Outline

1. Introduction / Prerequisites

2. Getting started!
   Psychology and Economics: The Topics

3. Psychology and Economics: Empirical Methods

4. Methodology: Reading the Psychology Journals

5. Psychology and Economics by Field

6. Defaults and 401(k)s: The Facts
1 Who am I?

Stefano DellaVigna

- Associate Professor, Department of Economics

- Bocconi (Italy) undergraduate (Econ.), Harvard PhD (Econ.)

- Psych and Econ, Applied Microeconomics, Media Economics, Political Economy, Behavioral Finance,

- Evans 515 – OH schedule by email
2 Who are you?

- PhD student 2nd year and higher. Graduate courses in
  - Econometrics
  - Micro Theory (Contract Theory, Game Theory)
  - Psychology and Economics – Theory (219A)

- Interest in
  - Psychology and Economics
  - Applied, empirical microeconomics (io, labor, public finance, finance)
3 What is this class?

• Reading list:

  – complete, updated list on course webpage


  – 11 Methodological Topics

  – Please email me (sdellavi@econ.berkeley.edu) for any issue with class and to schedule a meeting
Grade:

- 3 or 4 problem sets on models and empirics (30% weight)
- Final exam (40% weight)
- Your choice of:
  * 10-15 page paper that uses field evidence (30% weight)
  * An empirical problem set (30% weight)

I encourage you to try to write a paper
• Deadlines for paper
  – Meet with me about your paper by 3/2
  – Brief summary of your research idea by 4/6 (2 pages, research question, data availability)
  – Paper due on 5/10

• Information Sheet
4 Psychology and Economics: The Topics

- Prototypical economist conception of human behavior (Rabin, 2002a):

$$\max_{x_i^t \in X_i} \sum_{t=0}^{\infty} \delta^t \sum_{s_t \in S_t} p(s_t) U \left( x_i^t | s_t \right).$$

- $X_i$ is set of “life-time strategies”, $S_t$ is set of state spaces

- $p(s_t)$ are rational beliefs, $\delta \in (0, 1)$ is time-consistent discount factor

- $u(\cdot, s, t)$ is true utility at time $t$ in state $s$
• Improving Psychological Realism

• Step 1. Non-Standard Preferences

1. Present-Biased Preferences: time inconsistency $(\beta, \delta)$

2. Reference Dependence: $U(x_i|r, s)$ with $r$ reference point

3. Social Preferences: $U(x_i, x_{-i}|s)$ where $x_{-i}$ is allocation of others
• Example 1. Reference Dependence – Sydnor (AEJ: Applied, forthcoming)

• Sydnor studies deductible choice in home insurance policies

• Menu: $250, $500, $1,000. Higher deductible \( \rightarrow \) Lower premium
• Example 1. Reference Dependence – Sydnor *(AEJ: Applied, forthcoming)*

• Sydnor studies deductible choice in home insurance policies

• Menu: $250, $500, $1,000. Higher deductible → Lower premium

<table>
<thead>
<tr>
<th>Chosen Deductible</th>
<th>Number of claims per policy</th>
<th>Increase in out-of-pocket payments per claim with a $1000 deductible</th>
<th>Increase in out-of-pocket payments per policy with a $1000 deductible</th>
<th>Reduction in yearly premium per policy with $1000 deductible</th>
<th>Savings per policy with $1000 deductible</th>
</tr>
</thead>
<tbody>
<tr>
<td>$500</td>
<td>0.043</td>
<td>469.86</td>
<td>19.93</td>
<td>99.85</td>
<td>79.93</td>
</tr>
<tr>
<td>N=23,782 (47.6%)</td>
<td>(.0014)</td>
<td>(2.91)</td>
<td>(0.67)</td>
<td>(0.26)</td>
<td>(0.71)</td>
</tr>
<tr>
<td>$250</td>
<td>0.049</td>
<td>651.61</td>
<td>31.98</td>
<td>158.93</td>
<td>126.95</td>
</tr>
<tr>
<td>N=17,536 (35.1%)</td>
<td>(.0018)</td>
<td>(6.59)</td>
<td>(1.20)</td>
<td>(0.45)</td>
<td>(1.28)</td>
</tr>
</tbody>
</table>

