Lionel Robbins Memorial Lectures:
The Psychology of Saving and Investment

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Harvard University and NBER
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The Psychology of Saving and Investment

Lecture 1: Intertemporal Choice

Lecture 2: Investment for Dummies (Household Finance)

Lecture 3: Sticky biases and the Curse of Education (Behavioral IO)
Should Defaults Influence Economic Outcomes?

- Standard neoclassical theory:
  If transactions costs are small and stakes are large, defaults should not influence rational consumers.

- In practice, defaults make an enormous difference:
  - Organ donation
  - Car insurance
  - Car purchase options
  - Consent to receive e-mail marketing
  - Savings
  - Asset allocation
Outline

1. Defaults affect all saving and asset allocation outcomes
2. Four psychological factors jointly contribute to the default effect
3. How an economist might identify optimal defaults
4. Alternative interventions are much less effective
1. Defaults Affect Saving and Asset Allocation
   
i. Participation
   
ii. Contribution rates
   
iii. Asset allocation
   
iv. Pre-retirement distributions
   
v. Decumulation / annuitization
Participation, Contribution rates, and Asset Allocation

Automatic Enrollment in a US 401(k) plan

- Welcome to the company
- If you don’t do anything…
  - You are automatically enrolled in the 401(k)
  - You save 2% of your pay
  - Your contributions go into a money market fund
- Call this phone number to opt out of enrollment or change your investment allocations
Madrian and Shea (2001)

401(k) participation by tenure at firm

Fraction of employees ever participated

Tenure at company (months)

- Hired before automatic enrollment
- Hired during automatic enrollment
- Hired after automatic enrollment ended
Employees enrolled under auto-enrollment cluster at the default contribution rate.

**Distribution of contribution rates**

- **Hired before automatic enrollment**
- **Hired during automatic enrollment (2% default)**
- **Hired after automatic enrollment ended**

<table>
<thead>
<tr>
<th>Contribution rate</th>
<th>Fraction of participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>1%</td>
<td>3, 1, 6</td>
</tr>
<tr>
<td>2%</td>
<td>20, 67</td>
</tr>
<tr>
<td>3-5%</td>
<td>17, 7, 26</td>
</tr>
<tr>
<td>6%</td>
<td>37, 31</td>
</tr>
<tr>
<td>7-10%</td>
<td>14, 6, 18</td>
</tr>
<tr>
<td>11-16%</td>
<td>9, 4, 10</td>
</tr>
</tbody>
</table>

**Default contribution rate under automatic enrollment**
Participants stay at the automatic enrollment defaults for a long time.

Fraction of participants hired during auto-enrollment at both default contribution rate and asset allocation.
Additional evidence on Asset Allocation

- Private account component of Swedish Social Security system (Cronqvist and Thaler, 2004)
  - At inception, one-third of assets are invested in the default fund
  - Subsequent enrollees invest 90% of assets in the default fund
- Company match in employer stock (Choi, Laibson and Madrian, 2005b, 2007)
The Flypaper Effect in Individual Investor Asset Allocation  (Choi, Laibson, Madrian 2007)

Studied a firm that used several different match systems in their 401(k) plan.
I’ll discuss two of those regimes today:

- **Match** allocated to employer stock and workers can reallocate
  - Call this “default” case (default is employer stock)

- **Match** allocated to an asset actively chosen by workers; workers *required* to make an active designation.
  - Call this “no default” case (workers must choose)

Economically, these two systems are identical.
They both allow workers to do whatever the worker wants.
Consequences of the two regimes

<table>
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<tr>
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<th>Default for Match is Employer Stock</th>
<th>No-Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Own Contributions to Employer Stock</td>
<td>23%</td>
<td>20%</td>
</tr>
<tr>
<td>Matching Contributions to Employer Stock</td>
<td>95%</td>
<td>27%</td>
</tr>
<tr>
<td>Total Contributions to Employer Stock</td>
<td>56%</td>
<td>23%</td>
</tr>
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</table>
Four psychological factors contribute to the default effect

i. Financial illiteracy
ii. Endorsement
iii. Complexity
iv. Present-bias
i. Financial illiteracy


