Borrowing to Save?
The Impact of Automatic Enrollment on Debt

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Disclaimer

• The views expressed herein are those of the authors and do not reflect the views or position the United States Military Academy, the Department of the Army, the Department of Defense, any agency of the federal government, Harvard, Yale, or the NBER.
Auto-Enrollment in 401(k) is Growing Rapidly in U.S.

401(k) plans offering automatic enrollment

Source: Profit Sharing/401(k) Council of America
AE Increases 401(k) Participation

Fraction enrolled in 401(k)

Tenure (months)

- 0%
- 20%
- 40%
- 60%
- 80%
- 100%

0 6 12 18 24 30 36 42

Hired under automatic enrollment (3% contribution default)
- Hired and observed before automatic enrollment
- Hired under automatic enrollment (6% contribution default)

Source: Beshears, Choi, Laibson, and Madrian (2008)
Where Does 401(k) Savings Increase Come From?

Today’s Research Question

Reduced consumption?
Reduced saving elsewhere?
Increased debt?

Reduced consumption?
Reduced saving elsewhere?
Increased debt?
Setting

- U.S. Army civilian employees
- Before August 1, 2010, opt-in enrollment to Thrift Savings Plan (TSP)
- Starting August 1, 2010, automatic enrollment for new hires only
  - 3% of income default contribution rate
  - 100% in U.S. Treasury fund default
- 1% of income non-contingent employer contribution
- First 3% of income contributed matched at 100% rate, next 2% at 50%
Data

• Monthly payroll records from Dept. of Defense, 2007 – 2015

• Employee demographic info from Army personnel data

• June and December credit records from national credit bureau, 2007 – 2014
Empirical Strategy

• Compare two hire cohorts to each other at equivalent levels of tenure

  – Pre-AE Cohort: August 1, 2009 – July 31, 2010 hires
    n=32,073

  – Post-AE Cohort: August 1, 2010 – July 31, 2011 hires
    n=26,803

• Similar results with an RD strategy (see appendix).
## Demographics

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Avg. starting salary</td>
<td>$56,418</td>
<td>$55,825</td>
<td>-593</td>
<td>0.009</td>
</tr>
<tr>
<td>Avg. deflated starting salary</td>
<td>$56,962</td>
<td>$55,825</td>
<td>-1137</td>
<td>0.000</td>
</tr>
<tr>
<td>Avg. age at hire</td>
<td>39.7</td>
<td>39.9</td>
<td>0.2</td>
<td>0.012</td>
</tr>
<tr>
<td>Male</td>
<td>61.2%</td>
<td>61.5%</td>
<td>0.3%</td>
<td>0.411</td>
</tr>
<tr>
<td>High school only</td>
<td>42.0%</td>
<td>47.1%</td>
<td>5.1%</td>
<td>0.000</td>
</tr>
<tr>
<td>Some college, no degree</td>
<td>13.1%</td>
<td>12.2%</td>
<td>-0.9%</td>
<td>0.001</td>
</tr>
<tr>
<td>Associate degree</td>
<td>5.4%</td>
<td>4.9%</td>
<td>-0.5%</td>
<td>0.012</td>
</tr>
<tr>
<td>Bachelor’s degree</td>
<td>21.9%</td>
<td>18.5%</td>
<td>-3.3%</td>
<td>0.000</td>
</tr>
<tr>
<td>Graduate degree</td>
<td>16.6%</td>
<td>16.2%</td>
<td>-0.4%</td>
<td>0.227</td>
</tr>
<tr>
<td>Has credit report in six months before hire</td>
<td>83.0%</td>
<td>83.2%</td>
<td>0.1%</td>
<td>0.645</td>
</tr>
<tr>
<td>Avg. Vantage Score in six months before hire, conditional on having Vantage Score</td>
<td>686.4</td>
<td>687.4</td>
<td>1.0</td>
<td>0.245</td>
</tr>
<tr>
<td>N</td>
<td>32,073</td>
<td>26,803</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Main Outcomes

• Ratio of cumulative TSP contributions to first-year pay
  – Don’t observe balances, capital gains, withdrawals, loans

• Debt measures:
  – D1: Debt excluding first mortgages and auto debt as a fraction of first-year pay
  – D2: Debt excluding first mortgages as a fraction of first-year pay
  – D3: All debt as a fraction of first-year pay

• “Net Wealth” measures reflect contributions minus debt as a fraction of first year pay

• Vantage credit score
Secured debt in frictionless market

When secured loan originated to purchase asset:

\[ \Delta Durable\ asset + \Delta Financial\ assets = \Delta Debt \]

- Zero immediate net worth impact

- Larger secured loan implies:
  - More valuable asset purchased and/or
  - Fewer financial assets spent down
Why take out a larger loan?

- Feel wealthier

- A loan from the TSP eases down payment constraint
  - Ex: $1 of additional down payment in an FHA loan allows $27.57 larger mortgage with 96.5% LTV cap

- More liquid assets spent down in the past
Larger loan: Implications for future net worth

• Negative effect through higher interest costs

• Negative effect if asset depreciation is higher

• Positive effect if asset appreciation is higher

• Positive effect through “forced savings” channel
Main Outcomes

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• Vantage credit score
TSP Contributions (employer + employee) to Pay

\[ y_{i\tau} = \sum_s [I(\tau \in T_s)(\alpha_s + \beta_s X_i + \gamma_s PostAE_i)] + \epsilon_{i\tau} \]

Tenure (months)

1 to 6
7 to 12
13 to 18
19 to 24
25 to 30
31 to 36
37 to 42
43 to 48
49 to 53

0
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08

5.8%
Debt excluding auto loans and first mortgages divided by pay

\[ y_{i\tau t} = \alpha_i + \eta_t + \sum_{\tau} \left[ I(t \in \tau)(\alpha_s + \beta_\tau + \gamma_\tau PostAE_i) \right] + \epsilon_{i\tau} \]

- AE effects on debt components in Table 3.
  - No effects on balances in third party collections
Auto loans divided by pay

\[ y_{i\tau t} = \alpha_i + \eta_t + \sum_{\tau} [I(t \in \tau)(\alpha_s + \beta_{\tau} + \gamma_{\tau}PostAE_i)] + \epsilon_{i\tau} \]
First mortgage divided by pay

\[ y_{i\tau t} = \alpha_i + \eta_t + \sum_{\tau} [I(t \in \tau)(\alpha_s + \beta_\tau + \gamma_\tau PostAE_i)] + \epsilon_{i\tau} \]
### Debt and “net wealth” effects

<table>
<thead>
<tr>
<th>Effect at 43-48 months of tenure</th>
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<tbody>
<tr>
<td>D1</td>
<td>0.009</td>
<td>(0.009)</td>
</tr>
<tr>
<td>D2</td>
<td>0.028*</td>
<td>(0.011)</td>
</tr>
<tr>
<td>D3</td>
<td>0.102*</td>
<td>(0.041)</td>
</tr>
</tbody>
</table>

Cumulative employee TSP contributions: 0.026** (0.002)
\[ y_{i\tau t} = \alpha_i + \eta_t + \sum_{\tau} [I(t \in \tau)(\alpha_s + \beta_\tau + \gamma_\tau PostAE_i)] + \epsilon_{i\tau} \]
Conclusions

• At four years of tenure, automatic enrollment increases cumulative employee plus employer contributions by 5.8% (se 0.2%) of starting salary on average

• The increase in debt excluding auto loans and first mortgages is not statistically significant

• Auto loans and first mortgages increase

• No evidence of increased financial distress as measured by Vantage scores and collections