Average forgone expected savings for all low-deductible customers: $99.88

- Recruit workers to enter manually data on books for 6 hours for $12/hour

- Treatment (gift) group: After hiring, told pay increased to $20/hour
• Example 2. Social Preferences – Gneezy and List (EMA, 2006)

• Recruit workers to enter manually data on books for 6 hours for $12/hour

• Treatment (gift) group: After hiring, told pay increased to $20/hour
• Step 2. Non-Standard Beliefs: beliefs $\tilde{p}(s) \neq p(s)$

1. Overconfidence: wrong $E(p)$ or wrong $Var(p)$

2. Law of Small Numbers: Wrong forecast of $p(s_{t+1}|s_t)$

3. Projection Bias: wrong forecast of utility: $\hat{u}(\cdot, s)$
• Example 3 – Conlin, O’Donoghue and Vogelsang (AER, 2007)

• Examine mail orders of cold-weather apparel

• Relate temperature on order date to return probability

• Standard model: No relation or positive relation (the colder it is now, the more you will need it in 5 days)
Example 3 – Conlin, O’Donoghue and Vogelsang (*AER*, 2007)

- Examine mail orders of cold-weather apparel

- Relate temperature on order date to *return* probability

- Standard model: No relation or positive relation (the colder it is now, the more you will need it in 5 days)

<table>
<thead>
<tr>
<th>TABLE 2</th>
</tr>
</thead>
</table>

Probit Regression Measuring the Effect of Temperature on the Probability Cold Weather Clothing is Returned

Dependent Variable is Whether Item is Returned (=1 if item returned and 0 otherwise)

<table>
<thead>
<tr>
<th></th>
<th>Gloves &amp; Mittens</th>
<th>Winter Boots</th>
<th>Hats</th>
<th>Sports Equipment</th>
<th>Parkas &amp; Coats</th>
<th>Vests</th>
<th>Jackets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature on Day Item was Order</td>
<td>-0.00014** (0.00005)</td>
<td>-0.00021** (0.00008)</td>
<td>-0.00017** (0.00005)</td>
<td>-0.00009 (0.00007)</td>
<td>-0.00007 (0.00007)</td>
<td>-0.00043** (0.00010)</td>
<td>-0.00019 (0.00013)</td>
</tr>
</tbody>
</table>
• Correlation consistent with projection bias

• Current state \( s' \), future state \( s \). Predicted future utility

\[
\hat{u}(c, s) = (1 - \alpha) u(c, s) + \alpha u(c, s')
\]

• Structural estimation of projection bias parameter \( \alpha \)
• Correlation consistent with projection bias

• Current state $s'$, future state $s$. Predicted future utility

$$\hat{u}(c, s) = (1 - \alpha) u(c, s) + \alpha u(c, s')$$

• Structural estimation of projection bias parameter $\alpha$

<table>
<thead>
<tr>
<th>TABLE 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural Estimation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Winter Boots</th>
<th>Hats</th>
<th>Parkas &amp; Coats</th>
<th>Vests</th>
<th>Jackets</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\alpha$</td>
<td>0.48**</td>
<td>0.64**</td>
<td>0.33**</td>
<td>0.012</td>
<td>0.41**</td>
</tr>
<tr>
<td></td>
<td>(0.0599)</td>
<td>(0.0390)</td>
<td>(0.0790)</td>
<td>(0.0107)</td>
<td>(0.0488)</td>
</tr>
</tbody>
</table>
• Step 3. Non-Standard Decision-Making

1. Limited Attention: maximization set $\neq X_i$ (neglect less salient alternatives)

2. Menu Effects: Do not $\max U$

3. Persuasion and Social Pressure

4. Emotions
• Example 4. Limited Attention – Huberman and Regev (JF 2002)

• November 28, 1997: EntreMed company (biotech) discovers cure for cancer – Articles on Science, Nature, NYT (page 23)

