Motivation

- Key insight from behavioral economics: default options matter
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- High stakes setting: retirement savings plans

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Autoenrollment (AE) is affecting ~100 million people worldwide:

- NZ ('07), UK ('12), Turkey ('17): all private sector workers
- US: the majority of 401(k) plans already implements AE
  - 5 states are extending AE to workers without a 401(k)
This Project

Many studies on AE short-run impact but long-run effect unknown:

**Q:** What is the effect of autoenrollment on *lifetime* savings and *welfare*?
This Project

Many studies on AE short-run impact but long-run effect unknown:

**Q:** What is the effect of autoenrollment on 

*lifetime* savings and *welfare*?

**Challenge:** no long-run data because AE is a recent policy

**This paper:**

1. Identify the *mechanism* through which AE affects behavior
2. Build and estimate a *lifecycle model* to study AE long-run effect
Outline

1 Three Facts about Autoenrollment

2 A Lifecycle Model with Default Effects
   - Model
   - Estimation

3 Results
   - Long-term effect
   - Optimal policies

4 Conclusion
Two Datasets

U.S. 401(k) Data:
- New proprietary dataset I obtained from a large US pension provider
- Monthly contributions, balances, and asset allocation for 4m workers btw. 2006-17

U.K. Nationally Representative Data:
- ASHE 2006-16: nationally representative 1% panel
- Follows workers across successive jobs
Three Facts about Autoenrollment

Two new facts:

Fact I: AE in current job ↓ saving in next job
Fact I: AE Reduced Saving in Next Job

Mandatory Autoenrollement for all U.K. private sector employees
Policy roll-out by employer size between 2012-2017

Identification:

Previous employer \( j-1 \)

- Treated Employer (subject to AE)
- Untreated Employer

New employer \( j \)

- New Employer (AE or nonAE)
- \( \beta = s_{1,j} - s_{2,j} \)
- Year \( x \) Firm Fe

\( \beta = s_{1,j} - s_{2,j} \)
Fact I: AE Reduced Saving in Next Job

AE reduced participation by 11% in next opt-in job!
Existing within-job estimates may overstate AE effect on lifetime savings

<table>
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<td><strong>Panel A - Participation rate</strong></td>
<td></td>
</tr>
<tr>
<td>AE to non-AE</td>
<td>-0.109**</td>
</tr>
<tr>
<td></td>
<td>(0.052)</td>
</tr>
<tr>
<td>AE to AE</td>
<td>0.013</td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
<td><strong>Panel B - Contribution in (% of pensionable pay)</strong></td>
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</tr>
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<td>AE to non-AE</td>
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<tr>
<td></td>
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<td>-0.048</td>
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<tr>
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<td>(0.066)</td>
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Observations: 35,651

Robust standard errors clustered by current employer; *** p<0.01, ** p<0.05, * p<0.1

Sample: 22-60y & ≤1y tenure in ASHE 2006-17. Additional controls: total pay, previous total pay, tenure, previous
Fact I: AE Reduced Saving in Next Job

AE reduced participation by 11% in next **opt-in** job!
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<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE to non-AE</td>
<td>-0.109**</td>
<td>0.073</td>
<td>0.022</td>
<td>-0.003</td>
<td>0.022</td>
<td>0.046</td>
<td>0.008</td>
<td>-0.056</td>
</tr>
<tr>
<td></td>
<td>(0.052)</td>
<td>(0.062)</td>
<td>(0.041)</td>
<td>(0.055)</td>
<td>(0.054)</td>
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Panel A - Participation rate

| AE to non-AE      | -0.472**    | 0.023| -0.092| 0.161| -0.123| 0.021| -0.234| -0.137|
|                   | (0.185)     | (0.219)| (0.173)| (0.489)| (0.214)| (0.224)| (0.213)| (0.300)|
| AE to AE          | -0.048      |      |      |      |      |      |      |      |
|                   | (0.066)     |      |      |      |      |      |      |      |

Panel B - Contribution in (% of pensionable pay)

<table>
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<tr>
<th></th>
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</tr>
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<tbody>
<tr>
<td>Size_{j-1} X Size_{j}</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Employere_{j} X Year</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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Three Facts about Autoenrollment

Two new facts:

**Fact I:** AE in current job ↓ savings in next job
⇒ need a model to extrapolate effect after many job switches
Three Facts about Autoenrollment

Two new facts:

Fact I: AE in current job ↓ savings in next job
⇒ need a model ...

