

Default Effects

EC895; Fall 2022

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Our Outline:

- (1) The Standard Model
- (2) 401(k) Savings: Introduction
- (3) Documenting Default Effects
- (4) Facts About Household Finance

Exponential discounting: When a person receives utility at different points in time, she seeks to maximize her *intertemporal utility*.

$$U \equiv u_1 + \delta u_2 + \delta^2 u_3 + \dots + \delta^{T-1} u_T$$

or put another way:

$$= \sum_{t=1}^T \delta^{t-1} u_t.$$

- u_t is her **instantaneous utility** in period t (or her "well-being" in period t).
- δ is her **discount factor**, where $\delta \in (0, 1]$.

401(k) savings is the most common voluntary savings vehicle in the US. In brief:

- Purpose is to let people set aside money for retirement
- Free choice of contribution rate, and (mostly free choice) over asset allocation
- Generally large penalties for early withdrawal
- Employer sometimes pays matching contribution up to a threshold.
- Tax deferred: employee pays (typically lower) marginal tax rate during retirement

Patterns of 401(k) Investment (Choi, Laibson, Madrian, and Metrick, 2005)

- Two thirds of employees believe that they are saving too little.
- A quarter of these intend to raise their savings in the next 2 months.
- Almost nobody follows through.
- Reported undersavers have low savings rates.
- (Similar patterns in other surveys)

Should people save more?

Can we trust self-reported desires / interests?

- Consumption drops discretely at retirement, which might suggest under-saving
- But it's hard to show that people undersave (see [Erik Hurst's work](#))
- Increased saving from automatic enrollment may come from more debt rather than from reduced consumption (Beshears, Choi, Laibson, Madrian, and Skimmyhorn, 2017)

Costs of Non-Participation

- Foregone tax benefits
- Foregone employer match
- (Implicitly) foregone consumption smoothing

There are a set of typically applied tools that employers use to increase savings in 401ks.

- Financial education (we'll discuss this more later)
- Vary employer matching contribution
- Provide additional (or "better") choices

The Power of Suggestion: Madrian and Shea (2001)

Explores the impact of automatic enrollment on 401(k) savings behavior:

- 401(k) participation (yes/no)
- Contribution rates and asset allocation

This was a tremendously successful paper. **Why?**

I conjecture all of the following played a role:

- Concerns an *important* economic decision
- There are potentially large welfare effects
- Standard economics approaches were unsuccessful in raising savings
- Standard economics approaches have a hard time explaining default effects

In this sense, this paper provides a useful recipe for your own research and I encourage you to think about this type of environment.

Madrian et al. 2001 Specifics

Data came from a large, publicly traded Fortune 500 health care company. Employees had flexibility and could enroll in the 401(k) savings plan any day by:

- Filling out enrollment form, or
- calling the 401(k) record keeper.

⇒ Small direct transaction costs of starting/changing 401(k) allocation

Company had a 50% matching contribution for first 6%. (This is modal policy in "real world".)

- E.g., if an employee chooses 4%, the company pays an additional 2%. If an employee chooses 10%, the company pays an additional 3%.
- Employees first eligible after one year of employment (before change).

The authors found a discontinuity of 401(k) plan **defaults** based on date of hire:

Cohort 1 was hired April 1996 to March 1997:

- Default: *no* enrollment
- 1-year wait period for eligibility

Cohort 2 was hired April 1997 to March 1998

- Default: *no* enrollment
- Wait period until April 1998

Cohort 3 hired April 1998 to March 1999

- Default: enrollment
- 3 percent contribution rate
- 100 percent invested in money market fund (*Editorial comment: gross*)

TABLE II
EMPLOYEE COHORTS FOR COMPARATIVE ANALYSIS

	OLD	WINDOW	NEW
Dates of hire ^a	4/1/1996 to 3/31/1997	4/1/1997 to 3/31/1998	4/1/1998 to 3/31/1999
First eligible to participate in 401(k) plan	One year after date of hire	4/1/1998	Date of hire
First eligible for employer match	One year after date of hire	One year after date of hire	One year after date of hire
Automatically enrolled in 401(k) plan	No	No	Yes
Default contribution rate	None	None	3 percent
Default fund allocation	None	None	Money market fund

Note: 401(k) plans are otherwise identical.

TABLE I
401(k) PLAN FEATURES BY PLAN DATE

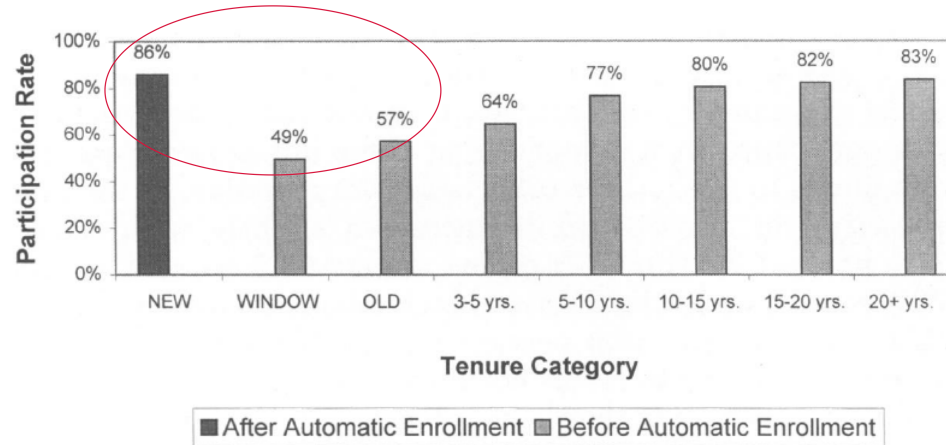
	Before 4/1/1998	After 4/1/1998
<i>Eligibility</i>		
Eligible employees	All except union and temporary employees	All except union and temporary employees
First eligible	After one year of employment	Immediately upon hire
Employer match eligible	After one year of employment	After one year of employment
<i>Contributions</i>		
Employee contributions	1 percent to 15 percent of compensation ^a	1 percent to 15 percent of compensation ^a
Employer match	50 percent of employee contribution up to 6 percent of compensation ^a	50 percent of employee contribution up to 6 percent of compensation ^a
<i>Vesting</i>		
Vesting of employee contributions	Immediate	Immediate
Vesting of employer contributions	2-year cliff	2-year cliff
<i>Participation</i>		
Default participation decision	No	Yes
Default contribution rate	None	3 percent of compensation
Default fund allocation	None	Money market fund

