Figure 1
Personal Saving and Saving Incentive Contributions as a Percentage of GDP, 1980–1995

Sources: National Income and Product Accounts and the references in footnote 1.
Figure 5a. Private Pension Contributions

Source: statistics computed by the author(s)
Figure 6b. Ratio of Private and Total Pension Contributions to Wage and Salary Earnings

Source: statistics computed by the author(s)
Effects on contributions (unconditional)

Source: Duflo et al. (2006)
Table 8: Saver's Credit Parameters

<table>
<thead>
<tr>
<th>Credit Rate</th>
<th>Equivalent Match Rate</th>
<th>Married Filing Jointly AGI range</th>
<th>Head of Household AGI range</th>
<th>Single and others AGI range</th>
</tr>
</thead>
<tbody>
<tr>
<td>t</td>
<td>t/(1-t)</td>
<td>$0-$30,000</td>
<td>$0-$22,500</td>
<td>$0-$15,000</td>
</tr>
<tr>
<td>50%</td>
<td>100%</td>
<td>$30,001-$32,500</td>
<td>$22,501-$24,375</td>
<td>$15,001-$16,250</td>
</tr>
<tr>
<td>20%</td>
<td>25%</td>
<td>$32,501-$50,000</td>
<td>$24,376-$37,500</td>
<td>$16,251-$25,000</td>
</tr>
<tr>
<td>10%</td>
<td>11.1%</td>
<td>$50,001+</td>
<td>$37,501+</td>
<td>$25,001+</td>
</tr>
<tr>
<td>0%</td>
<td>0%</td>
<td>$50,001+</td>
<td>$37,501+</td>
<td>$25,001+</td>
</tr>
</tbody>
</table>

Saver's credit is a non-refundable federal income tax credit proportional to the sum of IRAs and 401(k)s contributions up to $2,000 of contributions (per spouse for married). AGI = gross income - 401k - Traditional IRA

Source: Duflo et al. (2006)
Figure 4
Percent X-IRA Contributors by $250 AGI Bands

Source: Duflo et al. (2006)
Effects of Credit vs Match on X-IRA Take-up

Source: Duflo et al. (2006)
Automatic enrollment effect

Automatic enrollment dramatically increases participation.

401(k) participation by tenure at firm: Company B

Fraction of employees ever participated

Tenure at company (months)

Source: Madrian and Shea (2001)
Automatic enrollment effect

Employees enrolled under automatic enrollment cluster at the default contribution rate.

Distribution of contribution rates: Company B

Source: Madrian and Shea (2001)
Active decision effect on participation

401(k) participation increases substantially when employees are not allowed to be passive about savings.

Source: courtesy of David Laibson
Employer match threshold and contribution rates

Changing the match threshold caused employees to slowly move from the old threshold to the new threshold.

401(k) contribution rate response to match threshold change: Company G

Source: courtesy of David Laibson
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.

Source: courtesy of David Laibson
## Consequences of the two regimes

<table>
<thead>
<tr>
<th>Balances in employer stock</th>
<th>Default</th>
<th>No Default</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Default</strong></td>
<td>ES</td>
<td>Default</td>
</tr>
<tr>
<td>Own Balance in Employer Stock</td>
<td>24%</td>
<td>20%</td>
</tr>
<tr>
<td>Matching Balance in Employer Stock</td>
<td>94%</td>
<td>27%</td>
</tr>
<tr>
<td>Total Balance in Employer Stock</td>
<td>56%</td>
<td>22%</td>
</tr>
</tbody>
</table>

Source: courtesy of David Laibson
Cash Distributions

What happens to savings plan balances when employees leave their jobs?

