Behavioral Public Economics

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Introduction

- Behavioral economics has changed dramatically over the last 15 years
  - Moved from a largely critical stance to a constructive one
  - Instead of simply insisting that the standard model is wrong, it looks for regularities and offers modifications (“tweaks”)
- Result: tools from behavioral economics are increasingly integrated into mainstream economic research and thought
- Impact on Public Economics in particular has been substantial

Content of the paper

1. Positive tools
2. Normative tools
3. Policies affecting saving
4. Additional issues concerning tax policy
5. Transfer policy (social insurance, welfare)

- Omission: public goods (due to overlap with Andreoni)
- Today: focus on first three sections

1. Positive tools

- What qualifies as *behavioral* economics?
- Standard economics involves…
  - "standard" choice mappings…
  - defined over sets of "standard" consumption bundles
- Behavioral economics: either the choice mapping, the consumption bundles, or both are "non-standard"

What is a “non-standard” choice mapping?

- A standard choice mapping is one that satisfies WARP (Arrow’s version), and hence has a utility/preference representation
- A non-standard choice mapping is one that violates WARP
- Violations of WARP fall into three categories
  - Frame dependence
  - Menu dependence
  - Pairwise transitivity

- Most of the “behavioral” patterns studied in the literature involve some form of frame dependence
- Source of frame dependence varies: may be tied to either psychological predispositions or cognitive limitations
- Many forms of frame dependence seem highly idiosyncratic and difficult to model
  - Bertrand, Karlin, Mullainathan, Shafir, and Zinman (2005)
- However, because some important forms of frame dependence are systematic, we can build models and apply them to practical problems

Important examples of systematic frame dependence

1. Time inconsistency
2. Reference-dependent choice
   - Endowment effect, status quo bias, loss aversion
3. Biased beliefs
   - Optimism and overconfidence, non-Bayesian updating, etc.
4. Other aspects of choice with uncertainty
   - Prospect theory, regret theory, etc.
5. Other aspects of cognitive limitations
   - Memory, attention, bounded rationality

Models of time inconsistency

1. Strotz representations and quasi-hyperbolic discounting
   - Strotz (1956), Phelps and Pollak (1965), Peleg and Yaari (1972), Goldman (1980), Schelling (1984), Laibson (1996)
   - x is future consumption, U(·) governs preferences over x today, V(·) ≠ U(·) governs preferences over x in the future
   - QHD is a special case: $u_t(c_t) + \beta \sum_{k=t+1}^{T} \delta^{k-t} u_k(c_k)$
2. Random Strotz representations, hot/cold decision states, and visceral urges
   - Loewenstein (1996), Bernheim and Rangel (2004)
   - V(·) is random, and may depend on cues and/or previous actions

Models of time inconsistency

3. Temptation preferences

- Gul and Pesendorfer (2002)
- Preferences depend not only on the chosen object, but also on set from which it is chosen
- Preference ordering over (x,X) bundles governed by

$$u(x) - (\max_{y \in X} v(y) - v(x))$$

- u is interpreted as commitment utility, v as temptation utility

Models of time inconsistency

4. Doer-planner (or dual-self) models

   - Thaler and Shefrin (1981), Shefrin and Thaler (1988), Fudenberg and Levine (2007)
   - A patient "planner" controls an impatient "doer" through the exercise of costly willpower

Remark: These models have very similar positive implications and are quite difficult to distinguish (see, e.g., Dekel and Lipman, 2007, on the relationship between random Strotz representations and temptation preferences).

The choice between these models may matter more when one is performing normative analysis.

Additional points concerning time inconsistency

- Time inconsistency necessarily arises from aggregation of preferences over people with different levels of patience (e.g., spouses) – see Jackson and Yariv, 2011
  - Does it matter for our purposes whether the individual is time-inconsistent, or the couple is time-inconsistent?
  - For the purpose of positive analysis, probably not; for the purpose of normative analysis, yes
- Sophisticated time inconsistency naturally gives rise to a demand for precommitment (noted early on by Strotz, 1956, and Thaler and Shefrin, 1981)
  - Classic reference: Ulysses tied to the mast
  - Arguably the identifying characteristic of time inconsistency

What is a “non-standard” consumption bundle?