Balance check: no large differences across cohorts

TABLE III
COMPARISON OF WORKER CHARACTERISTICS

	Study company				
	OLD cohort	WINDOW cohort	NEW cohort	All workers	U. S. workforce
<i>Average age (years)</i>	37.2	36.0	34.5	37.6	38.8
<i>Gender</i>					
Male	25.4%	23.9%	22.0%	22.1%	53.1%
Female	74.6	76.1	78.0	77.9	46.9
<i>Ethnicity^a</i>					
White	77.1%	71.7%	68.8%	75.1%	74.6%
Black	12.5	16.8	18.9	14.1	11.3
Hispanic	7.1	8.2	6.7	6.6	9.5
Other	3.3	3.4	5.6	4.2	4.6
<i>Hours</i>					
Full-time (HPW > 35)	96.7%	95.6%	95.8%	94.6%	78.8%
Part-time (HPW < 35)	3.3	4.4	4.2	5.4	21.2
<i>Compensation^b</i>					
Mean	\$41,970	\$38,424	\$34,264	\$40,180	\$28,248
Median	\$33,470	\$30,530	\$26,519	\$31,333	\$20,400
<i>Geography</i>					
East	17.0%	13.7%	16.9%	21.7%	18.9%
Midwest	38.2	34.9	31.0	32.8	24.1
South	28.2	33.0	32.0	31.3	34.7
West	14.6	16.1	19.6	13.1	22.4
Other ^c	2.0	2.3	0.6	1.1	—
<i>Number of employees</i>	N = 3286	N = 4257	N = 5812	N = 29,267	—

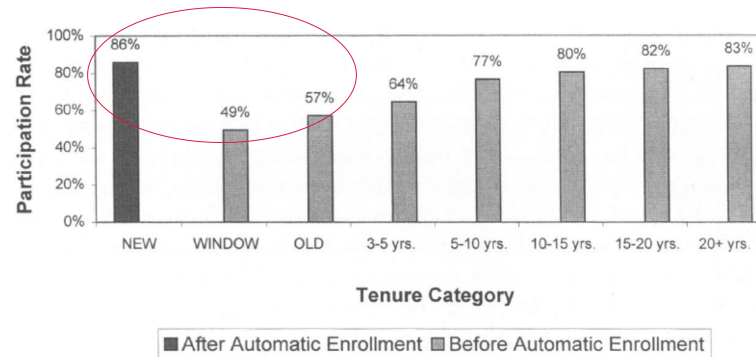
Participation rates in 401(k) in June 1999



Note that prior to automatic enrollment, participation increases with tenure.

- But highest participation rate observed for employees hired under automatic enrollment

Differences look even more stark when accounting for differences in compensation (pay).



Majority of participants keep the default contribution rate

- WINDOW: 63% are at 0 percent (default), 4% at 3 percent
- NEW: 14% are at 0 percent, 65% are at 3 percent (default)

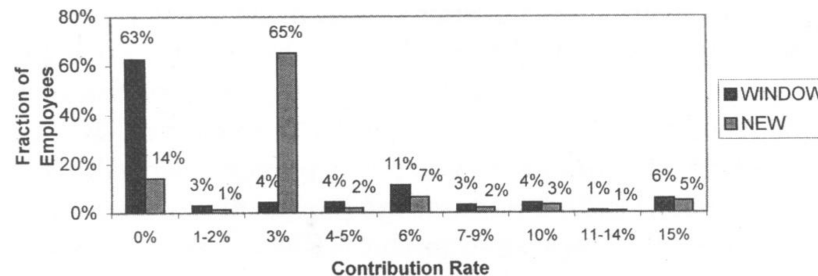


FIGURE IIc
Distribution of 401(k) Contribution Rates for the WINDOW and NEW Cohorts Including Nonparticipation

Share of assets invested in stocks varies dramatically by cohort.

- OLD: 75%; WINDOW: 73%; NEW: 16%

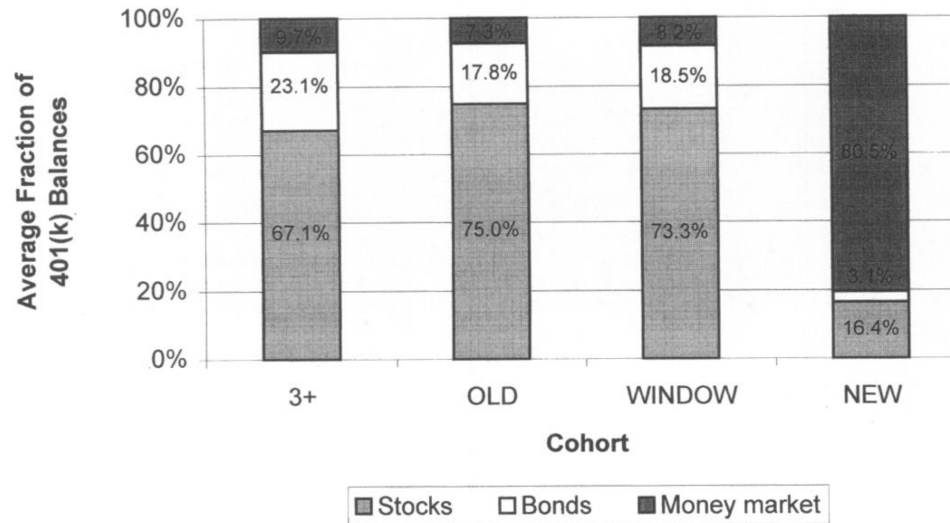


FIGURE III
401(k) Asset Allocation by Cohort

40 to 50 percent of individuals follow the default plan

[(1a)] 401(k) participation rate (yes/no)

[(1b)] Contribution rate and asset allocation

"Suggested choice" not very attractive unless default

[(2a)] WINDOW cohort resembles OLD cohort.

[(2b)] WINDOW cohort does *not* follow NEW cohort default (which could be have been perceived as choice suggested by the company).

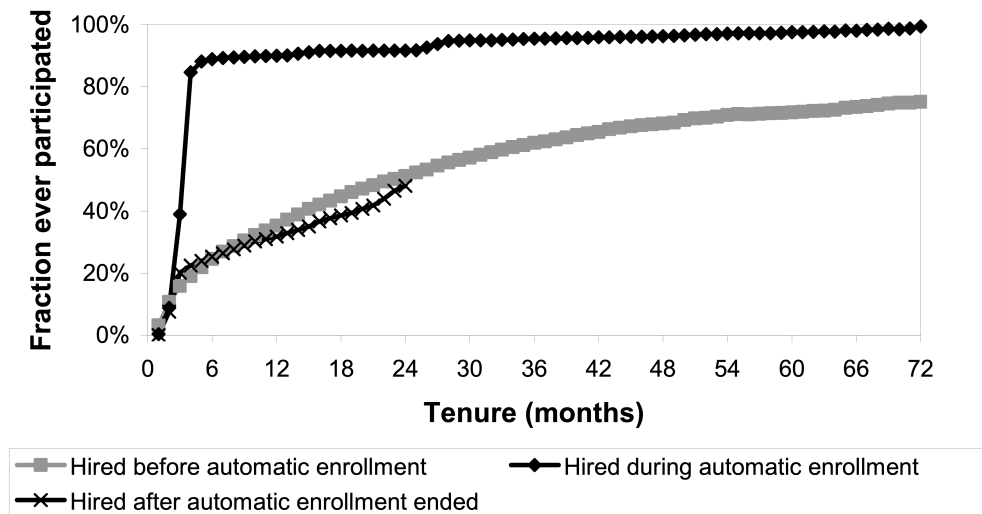
Large effects for unlikely participants in old plan (e.g., lower-income employees and minorities).

Effect of default falls over time, but is still large after two years.

Evidence from another company (B). This company switched from OLD to NEW to OLD; shows previous results are very robust.