- Employees can request a cash distribution or roll balances over into another account
  - Balances >$5000: default leaves balances with former employer
  - Balances <$5000: default distributes balances as cash transfer
- Vast majority of employees accept default (Choi et al. 2002, 2004a and 2004b)
- When employees receive small cash distributions, balances typically consumed (Poterba, Venti and Wise 1998)

Source: courtesy of David Laibson
Post-Retirement Distributions

- Social Security
  - Joint and survivor annuity (reduced benefits)
- Defined benefit pension
  - Annuity
  - Lump sum payout if offered
- Defined contribution savings plan
  - Lump sum payout
  - Annuity if offered

Source: courtesy of David Laibson
Defined Benefit Pension Annuitization

- Annuity income and economic welfare of the elderly
  - Social Security replacement rate relatively low on average
  - 17% of women fall into poverty after the death of their spouse (Holden and Zick 2000)

- For married individuals, three distinct annuitization regimes
  - Pre-1974: no regulation
  - ERISA I (1974): default joint-and-survivor annuity with option to opt-out
  - ERISA II (1984 amendment): default joint-and-survivor annuity, opting out required notarized permission of spouse

Source: courtesy of David Laibson
## Impacts of Government Policies on Savings for Active vs. Passive Savers

<table>
<thead>
<tr>
<th></th>
<th>Automatic Contribution</th>
<th>Price Subsidy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active Savers</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Passive Savers</td>
<td>Yes</td>
<td>Uncertain</td>
</tr>
<tr>
<td>Data</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Source: Chetty et al. QJE’14
Event Study around Switches to Firm with >3% Increase in Employer Pension Rate

Individuals with Positive Pension Contributions or Savings Prior to Switch

Source: Chetty et al. QJE'14

Δ Employer Pensions = 5.65
Δ Total Pensions = 4.86
Event Study around Switches to Firm with >3% Increase in Employer Pension Rate

Individuals with Positive Pension Contributions or Savings Prior to Switch

Source: Chetty et al. QJE’14

Δ Employer Pensions = 5.65
Δ Total Savings = 4.44
Fraction at Corner around Switches to Firm with >3% Increase in Employer Pension Rate

\[ \Delta \text{Zero Pension Contrib.} = 1.4\% \]

Source: Chetty et al. QJE'14
Fraction at Corner around Switches to Firm with >3% Increase in Employer Pension Rate

Δ Zero Pension Contrib. = 1.4%
Predicted = 28.4%

Source: Chetty et al. QJE'14
Mandated Savings (M) Around Eligibility Threshold in 1998

Source: Chetty et al. QJE'14
Effect on Mandate on Private Savings: Threshold Approach

Percent with Non-Employer Savings > 1962 DKr

Empirical Predicted with 100% Pass-Through

Income (DKr 1000s)

34 36 38 40 42 44

Private Savings

Pass-Through Rate: $\beta = 117\%$

(27%)

Source: Chetty et al. QJE’14

Empirical Predicted with 100% Pass-Through

Source: Chetty et al. QJE’14
Subsidy for Capital Pensions in 1999

Note: $1 ≈ 6 DKr

ΔSubsidy = -14%

Source: Chetty et al. QJE'14
Impact of Subsidy Reduction On Individual Capital Pension Contribs.

DD Impact Estimate: \( \beta = -2439.2 \) 
(97.65)

Source: Chetty et al. QJE'14
Impact of Capital Pension Subsidy Reduction On Annuity Pension Contributions

Source: Chetty et al. QJE’14

Annuity Pension Offset: $\beta = 56\%$

(4.7%)
Impact of Capital Pension Subsidy Reduction On Total Pension Contributions

<table>
<thead>
<tr>
<th>Year</th>
<th>Subsidy for Capital Pension Reduced</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>3000</td>
</tr>
<tr>
<td>1996</td>
<td>4000</td>
</tr>
<tr>
<td>1997</td>
<td>5000</td>
</tr>
<tr>
<td>1998</td>
<td>6000</td>
</tr>
<tr>
<td>1999</td>
<td>7000</td>
</tr>
<tr>
<td>2000</td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td></td>
</tr>
</tbody>
</table>

Source: Chetty et al. QJE'14
Change in Total Pension Contributions

Change in Total Pensions (DKr)
Income Relative to Top Tax Cutoff (DKr)

Change in Slope at Cutoff = \(-9.9/1000\) (1.2)

Total Pensions Pass-Through Rate
\(\Delta \text{Tot. Pens.} / \Delta \text{Cap. Pens.}: \beta = 0.48\) (0.05)

Source: Chetty et al. QJE'14
Change in Taxable Savings

Change in Taxable Savings (DKr)