Fact II: Increasing the AE default ↓ participation
Fact II: Increasing Default ↓ Participation

Compare workers hired before/after 86 U.S. firms increased their default

Example: 3% → 6%

Controls: plan, year, and age FEs, log tenure
Sample: 86 US 401k plans. 159,216 workers w/ ≤1y of tenure post grace-period
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Compare workers hired before/after 86 U.S. firms increased their default

Example: 3% → 6%

Participation rate
(i.e. contributions > 0%)

Positive contrib < initial default
(e.g. contributions at 1% or 2%)

Controls: plan, year, and age FEs, log tenure

Sample: 86 US 401k plans. 159,216 workers w/ ≤1y of tenure post grace-period
Fact II: Increasing Default ↓ Participation

Nudging workers to contribute more w/ higher default ....

... led more to drop-out and contribute at the lowest rates!

Opt-out cost: fits this evidence
- Ex. worker preferred contribution rate 1%
- 3% default: stay at 3% (not worth bearing opt-out cost)
- 6% default: drop to 1% (far enough from preferred rate)

Other theories (loss aversion, anchoring): opposite prediction
Three Facts about Autoenrollment

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One known fact w/ a new interpretation:

Fact III: Median non-AE catch-up to AE over 3yrs ...
Fact III: Median non-AE Catch-up to AE
Workers hired in the 12 months before/after AE at 3% in 34 firms
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Workers hired in the 12 months before/after AE at 3% in 34 firms

Gains from switching:
- Tax benefit
- Generous employer match

⇒ Large opt-out cost:
"DellaVigna ('06,'18): min. $1,200
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![Graph showing median worker's contributions]

**Static setting**

**Gains from switching:**
- Tax benefit
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Workers hired in the 12 months before/after AE at 3% in 34 firms

Dynamic setting

Gains from switching:
- Tax benefit
- Generous employer match

⇒ Smaller opt-out cost:
In a lifecycle model I estimate an opt-out cost of $250
Three Facts about Autoenrollment

Two new facts:

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... but heterogeneity matters
Heterogeneity Matters

**In the short run:** large treatment effects only at the bottom ...

... will these savings increase persist in the **long run**?
Outline

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3. Results
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   - Optimal policies

4. Conclusion
The Model

I build and estimate a detailed lifecycle model with default effects

- Features rich economic environment (8 state variables) ...
  
  1. Assets: realistic retirement account, liquid saving, and unsecured debt
  2. Labor market: income and employment risk varies with age and tenure (SIPP data)
  3. Government: progressive tax and benefit system (Social Security & UI)
  4. Demography: mortality risk, and changing household composition over lifecycle
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  - **Demography**: mortality risk, and changing household composition over lifecycle

- ... parsimonious specification of preferences (3 parameters):
  - **Time preferences**: standard (E.I.S. & exponential discount factor)
  - **Opt-out cost**: utility cost every time agent deviates from the default
Data and Estimation

Estimation Sample:
- 34 plans w/ a 50% match up to 6% and no autoescalation
- Workers hired in the 12 months before/after AE at 3%

Simulated Method of Moments results:

<table>
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<th>EIS</th>
<th>disct. fact.</th>
<th>opt-out cost</th>
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<tbody>
<tr>
<td>$\sigma$</td>
<td>0.455</td>
<td>0.987</td>
<td>$254</td>
</tr>
<tr>
<td>$\delta$</td>
<td>(0.013)</td>
<td>(0.001)</td>
<td>(11)</td>
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$\chi^2$ stat. (41 df): 586

Robustness: Weighting Matrix, Opt-in only, AE only

Extensions: Present Bias, Proportional Cost

Sensitivity: Andrews, Gentzkow, Shapiro '17
Estimation Moments
Distribution of Contribution Rates

Employees in their 1st year of tenure

![Opt-in (0% default) distribution graph]

![Auto-enrollment (3% default) distribution graph]
Distribution of Contribution Rates

Employees in their 1st year of tenure

Opt-in (0% default)

Auto-enrollment (3% default)

Contribution rate (% of salary)

Data Model
Evolution over Tenure

Participation - Opt-in

Participation - 3%

Share at the 3% default
Evolution over Tenure

**Participation - Opt-in**

- Graph showing the percentage of participation over the tenure quarters.

**Participation - 3%**

- Graph showing the participation at the 3% default.

**Share at the 3% default**

- Graph comparing data and model predictions for share at the 3% default.
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Why should we believe the model long-run predictions?

Advantage of structural estimation:
extrapolate to another policy, population, institutional setting, time-frame
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Out-of-Sample validation I: results
Model estimated using the introduction of AE at 3% ...
... predicts response to increasing the default
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Out-of-Sample validation I: results
Model estimated using the introduction of AE at 3% ...
... predicts response to increasing the default

Out-of-Sample validation II: results
Preference estimates from U.S. 401(k) plans ...
... predict the response to a national policy in the U.K.
AE ↑ Lifetime Savings at the Bottom

Typical AE policy at 3% adopted by all employers

Incidence on workers | AE 6pct | AE 10pct | High Present Bias | Low Present Bias | Proportional Cost
AE ↑ Lifetime Savings at the Bottom

Typical AE policy at 3% adopted by all employers

For most people: ↑ saving early-on ↓ saving later in life

BUT large effects at the bottom of the lifetime earnings distrib.
Optimal Policy

Planner selects default to \textbf{maximize social welfare}: (selected default adopted by all employers over a lifetime)

- can be more patient than individuals (\textit{paternalistic})
- can put more weight on low-income (\textit{inequality-averse}) \cite{Saez02}
- treat only a fraction of opt-out cost as welfare relevant \cite{Goldin18}
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Subject to employers’ \textbf{budget constraint}:

\[
\text{Total profits} + \text{Wages} + \text{Matching costs} = \text{Constant}
\]
**Utilitarian Policymaker**

**Utilitarian** policymaker prefers the **opt-in regime** ...

Match and tax incentives ⇒ save more than implied by preference

AE shift cons. even more toward retirement ⇒ ↓ welfare

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Utilitarian Policymaker

Utilitarian lifetime utility decreases for most ...

... but increases at the bottom (ex. 6% AE)
Inequality-Averse/Paternalistic Policymaker

Inequality-averse or paternalistic policymaker sets default near match threshold

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<td>AE 5%</td>
<td>AE 5%</td>
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<tr>
<td>Paternalistic</td>
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Proportional Cost

High Present Bias

Low Present Bias
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Summary of my Findings

People catch up over time ...

- workers undo much of AE positive effect by saving less later on
- AE in current job causes workers to save less at their next opt-in job

... therefore, a $250 opt-out cost can explain default effect

- Not so costly to remain at default because can compensate late

AE increases lifetime welfare/savings only at the bottom

- optimal default is either 0% or employer match threshold
  (depends on social planner's preferences)
What have we learned

Life Cycle Hypothesis (LCH):
- AE effect seen as a major challenge to the LCH
- I show that w/ small friction LCH performs remarkably well

Nudges:
- in a dynamic setting savings nudges are less effective ...
- ... but can still have important distributional effects