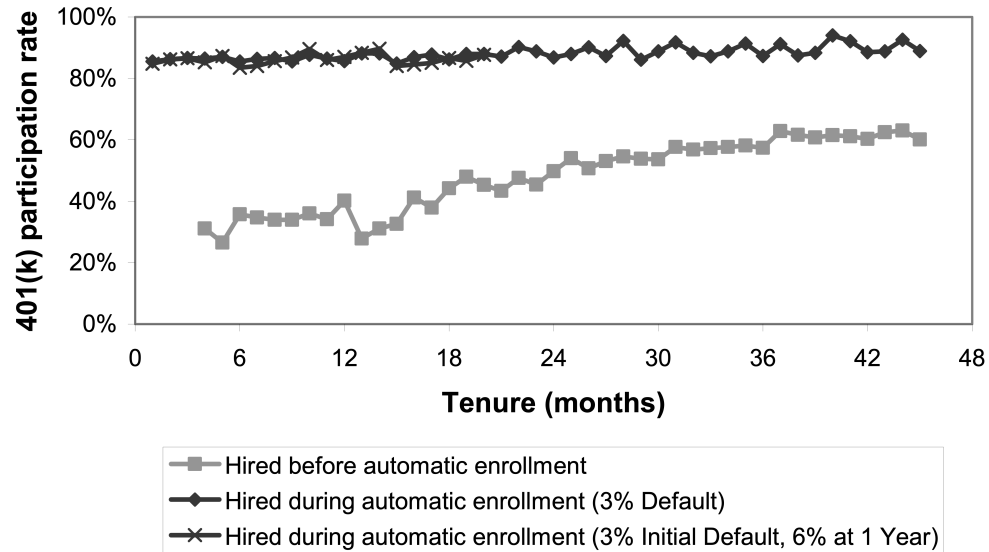
See Choi, Laibson, Madrian, et al. (2005).

Figure 1A. 401(k) Participation by Tenure: Company B



Evidence from **another** company (C). Company C switched from OLD to NEW to NEW2.

Figure 1B. 401(k) Participation by Tenure: Company C



Is automatic enrollment optimal?

Reasonable to argue that default effects are not informative of optimal saving plans. Need evidence showing

- OLD cohort under-saving; but it's possible that
- NEW cohort **over**-saving

What we do know. Automatic enrollment:

- Lowers contribution rate, conditional on participating. That is, it seems to make some people save *less*, and
- May even decrease overall savings after a few years.

These effects largely due to:

1. Lower contribution rates due to default
2. More conservative asset allocations

from Carroll, Choi, Laibson, Madrian, and Metrick (2009)

Setting: large Fortune-500 Company in the financial services industry. Comparison between:

- Before: active choice within 30 days of hire (paper-based)
- After: no-enrollment default (phone-based)

TABLE I
401(K) PLAN FEATURES BY EFFECTIVE DATE

	Effective January 1, 1997	Effective November 23, 1997
Eligibility		
Eligible employees	U.S. employees, age 18+	U.S. employees, age 18+
First eligible	Full-time employees eligible upon hire; part-time employees must accrue 1,000 hours in one year	Full-time employees eligible upon hire; part-time employees must accrue 1,000 hours in one year
Employer match eligible	Immediately upon plan eligibility	Immediately upon plan eligibility
Enrollment	First thirty days of employment or January 1 of succeeding calendar years	Daily
Contributions		
Employee contributions ^a	Up to 17% of compensation	Up to 17% of compensation
Guaranteed employer match	50% of employee contribution	50% of employee contribution
Additional possible employer match	Up to 100% (50% for bonus-eligible employees); rate depended on company profitability	Up to 100% (50% for bonus-eligible employees); rate depended on company profitability ^b
Employer match restrictions	Match on the lesser of before-tax employee contribution or 5% of compensation; match invested in employer stock	Match on the lesser of before-tax employee contribution or 5% of compensation; match invested in employer stock
Employer match vesting	Immediate	Immediate
Other		
Loans	Not available	Available; two maximum
Hardship withdrawals	Available	Available
Investment choices	Four options; employer stock also available, but only for after-tax contributions and employer match	Six options + employer stock (available for before- and after-tax contributions)

^aTotal employee contributions within each year were capped by federal law at \$9,500 (1997), \$10,000 (1998–99), and \$10,500 (2000–01).

^bActual discretionary match rates were 20% (1995), 20% (1996), 100% (1997), 100% (1998), 27% (1999), 33% (2000), 0% (2001).



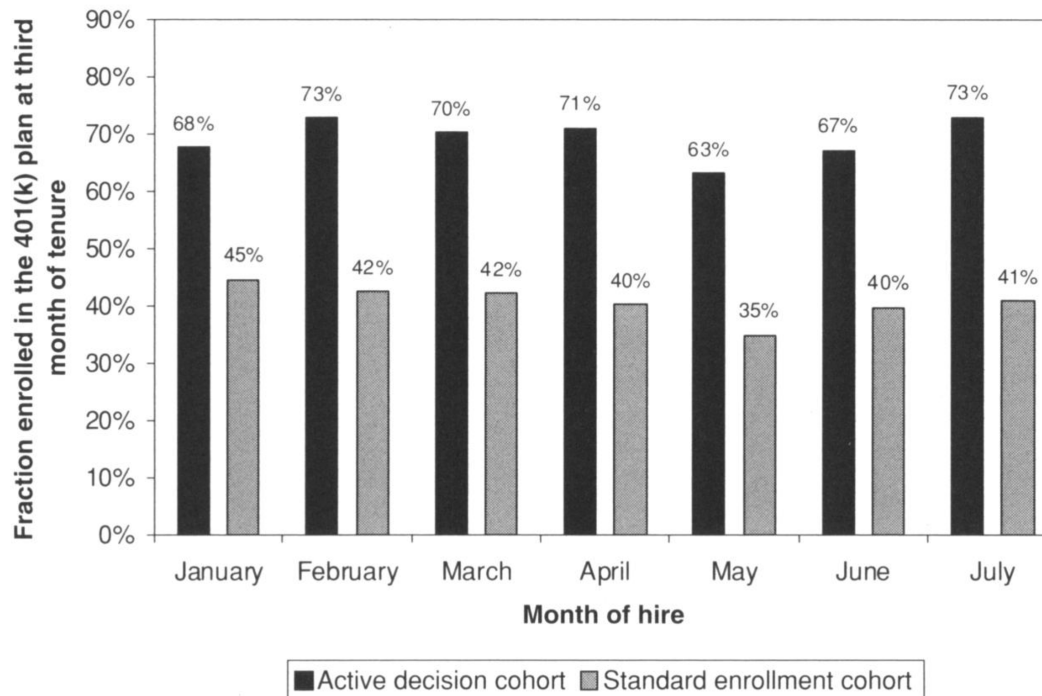
TABLE II
COMPARISON OF WORKER CHARACTERISTICS

	Study company			
	Active decision cohort on 12/31/98	Standard enroll. cohort on 12/31/99	All workers on 12/31/99	U.S. workforce (3/98 CPS)
Average age (years)	34.7	34.1	40.8	38.8
Sex				
Male	47.6%	42.0%	44.7%	53.1%
Female	52.4%	58.0%	55.3%	46.9%
Marital status				
Single	41.4%	49.3%	32.2%	39.0%
Married	56.0%	49.7%	66.8%	61.0%
Compensation				
Avg. monthly base pay	\$3,043	\$2,869	\$4,367	—
Median monthly base pay	\$2,666	\$2,513	\$3,664	—
Avg. annual income ^a	\$35,381	\$33,197	\$50,414	\$32,414
Median annual income ^a	\$31,013	\$29,239	\$40,965	\$24,108
Geography				
East	13.2%	11.1%	15.0%	18.9%
Midwest	34.3%	37.6%	32.2%	24.1%
South	37.7%	38.9%	37.7%	34.7%
West	14.7%	12.3%	15.0%	22.4%
Number of employees	2,231	2,349	46,944	—