- 38% of respondents report that they have little or no financial knowledge
- 40% of respondents believe that a money market fund contains stocks
- Two-thirds of respondents don’t know that it is possible to lose money in government bonds
- Respondents on average believe that employer stock is less risky than a stock mutual fund
- Two-thirds report that they would be better off working with an investment advisor than managing investments solo
Financial illiteracy among Wharton MBA’s
Choi, Laibson, Madrian (2006)

- Subjects allocate $10,000 among four funds
- Randomly choose two subjects to receive any positive portfolio return during the subsequent year
- Eliminate variation in pre-fee returns
  - Choose among S&P 500 index funds
- Unbundle services from returns
  - *Experimenters* pay out portfolio returns, so no access to investment company services
One year of index fund fees on a $10,000 investment
Experimental conditions

- **Control**
  - Subjects receive only four prospectuses
  - Prospectuses are often the only information investors receive from companies

- **Fees transparency treatment**
  - Eliminate search costs by *also* distributing fee summary sheet (repeats information in prospectus)

- **Returns treatment**
  - Highlight extraneous information by distributing summary of funds’ annualized returns since *inception* (repeats information in prospectus)
Fees paid by control groups (prospectus only)

<table>
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<tr>
<th>Minimum Possible Fee</th>
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<tbody>
<tr>
<td>$309</td>
<td>$589</td>
</tr>
<tr>
<td>$349</td>
<td>$549</td>
</tr>
<tr>
<td>$389</td>
<td>$509</td>
</tr>
<tr>
<td>$429</td>
<td>$469</td>
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<tr>
<td>$469</td>
<td>$509</td>
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</tr>
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<td>$549</td>
<td>$589</td>
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$443: average fee with random fund allocation

- 6% of MBA Controls put all funds in minimum-fee fund
- 0% of College Controls put all funds in minimum-fee fund

N = 83
N = 30

t-test: p = 0.5086
# Ranking of factor importance

**MBA controls**

1. Fees
2. 1-year performance
3. Performance since inception
4. Investment objectives
5. Desire to diversify among funds
6. Brand recognition
7. Performance over different horizon
8. Past experience with fund companies
9. Quality of prospectus
10. Customer service of fund
11. Minimum opening balance

**College controls**

1. 1-year performance
2. Performance since inception
3. Desire to diversify among funds
4. Investment objectives
5. Quality of prospectus
6. Performance over different horizon
7. Brand recognition
8. Fees
9. Customer service of fund
10. Minimum opening balance
11. Past experience with fund companies
Effect of fee treatment
(prospectus plus 1-page sheet highlighting fees)

MBA College

Fee treatment

t-tests:
MBA: p=0.0000
College: p=0.1451

19% of MBA treatment put all funds in minimum-fee fund
10% of College treatment put all funds in minimum-fee fund
We conducted a similar experiment with Harvard staff as subjects

- In this new version we have 400 subjects (administrators, faculty assistants, technical personal, but not faculty)
- We give every one of our subjects $10,000 and rewarded them with any gains on their investment
  - $4,000,000 short position in stock market
Data from Harvard Staff

3% of Harvard staff in Control Treatment put all $$$ in low-cost fund

9% of Harvard staff in Fee Treatment put all $$$ in low-cost fund

Fees from random allocation $431
ii. Endorsement

- A non-zero default is perceived as advice
- Evidence
  - Asset allocation of employees hired before automatic enrollment (Choi, Laibson, Madrian 2006)
Choi, Laibson, and Madrian (2007)

Asset Allocation Outcomes of Employees
Who are *Not* Subject to Automatic Enrollment

<table>
<thead>
<tr>
<th>Company D</th>
<th>Any balances in default fund</th>
<th>All balances in default fund</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hired before, participated before AE</td>
<td>13%</td>
<td>2%</td>
</tr>
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Choi, Laibson, and Madrian (2007)

Asset Allocation Outcomes of Employees Who are *Not* Subject to Automatic Enrollment

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<tr>
<td>Hired before, participated before AE</td>
<td>13%</td>
<td>2%</td>
</tr>
<tr>
<td>Hired before, participated after AE</td>
<td>29%</td>
<td>16%</td>
</tr>
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iii. Complexity

Complexity $\rightarrow$ delay


- Savings literature: each additional 10 funds produces a 1.5 to 2.0 percentage point decline in participation (Iyengar, Huberman and Jiang 2004)

- Also results on complexity generating more conservative asset allocation (Iyengar and Kamenica 2007).