• May 3, 1998: NYT repeats article on page 1
Figure 5: ENMD Closing Prices and Trading Volume 10/1/97-12/30/98

- May 4, 1998
- November 28, 1997
- November 12, 1998

• Data set on choice of 401(k) plans

• Comparison of plans with few options and plans with many options

• Focus on participation rate – Fractions of employees that invest
• **Step 4. Market Response to Biases**

• Integrate these findings into a market

1. Firms (Behavioral IO)
2. Employers (Behavioral Labor)
3. Investors (Behavioral Finance)
4. Managers (Behavioral Corporate Finance)
5. Politicians (Behavioral Political Economy)
6. ...
• Example 6 – DellaVigna and Malmendier (QJE, 2004) (applied theory paper)

• Credit card customers are:
  – tempted to over-consume (self-control problems)
  – naive about self-control problems

• How should credit-card companies price cards?

• Offer no yearly fee + bonuses (cash back, airline miles)...

• ...AND charge high interest rates
<table>
<thead>
<tr>
<th></th>
<th>Type of credit card offer</th>
<th>Regular interest rate (APR)</th>
<th>Annual fee in $</th>
<th>Benefits</th>
<th>Introductory interest rate (APR)</th>
<th>Length of introductory offer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citibank</td>
<td>Platinum Select Visa</td>
<td>Prime + 12.99%</td>
<td>0</td>
<td></td>
<td>2.90%*</td>
<td>9 months</td>
</tr>
<tr>
<td>MBNA</td>
<td>Platinum Plus Visa</td>
<td>12.99%</td>
<td>0</td>
<td></td>
<td>3.90%*</td>
<td>6 months</td>
</tr>
<tr>
<td>First USA</td>
<td>Platinum Visa</td>
<td>Prime + 6.50%</td>
<td>0</td>
<td></td>
<td>9.90%*</td>
<td>9 months</td>
</tr>
<tr>
<td>Chase Manhattan</td>
<td>Wal-Mart Mastercard</td>
<td>Prime + 3.98% to Prime + 11.98%</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bank of America</td>
<td>Visa Gold</td>
<td>Prime + 7.99% to Prime + 12.99%</td>
<td>0</td>
<td></td>
<td>3.90%</td>
<td>6 months</td>
</tr>
<tr>
<td>Household Bank</td>
<td>GM Mastercard</td>
<td>Prime + 9.99%</td>
<td>0</td>
<td>5% toward GM</td>
<td>2.90%</td>
<td>6 months</td>
</tr>
<tr>
<td>Providian</td>
<td>Visa Platinum</td>
<td>Prime + 3.24%</td>
<td>0</td>
<td></td>
<td>0%</td>
<td>3 months</td>
</tr>
<tr>
<td></td>
<td>Visa Gold Prestige</td>
<td>Prime + 10.24%</td>
<td>0</td>
<td></td>
<td>0%</td>
<td>2 months</td>
</tr>
<tr>
<td></td>
<td>Visa Gold Preferred</td>
<td>Prime + 13.24%</td>
<td>0</td>
<td></td>
<td>0%</td>
<td>2 months</td>
</tr>
<tr>
<td></td>
<td>Visa Classic</td>
<td>Prime + 17.24% to 0-59-89</td>
<td>0</td>
<td></td>
<td>0%</td>
<td>2 months</td>
</tr>
<tr>
<td>Capital One</td>
<td>Platinum Visa</td>
<td>9.90%</td>
<td>0</td>
<td></td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Gold Visa</td>
<td>14.90%</td>
<td>0</td>
<td></td>
<td>2.90%*</td>
<td>6 months</td>
</tr>
<tr>
<td></td>
<td>Classic Visa</td>
<td>19.80%</td>
<td>49</td>
<td></td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Discover</td>
<td>Platinum Card</td>
<td>13.90%</td>
<td>0</td>
<td>1% Cashback</td>
<td>1.70%*</td>
<td>6 months</td>
</tr>
<tr>
<td>American Express</td>
<td>Blue Credit Card</td>
<td>9.99%</td>
<td>0</td>
<td></td>
<td>0%</td>
<td>6 months</td>
</tr>
<tr>
<td></td>
<td>Optima Credit Card</td>
<td>Prime + 7.99%</td>
<td>0</td>
<td></td>
<td>7.90%</td>
<td>6 months</td>
</tr>
<tr>
<td></td>
<td>(Gold) Charge Card</td>
<td>N/A</td>
<td>55-75</td>
<td></td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
5 Psychology and Economics: Empirical Methods