Large, significant effects of active choice

ACTIVE: 69%. OLD2 41% (at month 3)

- Compare to NEW (86%) and OLD (57%) in MS01 after > 6 months. Does not depend on month of hire (see below)



Active choice increases (unconditional) contribution rate.

- ACTIVE: 4.8%. OLD2: 3.5%
- (Note that longitudinal data becomes only available after 9 months).

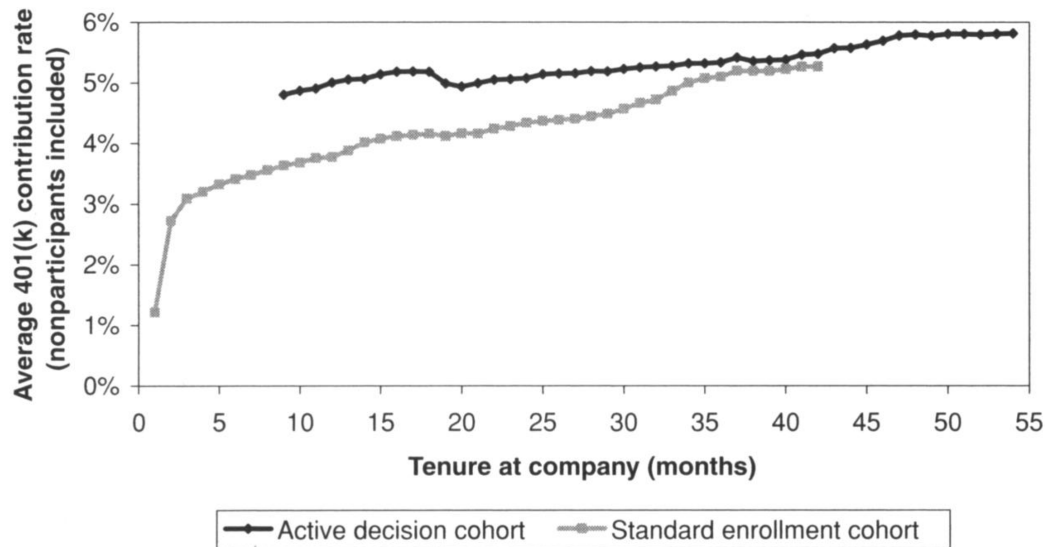
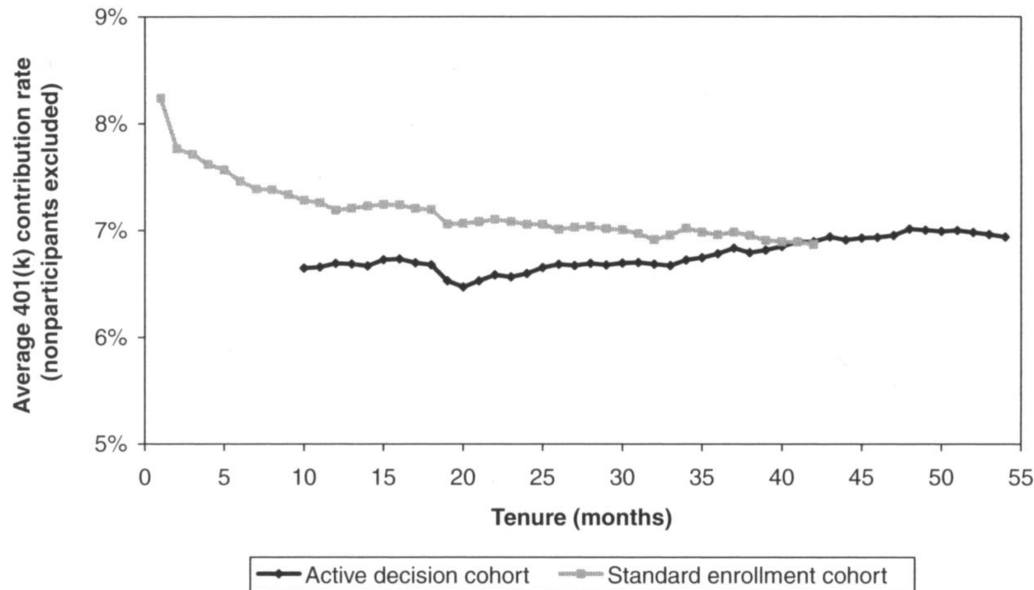


FIGURE III

Lower conditional contribution rate under active choice

- ACTIVE:6.8%. OLD2: 7.5% (at month 9)
- Obvious selection effect at play: marginal individuals have lower contribution rates.



ACTIVE resembles NEW and markedly differs from OLD and OLD2.

- Suggests Madrian and Shea (2001) default alleviated under-saving.

Effect of default mostly disappears after three years.

- But no catch-up in levels
- Moreover, individuals change employers frequently in these datasets.

Evidence from privatization of Social Security in Sweden in 2000

- 456 funds, 1 default fund (chosen by government)

In year 2000:

- Choice of default is discouraged with massive marketing campaign. Yet among new participants, 43.3 percent chooses default

In year 2003:

- End of marketing campaign. Among new participants, 91.6 percent chooses default
- Portfolio actively chosen in 2000 does *worse* than default (see Table 1).

Active choice less attractive if consumers are less financially sophisticated.

- See also Bhargava, Loewenstein, and Sydnor (2015a)
- Handel (2013a): another setting in which active choice seems to lower welfare.

Punchline: Lots of interesting open questions about active choice vs defaults.

from Chetty, Freidman, Leth-Petersen, Nielsen, and Olsen (2014)

Okay, employees largely follow default 401(k) plans.

- What if they compensate changed savings through other assets? E.g., savings in bank accounts, stock participation, etc. And what happens to credit card debt?

