and individuals contribute to the same accounts
  - so changes in employer contributions are analogous to changes in defaults
- Consider individual who contributes DKr 2000 to retirement account
- Employer takes DKr 1000 out of paycheck and contribute it to retirement
  - so total compensation the same
- Prediction: individual offsets employer's contribution by reducing personal contribution to DKr 1000
- Therefore employer's contribution changes the "default" contribution rate
- Test this by tracking individuals who switch firms
  - specifically to firms that contribute $\geq 3\%$ more than previous firm

Savings

Chetty et al. (2014): crowding out findings

FIGURE 2: Effects of Employer Contributions to Retirement Accounts



Notes: This figure reproduces Figure Ib in Chetty, Friedman, Leth-Petersen, Nielsen, and Olsen (2014). The figure analyzes a set of workers who switched to a new firm whose employer pension contribution rate was at least 3 percentage points of labor income higher than their previous firm. The x axis of the figure is the calendar year relative to the year the worker switched firms, so that year 0 represents the first year the worker is employed at the new firm. The figure plots mean employer and individual retirement account contributions as well as individuals' taxable savings in each year, all measured as a percentage of current labor income. The sample consists of workers for whom data is available for event years $[-4, +4]$, so that the number of observations is constant through the figure. The sample also includes only workers with positive individual contributions. The figure lists the change in each form of savings (as a percentage of labor income) from year -1 to year 0.

Theory of habit formation

- Savings different from habit-formation
  - retirement contributions are automatic once set up (no marginal cost)
  - challenge is to get people to make optimal choice (incur fixed cost)
  - habits (e.g. exercise) involve fixed cost (to start) and marginal cost (to maintain)
- Becker and Murphy (1988)
  - habits are harmful (beneficial) to extent they decrease (increase) future utility
  - marginal utility today correlated with historical consumption
    - changes today have small short-run effects
    - but could have large long-run effects
- Do incentives work?
  - short-run incentives could change habits and thus change long-run utility
  - or they could crowd-out intrinsic motivations and lead to relapse when incentives removed

Health: exercise and diet

- Can we use incentives to promote exercise?
- DellaVigna and Malmendier (2006)
  - data from three US health clubs offering a choice between a monthly contract with lump-sum fee approximately $80 per month and no payment per visit, and a pay-per-visit contract with fee of $10
  - More people buy the monthly contract – but end up paying more than if they had paid-per-visit
    - monthly contract holders attended gym ~4.8 times per month ($17 per visit)
  - Monthly contract is a commitment device
    - monthly membership reduces the marginal cost of a visit from $10 to $0
    - but individuals overestimate future selves

Health: exercise and diet

- Charness and Gneezy (2009): gym attendance
  - treatment 1: pay students $25 to attend gym once in a given week
  - treatment 2: same as treatment 1 but offer additional $100 for 8 more visits in 4 weeks
  - control: no incentives
  - positive significant effect for treatment 2
    - driven entirely by people who previously did not attend gym
- But positive effect decays in long run (Acland and Levy 2010)
- Peer effects amplify incentives
  - Babcock and Hartman (2010): more participation by individuals who were incentivized *and* whose friends were incentivized

Health: quitting smoking
Incentives

- 70% of smokers say they want to quit, but only 3% do (Volpp et al. 2006)
- Already large incentives
  - smoking causes cancer and heart disease (though these costs are realized later in time)
  - pack of cigarettes often higher than minimum wage
    - behavioral approach: change mental accounting?
- Volpp et al. (2006)
  - smokers randomized into control or incentive treatment to participate in 5-class program
  - incentive: $20 for each class attended and $100 for quitting within 30 days
  - short run: incentives lead to more class attendance (26% vs 12%) and quitting (16% vs 5%)
  - long run (6 months): no difference in quitting (6% vs 5%)

Health: quitting smoking
Incentives

- short run may matter (e.g. stop pregnant women from smoking until birth)
- can also extend incentives ("stretching the short run") to keep people away from bad habit
  - Volppe et al. (2009): $250 for cessation in 6 months, addition $400 for abstinence next 6 months
  - significant effect of incentives
  - but again a decay in long run