Income Relative to Top Tax Cutoff (DKr)

<table>
<thead>
<tr>
<th>Change in Taxable Savings (DKr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
</tr>
<tr>
<td>25000</td>
</tr>
<tr>
<td>50000</td>
</tr>
<tr>
<td>75000</td>
</tr>
<tr>
<td>-25000</td>
</tr>
<tr>
<td>-50000</td>
</tr>
<tr>
<td>-75000</td>
</tr>
</tbody>
</table>

Crowd-Out of Pension Contribution

ΔTaxable Saving / Δ Pension Contrib.: 

$\beta = -1.47$ (0.67)

Source: Chetty et al. QJE’14
Effects of match rates on X-IRA participation

![Bar chart showing the effects of match rates on participation rate.](source)

Source: Duflo et al. QJE'06
### Table 2: Effects of the experiment on X-IRA behavior

<table>
<thead>
<tr>
<th></th>
<th>0% match</th>
<th>20% match</th>
<th>50% match</th>
<th>20% - 0%</th>
<th>50% - 20%</th>
<th>50% - 0%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opened an X-IRA (%)</td>
<td>2.90</td>
<td>7.72</td>
<td>13.98</td>
<td>4.82</td>
<td>6.26</td>
<td>11.07</td>
</tr>
<tr>
<td></td>
<td>(0.24)</td>
<td>(0.40)</td>
<td>(0.50)</td>
<td>(0.46)</td>
<td>(0.65)</td>
<td>(0.56)</td>
</tr>
<tr>
<td>Amount contributed ($)</td>
<td>$22</td>
<td>$85</td>
<td>$155</td>
<td>$63</td>
<td>$70</td>
<td>$133</td>
</tr>
<tr>
<td>(unconditional)</td>
<td>3</td>
<td>6</td>
<td>7</td>
<td>7</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>Amount contributed ($)</td>
<td>$765</td>
<td>$1,102</td>
<td>$1,108</td>
<td>$337</td>
<td>$6</td>
<td>$343</td>
</tr>
<tr>
<td>(conditional)</td>
<td>84</td>
<td>55</td>
<td>34</td>
<td>102</td>
<td>62</td>
<td>85</td>
</tr>
<tr>
<td>Amount contributed+match</td>
<td>$22</td>
<td>$99</td>
<td>$222</td>
<td>$77</td>
<td>$124</td>
<td>$200</td>
</tr>
<tr>
<td>(unconditional)</td>
<td>3</td>
<td>7</td>
<td>10</td>
<td>7</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>Amount contributed+match</td>
<td>$765</td>
<td>$1,280</td>
<td>$1,591</td>
<td>$515</td>
<td>$310</td>
<td>$826</td>
</tr>
<tr>
<td>(conditional)</td>
<td>84</td>
<td>60</td>
<td>44</td>
<td>109</td>
<td>74</td>
<td>103</td>
</tr>
</tbody>
</table>

Source: Duflo et al. QJE'06
Figure 1B
Cumulated Distributions of Contributions, Non Married Taxpayers

Source: Duflo et al. QJE'06
Withdrawal activity: fraction contributors after 3 months

Source: Duflo et al. QJE'06

Income Relative to Top Tax Cutoff (DKr)

Source: Chetty et al. QJE'14
Impact of Capital Pension Subsidy Reduction On Total Pension Contributions

Source: Chetty et al. QJE'14
Total Pensions vs. Income:
Before and After Reduction in Capital Pension Subsidy

Source: Chetty et al. QJE'14
Total Pensions vs. Income:
Before and After Reduction in Capital Pension Subsidy

Source: Chetty et al. QJE'14
Change in Total Pension Contributions

Change in Total Pensions (DKr)

Income Relative to Top Tax Cutoff (DKr)

-2000  -1500  -1000  -500  0  25000  50000  75000

-75000 -50000 -25000  0  25000  50000  75000

Change in Slope at Cutoff = - 9.9 / 1000 (1.2)

Total Pensions Pass-Through Rate
Δ Tot. Pens. / Δ Cap. Pens.: β = 0.48 (0.05)