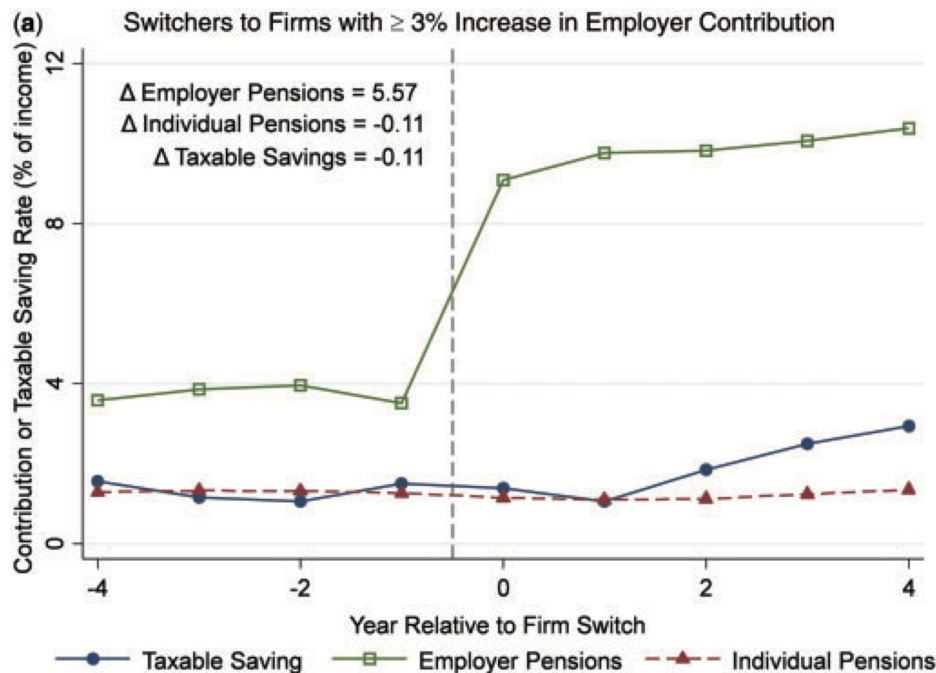
To answer such questions, we would need comprehensive asset information

- Only partial, suggestive information in Madrian and Shea (2001)
- No such information in Carroll, Choi, Laibson, et al. (2009)

Chetty et al. (2014): access to comprehensive data from Denmark including:

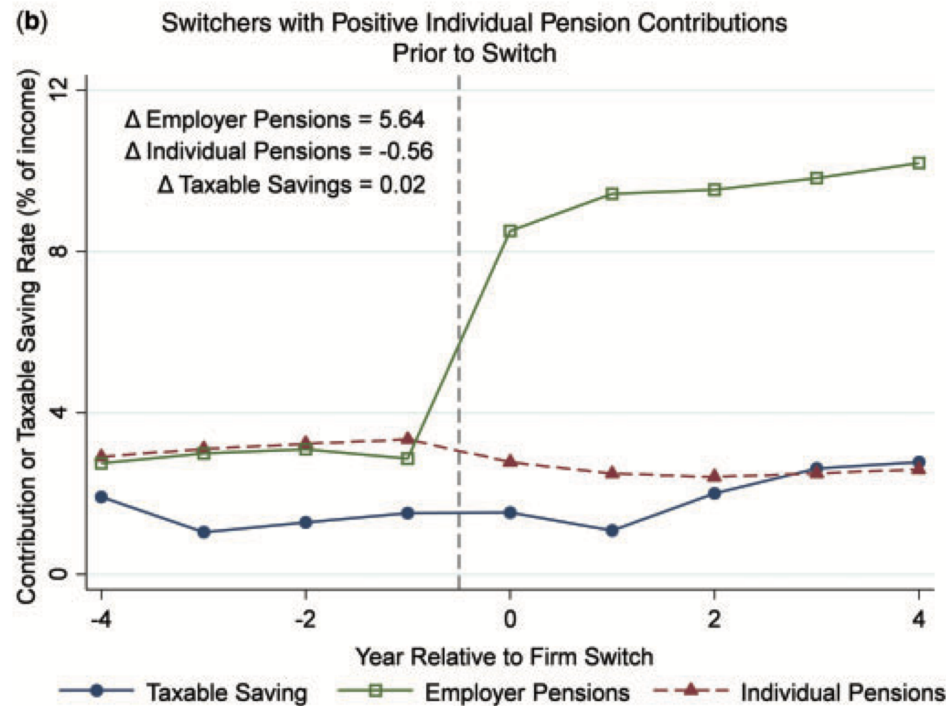
- Employer-contributed pension(s), individual-chosen pension contributions, and other savings.

- Event-study design: examine workers that switch employers
- Find employers and individuals that contribute to same account.
- Inferential step: note employer contribution is a perfect substitute for individual saving.



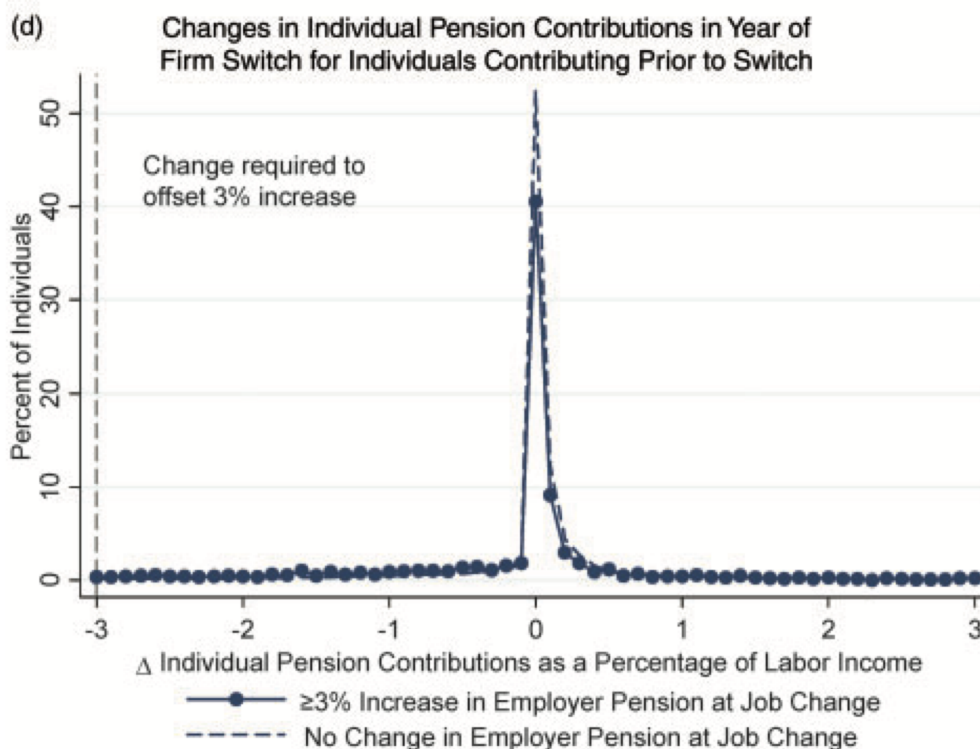
1. Does bunching at zero savings cause these patterns?

Seems like no. Restricting sample to employees with positive savings does not change the observed patterns.



2. How many individuals switch their individual pensions?

Put another way: what fraction fully offsets the employer pension change? The "surprise" answer is essentially zero!