- In behavioral economics, choice is often assumed to depend on elements of consumption bundles that are not simply goods or services consumed by the individual
- Important examples generally have to do with social interaction:
  - Altruism
  - Fairness, equity
  - Esteem, status
  - Intentions
  - Similarity to or differentiation from others

2. Normative tools

- Normative analysis is an essential part of Public Economics
- Problem: standard normative analysis is based on respect for choice. What do we do when choices are not entirely coherent?
- Possible directions for developing general normative principles:
  - Retain choice as the foundation of welfare analysis; generalize the principle of revealed preference
  - Supplement or abandon choice as the foundation for welfare analysis; e.g., examine self-reported well-being (happiness)

Choice-based approaches

- Two interpretations of standard choice-based welfare analysis:
  I. We respect preferences revealed by choices [add cites]
  II. We respect choices, period
- Both interpretations admit generalizations
- Problem with generalizing interpretation I: Identification
  - Many behavioral models can account for the same choice mapping
  - Any given positive model may admit multiple normative interpretations

- Example: satisficing (based on Tyson, 2008)
- Positive model:

$$C(X) = \arg\max_{x \in X} s(x) \quad \text{s.t. } u(x) \geq t(X)$$

- Some possible normative interpretations:
  - u is preference; s is salience and t is a threshold
  - s is preference; u is salience and t is a threshold

Example: the β,δ model:

- At time t, the individual maximizes

$$u_t(c_t) + \beta \sum_{k=t+1}^{T} \delta^{k-t} u_k(c_k)$$

- Multiple interpretations are possible, each with different normative implications
  - Unitary self, “present bias”
  - Unitary self, “intellectualization bias”
  - Dual-self planner-doer model with Nash bargaining
  - Multiple forward-looking selves

- In contrast, respect for choice (interpretation II) does not require us to make the preceding distinctions
  - Unlike objectives, choice is observable
  - This approach to behavioral welfare economics is *structurally minimalistic*
- Interpretation II is generalized by Bernheim and Rangel (2009)

The Bernheim-Rangel framework involves three steps:

1. Specify the set of "welfare-relevant" choices
   - "Mistakes" as *characterization failure*
2. Construct of the welfare criterion
   - The *unambiguous choice relation* (a direct generalization of the revealed preference relation)
   - It's the only criterion to satisfy certain desirable properties for a choice-based welfare criterion (binary relation that respects unambiguous choice and never overrules a valid choice)
3. Apply to the problem of interest

Advantages: universally applicable, generalizes standard welfare economic toolkit, easy to apply, nice continuity properties… (but may not be discerning)

Welfare with time inconsistency (QHD)

- Ad hoc criteria
  - The “long-run” criterion (ignore β) – reflects an arbitrary judgment that the forward-looking perspective is right and the contemporaneous perspective is wrong
  - Multi-self Pareto optimality – full preferences are not recoverable; arbitrarily assumes well-being is not backward-looking
- Application of BR framework
  - Yields an analytic condition with no domain restriction
  - A possible domain restriction: only include full-commitment choices (at all points in time). Leads approximately to the long-run criterion, which can be understood in this context as a robust form of multi-self Pareto optimality

Self-reported well-being

- Huge and burgeoning literature, including applications in public economics (e.g., Gruber and Mullainathan, 2002)
- Is “true happiness” mathematically identified from self-reports?
- At least three serious problems:
  - Distinguishing effects on happiness from effects on reporting (especially given that the scale is unitless and people need to pick a normalization)
  - Assuring the comprehensiveness of the happiness measure (do you root for the machines in *The Matrix*?
  - Assuring that the happiness measure aggregates the multiple dimensions of well-being appropriately

3. Policies affecting saving

- Growing dissatisfaction with the traditions LCH during the 1990s, due to findings concerning:
  - Adequacy of saving (objective and self-assessed)
  - Excess sensitivity of consumption to income
  - Non-fungibility of resources (e.g., differing MPCs out of different stores of value)
  - Retirement consumption puzzle

- Classes of behavioral concerns:
  - Self-control – Thaler and Shefrin (1981), Shefrin and Thaler (1988), Thaler (1994)
  - Knowledge/sophistication – Bernheim (various, 1991-1997)
- Floodgates burst in the late 1990s following Laibson's work on QHD and saving
- This section is divided into three parts:
  A. Self-control
  B. Knowledge/sophistication
  C. An application encompassing both sets of issues: default effects in 401(k)s