Health: quitting smoking
Commitment devices

- Gine et al. (2010)
  - voluntary commitment device to quit smoking
  - offer smokers savings accounts
  - smokers deposit funds for six months
  - get the funds back if they quit by end of the period
  - otherwise money goes to charity
- Findings
  - most people don't choose commitment device (only 11% opted-in)
  - those randomly assigned to device 3% more likely to quit

Incentives and habits
Takeaways

- Incentives work in the short-run
  - get people in the door/exposed to treatment
  - then what?
  - incentives less successful in long-run (i.e. when incentives are removed)
    - crowd-out intrinsic motivation to develop (break) good (bad) habit
    - why? possible explanation: turns off self-satisfaction of achieving goal
  - possible solution: exploit peer effects
    - social networks provide positive feedbacks, less likely to decay

Education

Attendance and enrollment

- Incentives work
- Mexico's PROGRESA (Behrman et al. 2005; Schultz 2004)
  - pay *families* $55 month (1/5 average income) if kids attend school
  - results: earlier entry, less grade repetition, lower drop-out rates, better grade-progression
  - spillover benefits: improvements by siblings who did not receive incentives
- Colombia's PACES and Familias en Accion
  - randomly distribute vouchers to cover half cost of secondary school if students "perform well"
    - standard was so low that good performance was equivalent to good attendance
  - Angrist et al. (2006): 10% more likely to finish 8th grade, fewer teenage marriages
- Why do incentives work?
  - attendance is a clear objective
  - families not students receive incentives
    - no crowding out (students don't substitute desire to learn with desire to earn)

Effort

- Bettinger (2010)
  - randomized incentives (up to $100) for higher grades in primarily schools in Ohio
  - positive effect on math grades ("concrete" subject)
  - no significant effect in reading or writing ("conceptual" subjects)
  - my two cents: incentives can produce "doers" but not "thinkers"
- Fryer (2010)
  - randomized incentives to students in urban schools (Chicago, Dallas, NYC, D.C.)
  - vary whether inputs (attendance, reading, wearing uniforms) or outputs (grades) were bought
  - $6.3m paid to ~38k students
  - incentives work better for inputs than outputs
    - inputs easier to measure and easier for students to control
- Incentives more effective when combined with mentoring (Rodriguez-Planas 2010)
  - consistent with Fryer (2010)
  - student motivated to increase outputs may need help mapping effort onto grades

Heterogenous treatment effects

- Gender: Angrist and Levy (2009)
  - Israeli students paid series of rewards totaling up to $2400 to complete *bagrut* (equivalent to GED)
  - incentives only worked for girls (higher certification and college matriculation)
    - why? argument: girls with incentives prepared more for exams
    - still not clear why - could be noise or omitted variables
- Prior academic achievement: Leuven et al. (2010)
  - incentives to first-year economics/business students at Univ. of Amsterdam
  - must pass all first-year requirements within one year (certain grades in courses, etc.)
  - positive impact among high-ability students
  - negative impact among low-ability students
  - dynamic spillovers (high-ability students continued to improve, low-ability continued to deteriorate)
- Bettinger (2010): positive effects only among top students

Long-run effects

- Mixed evidence of crowding-out intrinsic motivations to learn
- Cornwell et al. (2006)
  - merit-based scholarship recipients get higher grades in college (Georgia schools)
  - but they also choose easier classes
  - shift focus on maximizing measurable outputs (grades) rather than human capital
- Jackson (2010)
  - students received $100 to $500 for high scores on AP exams
  - incentivized students scored higher and had higher college GPAs
  - but no analysis of heterogeneous treatment effects

Takeaways

- Incentives work when goals are concrete
  - "attend class"
  - "read this book" (not "read books")
- But incentives don't work for all students
  - incentives less effective for low-ability students
  - possibly because they are worse at understanding objectives or start with bad habits
- Who else should we incentive?
  - Parents? Teachers? Administrators?
  - Incentives to change pool of applicants *into* education?
  - Relevant: German police