- Quick enrollment experiments
Complexity and Quick Enrollment

● Conceptual Idea
  ● Simplify the savings plan enrollment decision by giving employees an easy way to elect a pre-selected contribution rate and asset allocation bundle

● Implementation at Company D
  ● New hires at employee orientation: 2% contribution rate invested 50% money market / 50% stable value

● Implementation at Company E
  ● Existing non-participants: 3% contribution rate invested 100% in money market fund
Quick Enrollment and Savings Plan Participation

Before Quick Enrollment:
- Company D: 4 months after baseline - 9%
- Company E: 4 months after baseline - 6%

After Quick Enrollment:
- Company D: 4 months after baseline - 34%
- Company E: 4 months after baseline - 16%
iv. Present-Biased Preferences

- Framework: exponential discounting with an additional factor, \( \beta < 1 \), that uniformly down-weights the future.

\[
U_t = u_t + \beta [\delta u_{t+1} + \delta^2 u_{t+2} + \delta^3 u_{t+3} + ...]
\]
Procrastination (assume $\beta = \frac{1}{2}$, $\delta = 1$).

- Suppose you can join the plan today (effort cost $50) to gain delayed benefits $20,000$ (e.g. value of match)
- Every period you delay, total benefits fall by $10$.
- What are the discounted costs of joining at different periods?

<table>
<thead>
<tr>
<th>Join Period</th>
<th>Discounted Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Join Today:</td>
<td>$-50 + \frac{1}{2} [0] = -50$</td>
</tr>
<tr>
<td>Join t+1:</td>
<td>$0 + \frac{1}{2} [-50 - 10] = -30$</td>
</tr>
<tr>
<td>Join t+2:</td>
<td>$0 + \frac{1}{2} [-50 - 20] = -35$</td>
</tr>
<tr>
<td>Join t+3:</td>
<td>$0 + \frac{1}{2} [-50 - 30] = -40$</td>
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</table>
Interaction with financial illiteracy

- Consider someone with a high level of financial literacy, so effort cost is only $10 (not $50)
- As before, every period of delay, total benefits fall by $10.
- What are the discounted costs of joining at different periods?

- Join Today: $-10 + \frac{1}{2} [0] = -10$
- Join t+1: $0 + \frac{1}{2} [-10 - 10] = -10$
- Join t+2: $0 + \frac{1}{2} [-10 - 20] = -15$
- Join t+3: $0 + \frac{1}{2} [-10 - 30] = -20$
Interaction with endorsement and complexity

- Consider a plan with a simple form, or an endorsed form, so the effort cost is again only $10 (not $50)
- As before, every period of delay, total benefits fall by $10.
- What are the discounted costs of joining at different periods?

- Join Today:  $-10 + \frac{1}{2} [0] = -10$
- Join t+1:  $0 + \frac{1}{2} [-10 - 10] = -10$
- Join t+2:  $0 + \frac{1}{2} [-10 - 20] = -15$
- Join t+3:  $0 + \frac{1}{2} [-10 - 30] = -20$
3. Optimal Defaults – public policy

- Mechanism design problem in which policy makers set a default for agents with present bias (Carrol, Choi, Laibson, Madrian and Metrick 2007)

- Defaults are sticky for three reasons
  - Cost of opting-out of the default
  - Cost varies over time $\rightarrow$ option value of waiting
  - Present-biased preferences $\rightarrow$ procrastination
Basic set-up of problem

- Specify *behavioral* model of households
  - Flow cost of staying at the default
  - Effort cost of opting-out of the default
  - Effort cost varies over time $\rightarrow$ option value of waiting to leave the default
  - Present-biased preferences $\rightarrow$ procrastination
- Specify (dynamically consistent) social welfare function of planner (e.g., set $\beta=1$)
- Planner picks default to optimize social welfare function
Optimal ‘Defaults’

- Two classes of optimal defaults
  - Automatic enrollment
    - Optimal when employees have relatively homogeneous savings preferences (e.g. match threshold) and relatively little propensity to procrastinate
  - “Active Decision” — require individuals to make a decision (eliminate the option to passively accept a default)
    - Optimal when employees have relatively heterogeneous savings preferences and relatively strong tendency to procrastinate
- Key point: sometimes the best default is no default.
Active Decision

Offset Default

Center Default
Lessons from theoretical analysis of defaults

- Defaults should be set to maximize average well-being, which is not the same as saying that the default should be equal to the average preference.