Self-control

Potential policy-relevance of self-control issues:

1. Effects of precommitment opportunities

- Two types of precommitment opportunities are relevant for saving:
  - Opportunity to contribute to an illiquid store of value (e.g., penalties for withdrawal)
  - Opportunity to commit to future contributions to an illiquid store of value (e.g., sign up in advance)
- Both types of commitment opportunities should increase saving (provided the individual can arrange for the liquidity constraints to bind)
- Desire for precommitments will be moderated by uncertainty concerning future tastes or needs, and hence need for flexibility (Amador, Werning, and Angeletos, 2006)
- Welfare implications (here and throughout) depend on criterion

2. Effects of access to credit

- Increasing access to credit removes opportunities to accumulate illiquid resources, and therefore has the opposite effect from providing precommitment opportunities
- Consequently, Laibson (1997) suggests that the rise of consumer credit during the 1980s may have reduced saving by undermining self-control

3. Strategies to promote or exploit mental accounting

- Different stores of value may be treated differently either as a cognitive shortcut or because they trigger different pscyhological responses (e.g., some are more tempting than others)
- Thaler and Shefrin (1981): Simply keeping track seems to act as a tax on any behavior which the planner views as deviant."
- Thaler (1994): MPCs out of different assets may differ
- Things that can matter: segmenting assets, shifting assets or income between categories, labeling
- Example: offering IRAs may increase saving even if they are funded out of other savings and people contribute up to the cap
- Example: shifting income to bonuses, or increasing tax withholding (and hence refunds), may increase saving

4. Taxation/subsidization

- Laibson (1996): Shows that first-best can be achieved by subsidizing interest and penalizing excess withdrawals.
  - Intuition: offsets “internality”
  - A simple calibration exercise replicates penalties and tax advantages for actual retirement accounts.
- Krusell, Kuruscu, and Smith (2010)
  - Generalizes Laibson’s subsidization point to a two period model with temptation utility
  - Extends the result to an infinite horizon economy, and shows that capital should be subsidized in the long run, contrary to the well-known Chamley-Judd result

- Krusell, Kuruscu, and Smith (2002) ask whether the government can play a constructive role if it shares consumers' preferences and cannot commit to future policy
  - Finds that, in general, the central planner makes things worse
  - Intuition: the equilibrium involves too little saving. The planner will save less than the individual because the individual is a price-taker, whereas the planner is not, and the return to saving declines as the economy saves more in the aggregate.
  - In a more general model, Krusell, Kuruscu, and Smith (2002) allow for tax constitutions that restrict the government's tax instruments. They show that a laissez-faire constitution is sometimes (but not always) optimal.

- Laibson, Repetto and Tobacman (1998): what are the effects of tax-favored retirement accounts on saving and welfare?
  - Such accounts both provide precommitment opportunities (to illiquid savings) and reduce the tax distortion that time inconsistency exacerbates
  - The paper essentially replicate simulations by Engel, Gale, and Scholz, but with quasi-hyperbolic consumers
  - When the models are calibrated to achieve the same level of retirement wealth, the life cycle patterns are extremely similar and difficult to distinguish empirically. However:
  - Shows that QHD leads to greater responsiveness to employee-directed DC plans, both in saving and welfare.
  - Share of saving that is new saving is higher for hyperbolic economy.

5. Mandatory saving

- Shefrin and Thaler (1998): in the doer-planner model where different levels of willpower are needed to protect assets in different types of mental accounts, mandatory saving will not offset other saving (because it conserves on willpower)
- Amador, Werning, and Angeletos (2006)
  - Adds preference shocks to a model where the individual has a preference for precommitment due to time inconsistency
  - Shows that optimum involves a minimum saving rule
- Imrohoroglu, Imrohoroglu, and Joines (2003)
  - Unfunded social security system may be unattractive with time-inconsistent agents because reduction in aggregate capital accumulation has more severe consequences
  - See also Feldstein (1985) and some subsequent papers

External vs. internal self-control strategies

- External self-control devices can affect internal self-control strategies in important and sometimes surprising ways
  - Such effects are present in the doer-planner model – e.g., mandatory saving frees up willpower to be used in other contexts – but the effect is simply present by assumption
  - More generally these interdependencies are ignored – what do they imply?