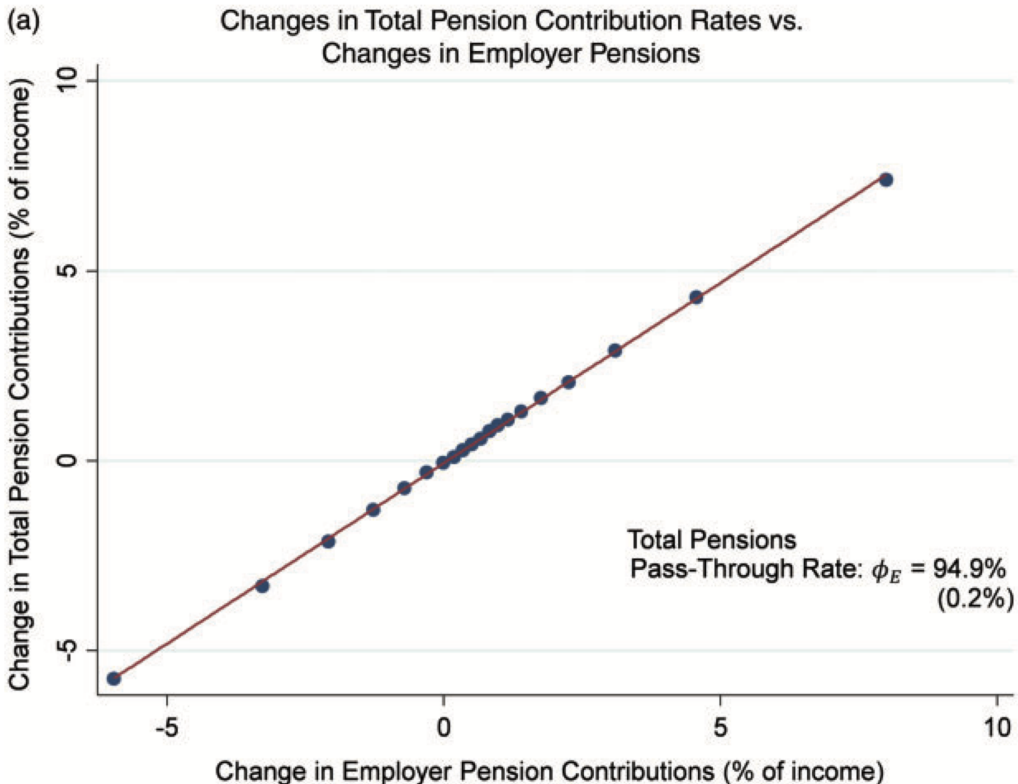


This is not the perfect setup.

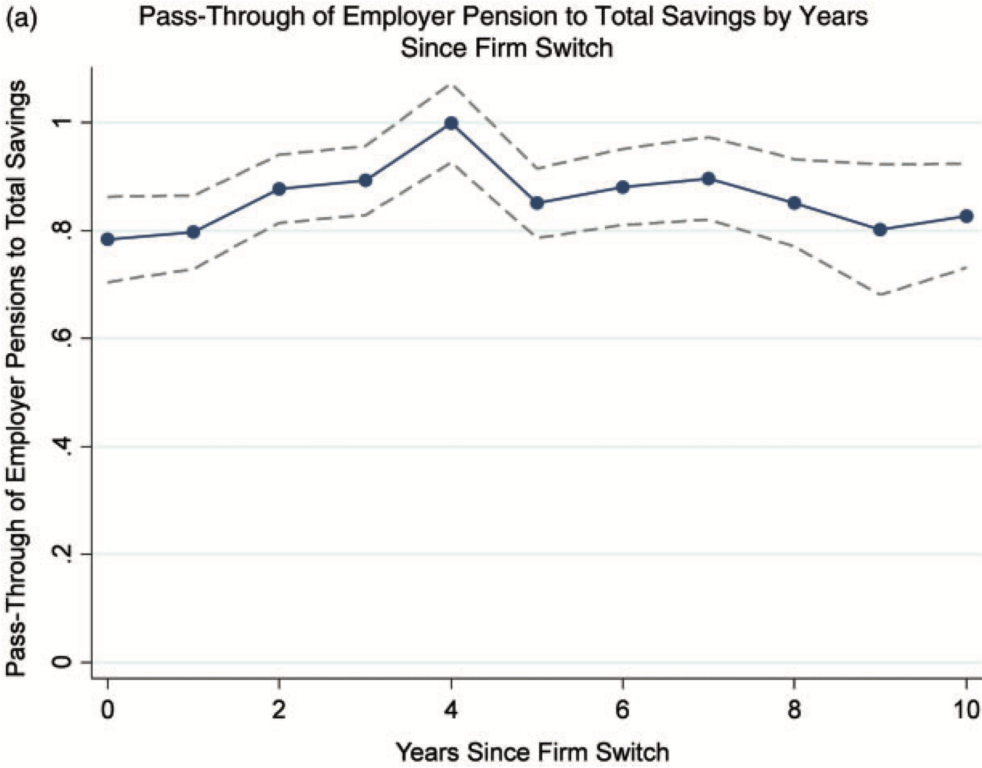
In the ideal experiment, we could randomize automatic contributions holding fixed total compensation.

- Chetty, Freidman, Leth-Petersen, et al. (2014) approximate ideal experiment by using changes in employer-provided pension contributions due to job changes.
- **But job changes are endogenous.** Could this explain the results?
- No pre-trends towards higher individual pension contributions prior to year 0.
- The vast majority of individuals do not change their individual pension contribution at the time of the job switch.

Scatterplot of change in employer pension vs change in total contributions suggests **nearly complete pass-through of employer pensions savings.**



These effects are meaningful in the long run.



About 85% of individuals are "passive savers":

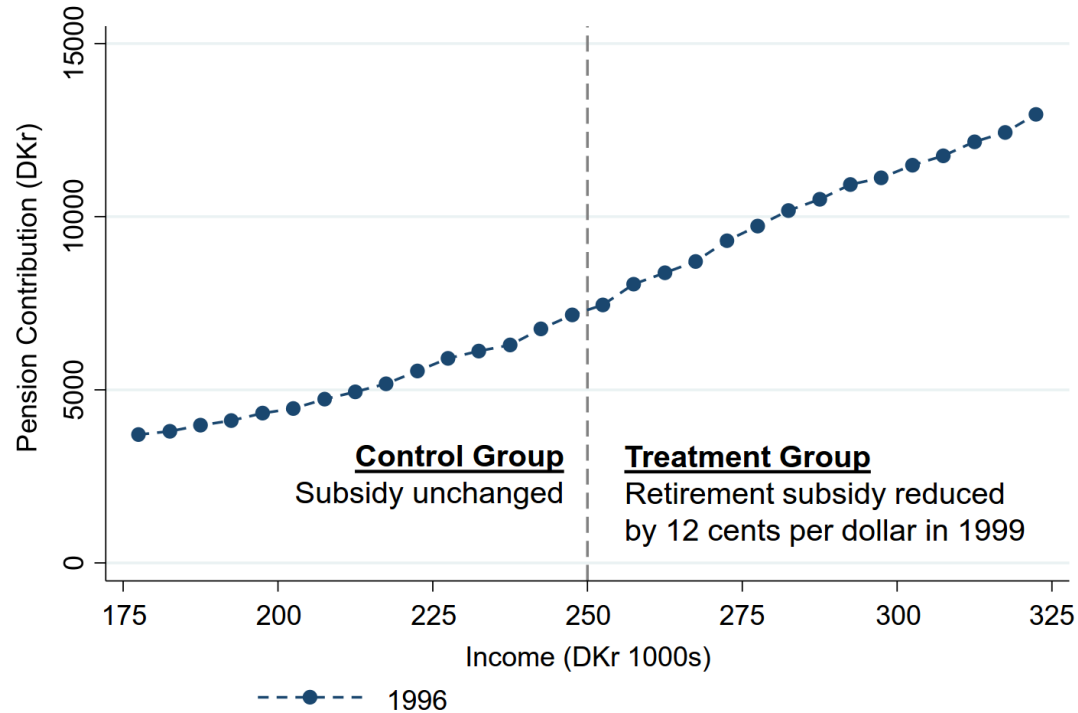
- They respond passively to changes in employer contribution.
- Employer contribution is very effective tool to affect **total** savings.
- Effect is highly persistent and affects wealth at retirement.