Source: Chetty et al. QJE'14
Change in Taxable Savings

Change in Taxable Savings (DKr)

Income Relative to Top Tax Cutoff (DKr)

Crowd-Out of Pension Contribution
\[ \Delta \text{Taxable Saving} / \Delta \text{Pension Contrib.} : \beta = -1.47 \quad (0.67) \]

Change in Slope at Cutoff = 5.9 / 1000 (2.8)

Source: Chetty et al. QJE'14
Change in Fraction with Above-Median Savings

Income Relative to Top Tax Cutoff (DKr)

Change in % with Taxable Savings Above Median

-1.25
-0.75
-0.25
0.25
0.75
1.25

-75000
-50000
-25000
0
25000
50000
75000

Crowd-Out of Pension Contribution

\[ \frac{\Delta \text{Taxable Saving}}{\Delta \text{Pension Contrib.}}: \beta = -0.98 (0.22) \]

Ch. in Slope at Cutoff = 0.019% / 1000 (0.004%)

Source: Chetty et al. QJE'14
Consider impacts of a DKR 1000 increase in pre-tax income

- **DKR 10.0** less contributed to retirement accounts when subsidy fell
- MTR of 60% → disposable income rises by $0.4 \times 10.0 = \text{DKR 4.0}$
- **DKR 3.92** of this is deposited in taxable savings
- **DKR 0.08** is consumed → net saving falls by DKR 0.08

→ 98% of the increase in pension contributions due to subsidies is financed by offsetting reductions in savings in taxable accounts

- Based on this estimate, we calculate that each DKr 1 of tax expenditure on subsidies raises total saving by less than 1 cent

Source: Chetty et al. QJE'14
Heterogeneity in Response to Capital Pension Subsidy by Wealth/Income Ratio

Wealth/Income Ratio in 1998

% Exiting Capital Pension and Raising Annuity in 1999

Source: Chetty et al. QJE'14

\[ \beta = 7.1 \pm 0.4 \]

Source: Chetty et al. QJE'14
Change in MPS at cutoff = 0.6%

Source: Chetty et al. QJE'14
Change in Marginal Propensity to Save in Annuity vs. Capital Accounts at Top Tax Cutoff by Year

Diff-in-Diff: $\mu_{MPS} = -0.021^{(0.002)}$

Source: Chetty et al. QJE’14
Change in Marginal Propensity to Save in Annuity vs. Capital Accounts at Top Tax Cutoff by Year

Source: Chetty et al. QJE’14

Crowd-out: $\phi^{MPS} = 47.1\% (5.6\%)$
Use change in capital pension subsidy as an instrument for total pension contributions

- $1 reduction in capital pensions $\rightarrow$ 45 cent reduction in total pensions

- Does this 45 cents go into consumption or saving in taxable accounts?
Change in Marginal Propensity to Save in Retirement vs. Non-Retirement Accounts at Top Tax Cutoff by Year

Source: Chetty et al. QJE'14
Difference in MPS Above vs. Below Top Tax Cutoff

Retirement Accounts
Taxable Savings Accounts

Change in Marginal Propensity to Save in Retirement vs. Non-Retirement Accounts at Top Tax Cutoff by Year

Crowd-out: $\phi^L = 120\%$ (59%)
| Source: Chetty et al. QJE'14 |

| Estimates of Crowd-out Induced by Subsidy Change Based on Changes in Marginal Propensity to Save |

<table>
<thead>
<tr>
<th></th>
<th>Annuity Contrib.</th>
<th>Total Pension Contrib.</th>
<th>Taxable Saving</th>
<th>Trimmed Taxable Saving</th>
<th>Taxable Saving Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital Pension Contrib.</td>
<td>-0.471 (0.056)</td>
<td>0.529 (0.056)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Pension Contrib.</td>
<td></td>
<td>-1.200 (0.588)</td>
<td>-0.984 (0.267)</td>
<td>-0.994 (0.215)</td>
<td></td>
</tr>
<tr>
<td>No. of Obs.</td>
<td>7,026,187</td>
<td>7,026,187</td>
<td>7,026,187</td>
<td>7,026,187</td>
<td>7,026,187</td>
</tr>
</tbody>
</table>