- Modeling internal self-control in the QHD framework:
  - Ainslee: internal self-control strategies involve the use of personal rules (e.g., never eat cake); local deviations are construed as having global implications (if I eat cake today I will do so in the future as well)
  - Viable personal rules can be modeled as history-dependent subgame-perfect equilibria of the game played between successive selves (Laibson, 1997, Bernheim, Ray, and Yeltekin, 1998)
  - Bernheim, Ray, and Yeltekin (2011) examine the entire set of subgame-perfect equilibria for an intertemporal consumption allocation probem with QHD preferences, to determine the set of viable personal rules.
  - Despite the complexity of the problem, strategies have some simple and intuitive properties
  - Question: how do changes in institutions affect the set of viable personal rules?

Implications:

- People may avoid taking advantage of precommitment opportunities, even when they have self-control problems
  - Undertaking precommitments reduces the severity of the worst continuation equilibrium, thereby reducing the set of viable personal rules
  - Thus, undertaking an external commitment can undermine a more effective internal self-control strategy
  - For example, shifting all of your savings to a commitment account may render further saving unsustainable
  - Therefore, precommitment opportunities may be less valuable than one would otherwise think, and a widespread failure to take advantage of them would not imply the absence of self-control problems

- It takes money to save money
  - *When you aint got nothin', you got nothin' to lose.* - Bob Dylan
  - Possibly explains the apparent inability of the poor to save their way out of poverty despite high rates of return, particularly in developing countries
  - Suggests that saving may become self-sustaining once assets accumulate to a critical level
  - Therefore, argues for "pump-priming" policies such as subsidizing saving among the asset-poor
  - See also Banerjee and Mullainathan (2011), who generate the same type of poverty trap by assuming that more tempting goods are inferior

- Greater access to credit may improve internal self-control strategies (contrary to Laibson, 1997) for those with sufficient initial wealth
  - A source of increasing inequality: with greater access to credit, the rich get richer and the poor get poorer
- Provides a possible justification for “goal accounts”
  - Lock up funds only until a self-set target is reached
  - Exploits external self-control strategies for low assets, and internal self-control strategies for high assets (where the latter kick in)
  - As we’ll see, this type of mechanism has been used with some effectiveness

Evidence on policy and self-control

- Question: do precommitment opportunities increase saving?
  - Relevant for the design of retirement accounts: early withdrawal penalties, loan provisions, etc.
- If people demand commitment devices, why doesn't the market provide them?

- One answer: it does
  - Many financial vehicles create some degree of inflexibility – 401(k)s, mortgages, etc. However, it isn't clear whether people use these vehicles because of or in spite of their inflexibility
  - A few financial vehicles are just about commitment – e.g., Christmas clubs. But these are relatively rare. Arguably, the exception proves the rule.
  - Financial advice and various anecdotes point to precommitments (e.g., tearing up credit cards). But is the behavior at all widespread?
- Another answer:
  - Uncertainty trumps the demand for precommitment
  - External commitments would undermine well-functioning internal commitment devices
- Recent literature tries to resolve this issue experimentally

Evidence from the U.S.

- Thaler and Benartzi (2004): Save More Tomorrow program
  - Main feature: decision to increase saving to a 401(k) is made before it goes into effect, and is linked to an expected pay raise
  - Three actual implementations
  - Basic pattern: those who opted in were not saving more than others before the pay raises, but were saving more after subsequent raises
  - Self-selection is a serious concern
  - Control group is either absent or inadequate

- Beverly, Schneider, and Tufano (2005): Refund to Assets (R2A) program
  - Low income individuals could agree in advance to split their refund between cash and a savings account
  - Modest take-up, but substantially higher saving among those who participated, relative to their history and to a control
  - However, the account was liquid, so any effect likely reflects some sort of mental accounting rather than precommitment
  - Self-selection is an issue, and the control is problematic

- Beshears, Choi, Laibson, Madrian, and Sakong (2011): online experiment, where people allocate funds between liquid and illiquid accounts
  - At the same interest rate, nearly half is allocated to commitment account, and one-quarter when interest rate is lower. (1/N heuristic? Framing effects from labeling? Hawthorne effects?)
  - When the interest rate is the same, the amount allocated to the commitment account is increasing in the degree of commitment. True both across and within subjects. (Aversive to "penalty" labeling?)
  - When the interest rate for the commitment account is higher, the latter relationship disappears. (Attributed to an influx of naifs, who respond to commitment in the opposite way from sophs.)