Contrast this with the (non) impact of financial education on retirement savings:

- Positive, but only moderate effects (Duflo and Saez, 2003)

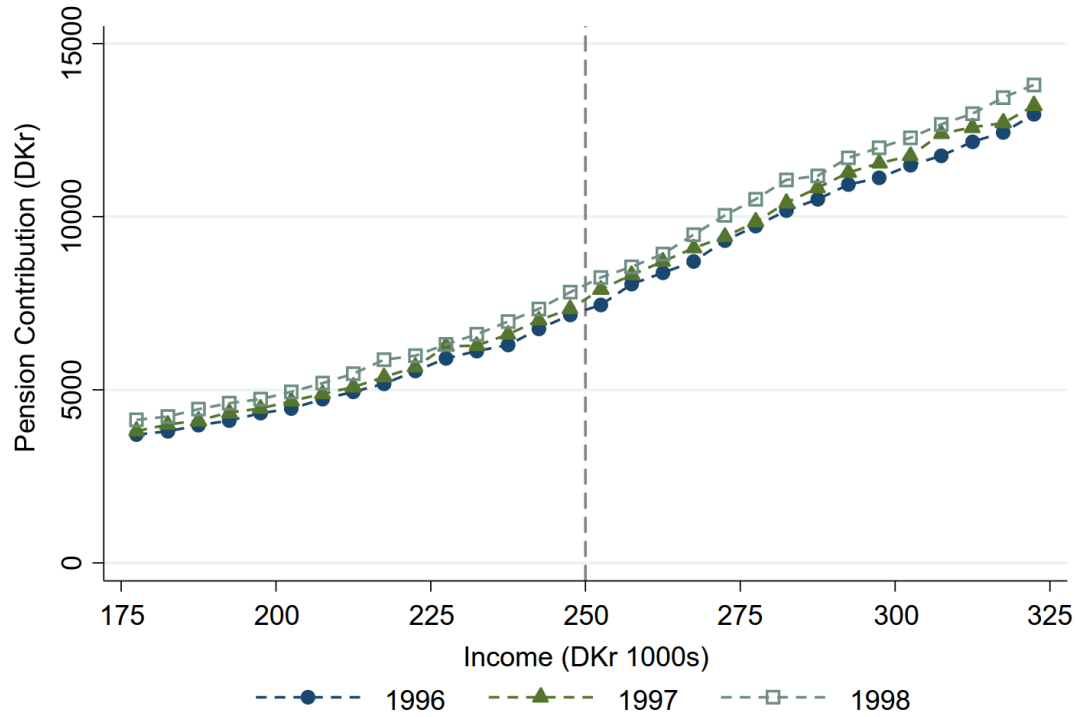
Next we'll contrast this with the impact of a reduced subsidy (14 cents per DKr)