- Psychology and Economics is
  - Idea from Psychology (Self-control, Reference Dependence, Overconfidence, Inattention, Social Preferences, Persuasion, ...)
  - Setting in Economics (Asset Pricing, Charitable Giving, Consumption and Savings, Job search, ...)

- Each setting has specific methodologies → Variety of methodologies

- Defining feature for the field is idea, not technique or methodology
• However: Five main methodologies in Field P&E

1. **Menu choice**

   (a) Example 1. Sydnor (forthcoming) on small-scale risk aversion

   (b) Compare behavior in a menu (Ex.: deductibles)

   (c) Given a model, make inferences about preferences, beliefs, etc. (Ex.: Risk aversion)
2. **Natural Experiments**

   (a) Example 4. Huberman and Regev (*JF*, 2002) on limited attention

   (b) Treatment vs. Control comparison

   (c) Quasi-random Naturally occurring events (Ex.: timing of article publication)

3. **Field experiment**

   (a) Example 2. Gneezy and List (*EMA*, 2006) on gift exchange

   (b) Treatment vs. Control comparison

   (c) Explicit randomization in a field setting (Ex.: Additional pay)
4. **Correlational studies**

   (a) Example 5. Iyengar, Huberman, and Lepper (2006) on choice overload

   (b) Test correlation of two variables (Ex.: No. options and participation)

   (c) Derive conclusion – Correlation, not causality here

5. **Structural Identification**

   (a) Example 3. Conlin, O’Donoghue and Vogelsang (*AER*, 2007) on projection bias

   (b) Write out model

   (c) Estimate the parameters of the model (Ex.: projection bias)
6 Methodology: Reading Psychology Journals

- One strategy for papers in Psychology and Economics:
  - Get idea from reading psychology literature
  - Think of economic setting to apply to
    - Model new phenomenon
    - Test with economic experiments
    - Apply using field data
  - How to start with psychology literature?
Step 1. Choosing your Psychology. Not all kinds of psychology are equally useful!

- Social Psychology (attribution errors, emotions, discrimination). YES!
- Cognitive Psychology (Kahneman and Tversky agenda). YES!
- Personality Psychology (Big Four personality types). Not very optimistic (Michigan and NYU group more optimistic)
- Developmental Psychology (Development of skills in children). Not much so far, may become important (see Bill Harbaugh’s experiments)
- Comparative Psychology (Example: Asians not overconfident). Difficult to test empirically, but promising
• **Step 2.** Where to start?

  – Read a good introductory book


  – Attend a graduate (or undergraduate) class in social of cognitive psychology. Check listing in Psychology, Sociology (Robb Willer), GSPP (Jack Glazer), and Haas (OB/Marketing)
• **Step 3.** Continuing education – Choosing the psychology journals

  – Look for the top psychology journals:

    1. *Journal of Personality and Social Psychology* (*JPSP*)
       
       * Mostly very high-quality experiments
       
       * Go directly to design—Do not stop at summary
       
       * Skip the Section on personality psychology

    2. *Psychological Science*

       * Recent journal, extremely successful

       * Publishes short articles, like *Science*
3. *Psychological Bulletin*
   * Publishes mostly reviews

4. *Psychological Review*
   * Publishes ‘theoretical’ contributions, i.e., attempts to summarize existing experimental evidence. No Greek letters!