Evidence from developing countries

- Shipton (1990) – use of lockboxes in Gambia
- Anderson and Baland (2002) – based on relationship between ROSCA contributions and a wife's share of household income in Kenya, argue that women use ROSCAs for spouse control, rather than self-control.
- Gugerty (2007) – also using Kenyan data, rejects the pattern from which Anderson and Baland inferred a spousal control motive.
  - Provide survey evidence indicating that husbands support ROSCA participation.
  - Notes that 60% of ROSCAs involve a commitment to use the funds in a particular way, suggesting a self-control motive.

- Ashraf, Karlan, and Yin (2006a,b) conduct an experiment involving commitment saving products offered by a bank in the Phillipines
  - Participants committed to self-established goals
  - Moderate participation rates and substantial increases in accumulation observed
  - Among women, those who tested as present-biased were more likely to participate (but the test doesn't distinguish between other-control and self-control)
  - Follow-up survey showed shift in power toward women

- Dupas and Robinson (2011) conduct a ROSCA-based experiment in Kenya
  - Multiple treatments, including a “safebox” where the participant keeps the key, and a “lockbox” where the bank keeps the key until goal is met
  - Lockbox increased saving, but safebox increased saving by a larger amount
  - Suggests that asset segmentation is the critical factor, not precommitment
  - Survey responses suggest mental accounting: easier to say “no” to other people who ask for money when the cash it put away in a separate place for a specific purpose

- Not clear in any event whether evidence from developing countries is relevant.
  - While human nature may be constant, institutions are not. Absence of reliable and convenient banking may make a big difference.

Knowledge and Sophistication

- Observation #1: People appear to lack the knowledge and skills necessary for sound life-cycle financial planning
  - Poor scores on questions concerning compound interest, inflation, asset diversification, etc. (Bernheim 1995, 1998, Mandell, 2004, Hilgert, Hogarth, and Beverly, 2003, Agnew and Szykman, 2005, Moore, 2003, Lusardi and Mitchell, 2006, 2007,…)
  - Problem: what is the right metric for measuring a shortfall in financial literacy? How do we know it's important? What does a "C" mean?
  - One answer: see whether differences in financial literacy have large effects on behavior

- Observation #1, continued
  - Financial literacy is strongly correlated with saving and other financial decisions (Bernheim, 1988, Hilgert, Hogarth, and Beverly, 2003, Lusardi and Mitchell, 2007, Stango and Zinman, 2007, van Rooij, Lusardi, and Alessie, 2007, Kimball and Shumway, 2007)
  - Efforts to establish causality through the use of instruments are not entirely convincing (Bernheim, 1988, Lusardi and Mitchell, 2007)
  - For example, Lusardi and Mitchell's use of financial literacy when young as an instrument deals with reverse causation, but not common causation
  - Still, the gaps in financial literacy seem severe

- Observation #2: Few people make use of tools and qualified financial advice
  - Reliance on friends, family, and neighbors is high; use of tools and experts is low – “blind leading the blind” (Bernheim, 1998, Lusardi, 2003, Hone, Kubik, and Stein, 2007, Brown, Ivkovich, Smth, and Weisbenner, 2008)
  - The pattern is especially pronounced for those with low financial literacy (Van Rooij, Lusardi, and Alessi 2007)

- Observation #3: A large fraction of the population engages in no serious life-cycle financial planning
  - 30% of HRS respondents ages 51 to 56 have given no thought to financing retirement (Lusardi and Mitchell, 2007)
  - Only 18% of HRS respondents were able to develop a savings plan and stick to it (Lusardi and Mitchell, 2006)
  - Only 36% of workers have tried to determine how much they need to save for a comfortable retirement, and many of those could not give a figure (Yakoboski and Dickemper, 1997)
  - Planning is correlated with saving (Lusardi, 1999, 2003, Lusardi and Mitchell, 2007), but again, causality is difficult to establish