- Endogenous opting out should be taken into account when calculating the optimal default.

- The default has two roles:
  - causing some people to opt out of the default (which generates costs and benefits)
  - implicitly setting savings policies for everyone who sticks with the default
The power of deadlines: Active decisions
Choi, Laibson, Madrian, Metrick (2007)

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
401(k) participation by tenure

Fraction of employees ever participated

Tenure at company (months)

Active decision cohort
Standard enrollment cohort
Active decisions: conclusions

- 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.)
New directions for defaults

- Defaults for savings rate escalation
- Defaults with high savings rates
- Defaults for lifecycle rebalancing
- Defaults for annual rebalancing
- Defaults for employer stock
- Defaults at separation
- Defaults for annuitization
- Individualized defaults (savings rate and asset allocation)
- Defaults for employees not covered by DB/DC plans
- Defaults for investment of tax refunds
4. Alternative Policies

- Paying employees to save
- Educating employees
$100 bills on the sidewalk
Choi, Laibson, Madrian (2004)

- Employer match is an instantaneous, riskless return on investment
- Particularly appealing if you are over 59½ years old
  - Have the most experience, so should be savvy
  - Retirement is close, so should be thinking about saving
  - Can withdraw money from 401(k) without penalty
- We study seven companies and find that on average, half of employees over 59½ years old are not fully exploiting their employer match
  - Average loss is 1.6% of salary per year
- Educational intervention has no effect
Financial education

- Seminars presented by professional financial advisors
- Curriculum: Setting savings goals, asset allocation, managing credit and debt, insurance against financial risks
- Seminars offered throughout 2000
- Linked data on individual employees’ seminar attendance to administrative data on actual savings behavior before and after seminar
Effect of education is positive but small

<table>
<thead>
<tr>
<th>% planning to make change</th>
<th>% actually made change</th>
<th>% actually made change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seminar attendees</td>
<td>Non-attendees</td>
<td></td>
</tr>
<tr>
<td>100%</td>
<td>14%</td>
<td>7%</td>
</tr>
<tr>
<td>Enroll in 401(k) Plan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28%</td>
<td>8%</td>
<td>5%</td>
</tr>
<tr>
<td>Increase contribution rate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>47%</td>
<td>15%</td>
<td>10%</td>
</tr>
<tr>
<td>Change fund selection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>36%</td>
<td>10%</td>
<td>6%</td>
</tr>
<tr>
<td>Change asset allocation</td>
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Those not in 401(k)

Those already in 401(k)
Effect of education is positive but small

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**Those not in 401(k)**
- Enroll in 401(k) Plan
  - 100%
  - 14%
  - 7%

**Those already in 401(k)**
- Increase contribution rate
  - 28%
  - 8%
  - 5%
- Change fund selection
  - 47%
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- Change asset allocation
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Effect of education is positive but small

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Those not in 401(k)
- Enroll in 401(k) Plan: 100% (planning), 14% (made change), 7% (made change)

Those already in 401(k)
- Increase contribution rate: 28% (planning), 8% (made change), 5% (made change)
- Change fund selection: 47% (planning), 15% (made change), 10% (made change)
- Change asset allocation: 36% (planning), 10% (made change), 6% (made change)
• Financial education effects are small
• Seminar attendees have good intentions to change their 401(k) savings behavior, but most do not follow through
• Financial education alone will not dramatically improve the quality of 401(k) savings outcomes
• Choi et al (2005) study the effect of the Enron, Worldcom, and Global Crossing scandals on employer stock holding
  • No net sales of employer stock in reaction to these news stories
  • These scandals did not affect the asset allocation decisions of new hires.
  • These hires did not affect the asset allocation decisions of new hires at other Houston firms.
Conclusion

- Defaults are not neutral for four reasons:
  - Investors are not financially literate
  - Investors display an endorsement effect
  - Investors respond adversely to complexity
  - Investors are prone to procrastinate

- Employers/institutions will influence savings outcomes through the choice of defaults (whether the institution wants to do this or not)

- We should devote more effort to the analysis of how we pick defaults.