– Top marketing journals can be useful too

1. *Journal of Consumer Research*. Generally the most psychology-based

2. Also *Journal of Marketing Research*
• **Step 4.** Reading a psychology article

  – Do not go for the newest finding.
  
    * Look for findings that have been replicated, preferably by different researchers
  
    * Use Google Scholar for that

  – Reading group: Reading the articles in a group of 2-3

  – Psych articles will contain typically 3-6 experiments. Focus on strongest one or two

  – Classical issues to look for:

    * Sample sizes small
* Are outcome variables interesting?

* Deception

  – Psych authors tend to claim that they found a new effect – Look for unifying theme instead

  – Read meta-analyses (summaries of experiments in an area) — But be wary that many bad experiments do not make a good one
• **Step 5.** Apply it to economics

1. Criticize the findings
   - Are they relevant for economics?
   - Can existing economic models explain it? (information stories often successful)

2. Find economic problem could apply to
   - Brainstorm: charitable giving, yes-men in companies, shopping behavior,...

3. Look for related papers in economics (and psychology)

• It may not work, but you will learn much
7 Psychology and Economics by Field

1. Public Finance
   (a) Present-bias (addiction, sin taxes, retirement savings)
   (b) Social preferences (charitable contributions)
   (c) Limited attention (incidence of taxes, low take-up of benefits)

2. Environmental Economics
   (a) Reference dependence (WTA/WTP)
   (b) Framing effects (value of a life)
3. Labor Economics

   (a) Reference dependence (labor supply, wage setting)

   (b) Social preferences (wage setting)

   (c) Money Illusion (wage setting)

4. Development Economics

   (a) Present-bias (commitment devices in savings, choice of crops)

   (b) Social preferences (group savings, trust, ethnic hatred)
5. Industrial organization

(a) Present-bias (Credit cards)

(b) Reference dependence (sales)

(c) Demand estimation + Profit maximization

6. Marketing

(a) Menu effects (Strategic pricing of products)

(b) Present-bias (Placement of tempting products)
7. Law and Economics

(a) Present-bias (Cooling off period)

(b) Emotions (litigation)

8. Political Economy

(a) Market Reaction (manipulation of hatred or inattention)

(b) Welfare Enhancement (SMRT plan)
9. Asset pricing

(a) Overconfidence (overtrading)

(b) Heterogeneity and Market Reaction (noise traders)

(c) Limited attention (footnotes in accounting, demographics, large events)

10. Corporate finance

(a) Overconfidence (investment, mergers, options)

(b) Limited attention (media)
11. Macro – Consumption/Savings

(a) Present-bias (low saving + mostly illiquid wealth)

(b) Reference dependence (nominal wage rigidity)

(c) Limited attention (menu costs)
8 Defaults and 401(k)s: The Facts

- 401(k) savings most common voluntary savings vehicle in the US
  - Set aside money for retirement
  - Choice of percent contribution, and stocks/bonds composition
  - Penalty for early withdrawal
  - Sometimes: Company matching of contribution up to a threshold

- Patterns of 401(k) investment (Highly recommended survey: Choi et al., 2006 – “Saving for Retirement on the Path of Least Resistance”)
• Today: Focus on Default Effects

• **Fact 1.** Close to 50% of investors follows Default Plan (at least initially)

• Madrian and Shea (QJE, 2001): Single most important piece of field evidence on P&E

• Details:
  
  – Health Care company

  – Paper-and-pencil 401(k) choice
– Can enroll any day

• Design (Table 1)