- Observation #4: Financial choices reflect a lack of sophistication
  - Failure to choose dominant or highly attractive alternatives – e.g., Choi, Laibson, and Madrian (2011)
  - Naïve diversification strategies – e.g., Huberman and Jiang (2006), Mitchell and Utkus (2004)
  - Strong peer effects – e.g., Duflo and Saez (2002a,b)
  - Aversion to dealing with complexity – Huberman (2003), Choi, Laibson, and Madrian (2005)
  - Responsiveness to packaging and labeling – Saez (2009)
  - Inattentiveness – Bernartzi and Thaler (1999)
  - Simple rules of thumb – Bernheim (1998), Hewitt Associates (2002), Bernartzi and Thaler (2007)

Policy: simplification

- Choi, Laibson, and Madrian (2009)
  - Low-cost manipulation designed to simplify 401(k) enrollment (Quick Enrollment™)
  - Can elect to participate quickly with preselected contribution rate and asset allocation
  - Tripled participation rates of new employees with 3 months of hire
  - 10-20 percentage point increase in participation rates among incumbent employees
- Beshears, Choi, Laibson, and Madrian (2010)
  - Extends CLM, including longer term follow-up (durable effects to 54 months)
  - Also, shows effectiveness of Easy Escalation, which is a simplified way of increasing the contribution rate

Policy: attention

- Karlan, McConnell, Mullainathan, and Zinman (2010)
  - Three separate interventions in the Phillipines, Peru, and Bolivia
  - Bank offered attractive savings account structured around an objective (with some degree of lock-in)
  - Random subset of subjects received contribution reminders
  - Significantly increased saving
  - Alternative explanations: browbeating, guilt, embarrassment
- Kast, Meier, and Pomeranz (2010)
  - Field experiment involving low-income micro-entreprenuers in Chile
  - Self-help peer groups increase the number of deposits 3.5-fold
  - 80% of gains can be achieved without meetings or peer pressure through simple text message reminders with feedback

Policy: Financial education in the workplace

- Bernheim and Garrett (2003)
  - Household cross-sectional survey
  - Course measure of workplace financial ed
  - Focus on “intent to treat” effect
  - Availability appears to be remedial
  - Availability increases median saving rate by 28%; largest proportional effect occurs at lower end of saving distribution; 12 percentage point increase in 401(k) participation rates

- Bernheim, Bayer, and Scholz (2009) (1996 WP)
  - Panel survey of employers
  - Richer info on nature of financial education (type, frequency) and other pension plan characteristics
  - No data on assets outside 401(k)
  - Firms tend to establish or enhance financial ed when participation is low (remedial)
  - Positive effects are concentrated among firms that offered *frequent seminars*, and among *non-highly compensated* employees
  - NHC participation rates and contribution rates increased by 12 and 1 percentage points, on bases of 59% and 3%, respectively

- Duflo and Saez (2003)
  - Randomized field experiment involving employees of a university
  - Some employees in some departments incentivized to attend benefits fair (stated purpose: increase participation in TDA)
  - After 11 months, 20% increase in TDA participation among incentivized group (but small in absolute terms)
  - Effect was roughly the same for untreated individuals in the same departments, which underscores the importance of social effects
  - The effects are small (in absolute size), but: the TDA was a supplementary plan; this was a one-off intervention (not frequent); large in proportional terms
  - Importance of social effect
    - Raises questions about whether effects are truly informational
    - Explains how the frequency of seminars could be important even if particular individuals only attend once

- General corroboration:
  - Clark and Schieber (1998), Lusardi (2004), Clark and d'Ambrosio (2003), Lusardi and Mitchell (2006), Anderson, Uttley, and Kerbel (2006), Garman, Kim, Kratzer, and Brunson (1999, Kim (2007)
  - There is some evidence that financial education in the workplace improves knowledge (Clark and D'Ambrosio, 2008, Clark and Morrill, 2010)
- There is also some contrary evidence
  - Tend to be attended by those who "need" it the least (Mandell, 2008). But others may be influenced through peer effects.
  - Many workers attend only once (Clark and D'Ambrosio, 2008). But frequent seminars may establish a norm through social interaction.
  - Only a minority change their goals (Clark and D'Ambrosio, 2008). But may change perception of what is necessary to achieve those goals.
  - Changed intentions often do not translate into action (Clark and D'Ambrosio, 2008, Choi, Laibson, Madrian and Metrick, 2006, and Madrian and Shea, 2001).

Policy: High School Financial Education

- Bernheim, Garrett, and Maki (2001)
  - Cross-sectional household survey
  - Measures effect of state mandates (thereby avoiding the problem that taking a course is endogenous)
  - Diffs-in-diffs design, based on cohort and state in which attended high school, using the fact that different states introduced different mandates at different points in time
  - Key findings:
    - rate of saving as adult is 1.5 percentage points higher for those exposed to financial education mandates
    - wealth is also significantly higher
    - effect is concentrated in those whose parents were not frugal
    - no effect for economic education

- Finding disputed by Cole and Shastry (2009)
  - Attempted replication using Census data (advantage: *much* larger sample)
  - Census does not contain the right variables
- Other evidence relates financial education to short-term outcomes – scores on tests, and some behavioral measures – rather than adult behavior
  - Positive effects: Boyce and Danes (1998), Danes, Huddleston-Casas, and Boyce (1999), Danes (2004), Walstad, Rebeck, and MacDonald (2010)
  - Little or no effect: Mandell (2001, 2002, 2004, 2006, 2009), Peng, Barthomomae, and Cravener (2007)
  - Self-selection is a concern throughout

- Potential interpretation: the mechanism by which high school financial education affects behavior may not involve financial literacy per se.
- Alternatives:
  - Greater comfort with financial matters (self-perceived knowledge)
  - Better knowledge of how to proceed with a financial decision (e.g., what questions to ask)
  - Indoctrination
- Mandell (2009): Little evidence showing that full-time high school (or college) courses in personal finance increase financial *literacy*, but clear evidence that they affect financial *behavior*.
- Obscures welfare implications

Application: Default effects in 401(k)s

- Changing the contribution default (e.g., from zero to 3%) has a huge effect on participation and contributions
  - Madrian & Shea, 2001, plus at least nine subsequent papers by Choi, Laibson, Madrian, and various combinations of Beshears, Metrick, and Weller
  - Much bigger than tax effects, but the latter have received much more attention
- Policy implications?
  - Thaler & Sunstein (2003): informally recommend opt-out minimization (based on "ex post validation")
  - Carroll, Choi, Laibson, Madrian, & Metrick (2009), henceforth CCLMM, posit time inconsistency as an explanation, and use a simple theoretical model to show that (under the long-run criterion with enough time inconsistency) opt-out maximization is optimal

- Why do we observe default effects?
  - Neoclassical: Opt-out entails costly effort and inconvenience
  - Behavioral:
    - Default rate may serve as a psychological anchor because of its salience or imprimatur
    - Adherence to default may reflect procrastination arising from time inconsistency
    - Adherence to default may reflect inattentiveness
    - Each behavioral theory presumes a different type of frame-dependence for the choice mapping

- Bernheim, Fradkin, and Popov (2011)
  - Develops a framework for analyzing the welfare effects of defaults under all four theories; brings the theories to data
  - Theory:
    - A generalized Pareto improvement criterion favors a default of zero
    - For small opt out costs, generalized surplus maximization is achieved at zero, the match cap, or the contribution cap (and those tendencies are also present with large opt-out costs)
    - Divergences between opt-out minimizing and surplus-maximzing default rates can be arbitrarily large
    - Optimality of extreme default rates is an artifact of the employer's assumed inability to reward active choice and/or penalize inactive choice

- Empirics and simulations:
  - Contribution patterns favor the anchoring explanation
  - For the anchoring model:
    - Without a restriction on the welfare-relevant choice domain, there is a high degree of normative ambiguity
    - Restricting attention to a “neutral” choice frame, worker welfare is virtually unaffected by the default, so the social optimum is zero
  - For time inconsistency and inattentiveness models:
    - The welfare analysis is relatively insensitive to the frame of evaluation, so the degree of normative ambiguity is surprisingly small despite large default effects
    - Maximum matchable contribution rate is the optimal default in most cases
    - Without a restriction on the welfare-relevant domain, allowing for precommitments (with time inconsistency) increases normative ambiguity

Some Important Issues I Haven't Discussed Today

- Time inconsistency and transfer policy
- Tax salience
- Tax compliance
- Tax/transfer labeling
- Effects of withholding
- Optimal income taxation in behavioral settings
- Luxury taxes and status signaling
- Sin taxes
- Biased beliefs and social insurance