  – Discontinuity of 401(k) plan defaults depending on date of hire

  – After 4/1/1998 investment by default

  – 50 percent match up to 6% contribution

  – Observe effect on investment decisions
<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Eligibility</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eligible employees</td>
<td>All except union and temporary employees</td>
<td>All except union and temporary employees</td>
</tr>
<tr>
<td>First eligible</td>
<td>After one year of employment</td>
<td>Immediately upon hire</td>
</tr>
<tr>
<td>Employer match eligible</td>
<td>After one year of employment</td>
<td>After one year of employment</td>
</tr>
<tr>
<td><strong>Contributions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employee contributions</td>
<td>1 percent to 15 percent of compensation¹</td>
<td>1 percent to 15 percent of compensation¹</td>
</tr>
<tr>
<td>Employer match</td>
<td>50 percent of employee contribution up to 6 percent of compensation¹</td>
<td>50 percent of employee contribution up to 6 percent of compensation¹</td>
</tr>
<tr>
<td><strong>Vesting</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vesting of employee contributions</td>
<td>Immediate</td>
<td>Immediate</td>
</tr>
<tr>
<td>Vesting of employer contributions</td>
<td>2-year cliff</td>
<td>2-year cliff</td>
</tr>
<tr>
<td><strong>Participation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Default participation decision</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Default contribution rate</td>
<td>None</td>
<td>3 percent of compensation</td>
</tr>
<tr>
<td>Default fund allocation</td>
<td>None</td>
<td>Money market fund</td>
</tr>
</tbody>
</table>
• OLD Cohort hired 4/1/96-3/31/97:
  – default: no enrollment
  – 1-year wait period for eligibility

• WINDOW Cohort hired 4/1/97-3/31/98:
  – default: no enrollment
  – wait period for eligibility till 4/1/98
NEW Cohort hired 4/1/98-3/31/99:

- default: enrollment in 3 percent money market fund
- immediate eligibility

<table>
<thead>
<tr>
<th>TABLE II</th>
<th>EMPLOYEE COHORTS FOR COMPARATIVE ANALYSIS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OLD</td>
</tr>
<tr>
<td>First eligible to participate in 401(k) plan</td>
<td>One year after date of hire</td>
</tr>
<tr>
<td>First eligible for employer match</td>
<td>One year after date of hire</td>
</tr>
<tr>
<td>Automatically enrolled in 401(k) plan</td>
<td>No</td>
</tr>
<tr>
<td>Default contribution rate</td>
<td>None</td>
</tr>
<tr>
<td>Default fund allocation</td>
<td>None</td>
</tr>
</tbody>
</table>
- Step 1. Check Design (endogeneity issues)
  - Compare different cohorts: No large differences

<table>
<thead>
<tr>
<th>TABLE III</th>
<th>COMPARISON OF WORKER CHARACTERISTICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study company</td>
<td>OLD cohort</td>
</tr>
<tr>
<td>Average age (years)</td>
<td>37.2</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>25.4%</td>
</tr>
<tr>
<td>Female</td>
<td>74.6</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>77.1%</td>
</tr>
<tr>
<td>Black</td>
<td>12.5</td>
</tr>
<tr>
<td>Hispanic</td>
<td>7.1</td>
</tr>
<tr>
<td>Other</td>
<td>3.3</td>
</tr>
<tr>
<td>Hours</td>
<td></td>
</tr>
<tr>
<td>Full-time (HPW &gt; 35)</td>
<td>96.7%</td>
</tr>
<tr>
<td>Part-time (HPW &lt; 35)</td>
<td>3.3</td>
</tr>
<tr>
<td>Compensation</td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>$41,970</td>
</tr>
<tr>
<td>Median</td>
<td>$33,470</td>
</tr>
</tbody>
</table>
• Step 2. Compare plan choices:

1. Participation rates in 401(k) by June 30, 1999 (Figure I and Table IV):

   • OLD: 57%, WINDOW: 49%, NEW: 86%
<table>
<thead>
<tr>
<th></th>
<th>Automatic enrollment</th>
<th>Immediate eligibility</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Participation rate of Window cohort on 6/30/98</td>
<td>Participation rate of New cohort on 6/30/99</td>
</tr>
<tr>
<td>Overall</td>
<td>37.4%</td>
<td>85.9%</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>42.3</td>
<td>85.7</td>
</tr>
<tr>
<td>Female</td>
<td>35.9</td>
<td>86.0</td>
</tr>
<tr>
<td>Race/ethnicity</td>
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<td></td>
</tr>
<tr>
<td>White</td>
<td>42.7</td>
<td>88.2</td>
</tr>
<tr>
<td>Black</td>
<td>21.7</td>
<td>81.3</td>
</tr>
<tr>
<td>Hispanic</td>
<td>19.0</td>
<td>75.1</td>
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<tr>
<td>Other</td>
<td>46.2</td>
<td>85.2</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age &lt;20</td>
<td>—</td>
<td>73.6</td>
</tr>
<tr>
<td>Age 20–29</td>
<td>25.3</td>
<td>82.7</td>
</tr>
<tr>
<td>Age 30–39</td>
<td>37.2</td>
<td>86.3</td>
</tr>
<tr>
<td>Age 40–49</td>
<td>47.3</td>
<td>90.1</td>
</tr>
<tr>
<td>Age 50–59</td>
<td>51.8</td>
<td>90.0</td>
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<tr>
<td>Age 60–64</td>
<td>60.0</td>
<td>86.0</td>
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<tr>
<td>Compensation</td>
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<tr>
<td>&lt;$20K</td>
<td>12.5</td>
<td>79.5</td>
</tr>
<tr>
<td>$20–$29K</td>
<td>24.5</td>
<td>82.8</td>
</tr>
<tr>
<td>$30–$39K</td>
<td>42.2</td>
<td>88.9</td>
</tr>
<tr>
<td>$40–$49K</td>
<td>51.0</td>
<td>91.8</td>
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<tr>
<td>$50–$59K</td>
<td>61.6</td>
<td>92.8</td>
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<tr>
<td>$60–$69K</td>
<td>59.7</td>
<td>94.7</td>
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<tr>
<td>$70–$79K</td>
<td>57.9</td>
<td>91.5</td>
</tr>
<tr>
<td>$80K+</td>
<td>68.3</td>
<td>94.2</td>
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<tr>
<td>Sample size</td>
<td>N = 4249</td>
<td>N = 5801</td>
</tr>
</tbody>
</table>
1. *Contribution* rates (Figures IIc):

- **WINDOW**: 63% are at 0 percent, 4% at 3 percent
- **NEW**: 65% are at 3 percent (Default)

![Distribution of 401(k) Contribution Rates for the WINDOW and NEW Cohorts Including Nonparticipation](image-url)
1. *Allocation* of funds in stocks (Figure III):

- OLD: 75%, WINDOW: 73%, NEW: 16%
- Results equally strong with controls (Table VI)

### TABLE VI
**Raw and Regression-Adjusted Effects of Automatic Enrollment and Immediate Eligibility**

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>401(k) Participation rate</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raw difference</td>
<td>48.5%*</td>
<td>0.6%</td>
</tr>
<tr>
<td>Regression-adjusted difference</td>
<td>50.4%*</td>
<td>4.1%*</td>
</tr>
<tr>
<td><strong>401(k) Contribution rate</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raw difference</td>
<td>-2.9%*</td>
<td>-0.1%</td>
</tr>
<tr>
<td>Regression-adjusted difference</td>
<td>-2.2%*</td>
<td>0.2%</td>
</tr>
</tbody>
</table>
• Results very robust. Choi et al. (2004) Survey paper:

• Company B switches from OLD to NEW to OLD
• Company C switches from OLD to NEW to NEW2
• Company D switches from OLD to NEW to NEW2

![Graph showing 401(k) participation by tenure for employees aged 40+ at hire: Company D.](image-url)
- Company H switches from OLD to NEW
• Summary.

  – OLD and NEW cohorts invest very differently one year after initial hire

    * Fact 1. **Fact 1. Close to 50% of investors follow Default Plan**

    * Fact 1a. Applies to participation (yes/no)

    * Fact 1b. Applies also to contribution level and allocation

  – (Less commonly cited) WINDOW cohort resembles OLD cohort

    * Fact 2. ‘**Suggested choice**’ not very attractive unless default
9 Next Lecture

- More defaults effects in 401(k) savings
  - Present-biased preferences
  - Interpretation facts using present-biased preferences

- Consumption Choices
  - *Investment Good*. Homework

- Problem Set 1 is due next week