Impact of 1999 Pension Subsidy Reduction On Pension Contributions

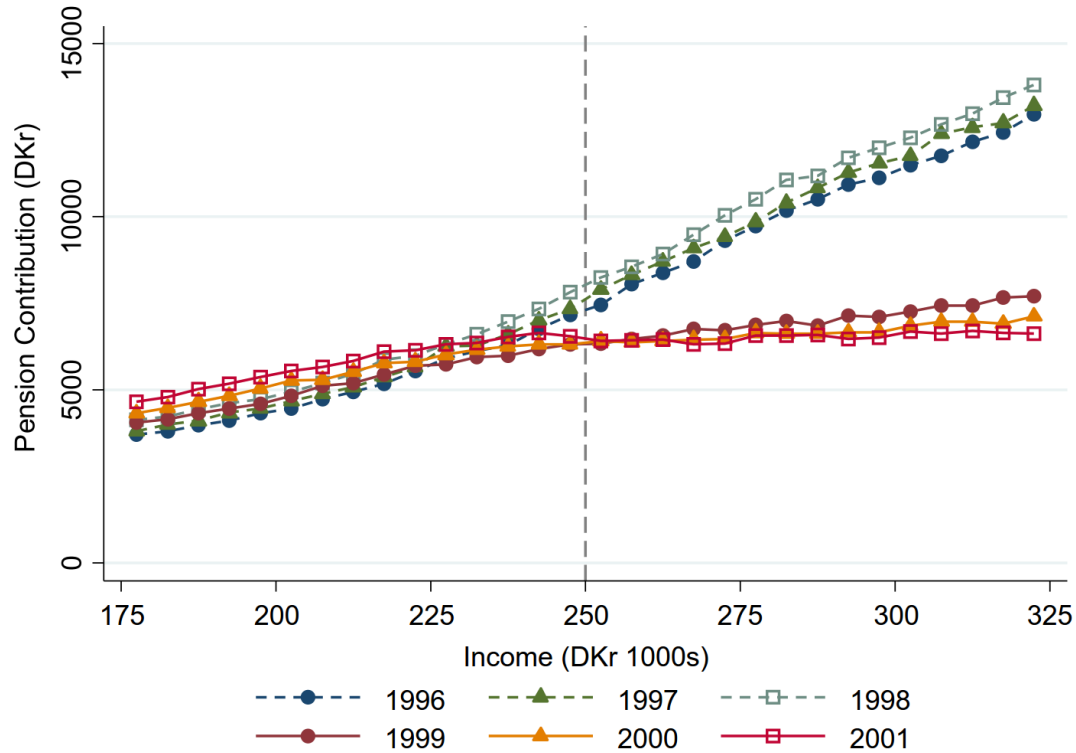


Note: \$1 \cong 6 DKr

Impact of 1999 Pension Subsidy Reduction On Pension Contributions



Impact of 1999 Pension Subsidy Reduction On Pension Contributions



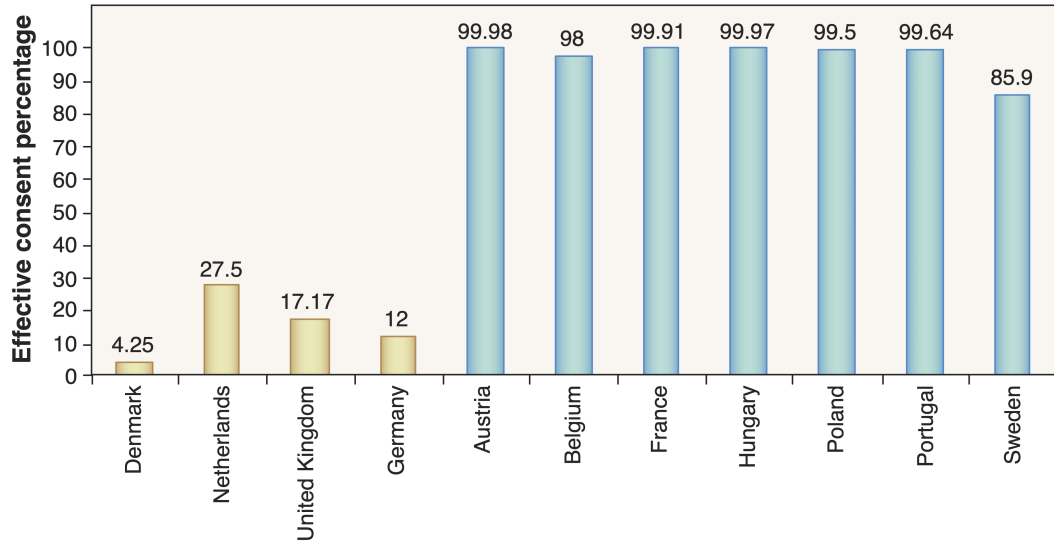
Aggregate reduction is entirely driven by 19% of treated households who completely stop contributing to pensions

- Remaining 81% do not change their retirement contributions at all
- Suggests most individuals are inattentive to savings incentives or procrastinate in planning for retirement

Moreover, 90% of the reduction in retirement contributions is offset by more saving in non-retirement accounts ("crowd-out")

- Each \$1 of marginal expenditure on tax subsidies raises total personal saving by approximately 1 cent

Final evidence: defaults have huge effects for rates of organ donations.



Effective consent rates, by country. Explicit consent (opt-in, gold) and presumed consent (opt-out, blue).

Defaults can have powerful effects.

- In 401(k) savings: defaults seem to be most effective policy tool.
- Defaults are also very cheap.

Distributional aspects not obvious.

- 401(k) default effects appear to be larger among the poor. *Why?*
- Is it because the default contribution is closer to optimal for the poor?
- Or are the poor more inattentive or more likely to procrastinate?
- Or is switching more costly for the poor?

Optimal defaults, active choice, and welfare (Carroll, Choi, Laibson, et al., 2009)

What is the optimal default?

- Consumer heterogeneity makes active choice more attractive.
- But active choice only improves outcomes if consumers choose what is good for them.

What are the welfare effects of defaults (Bernheim, Ray, and Yeltekin, 2015)

- Do individuals prefer defaults?
- Do firms use defaults optimally?

Some candidate explanations / key ingredients

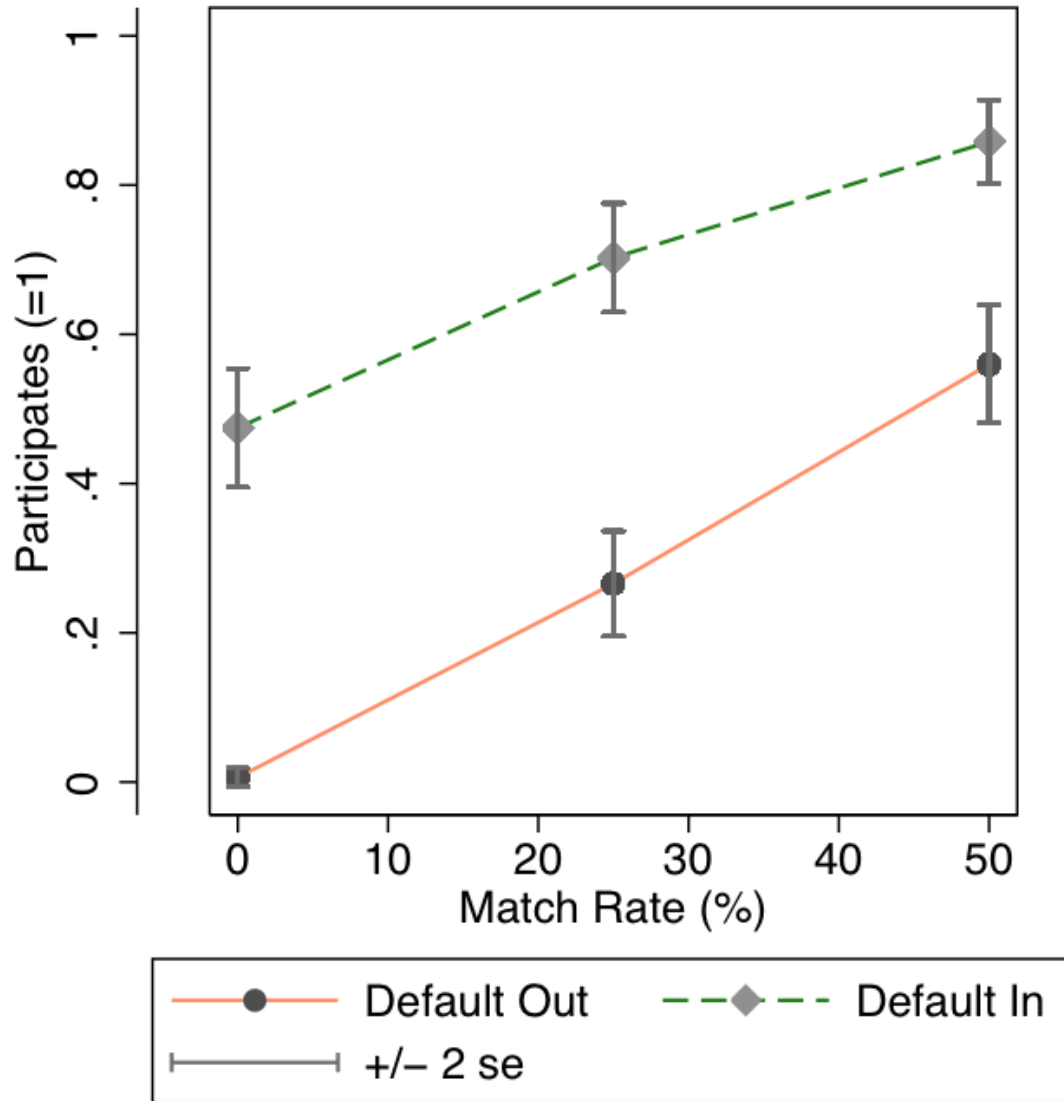
- Awareness
- Implicit endorsement
- Inattention/memory
- Present bias (+ naivete)
- Disliking making choices (why?)
- **Others?**

Cell phone-based savings account in Afghanistans

- Accounts include automatic payroll deduction plan
- Random variation in default (in or out) and matching contribution

Two main contributions:

1. Does default enrollment increase savings?
2. Attempt to rule in/out potential mechanisms



1. Lack of awareness/understanding that (and how) contribution rate can be changed

- Seems unlikely. Participants underwent extensive training
- Everyone knows and understands product features.
- Very low transaction costs

2. Employer endorsement: "My employer knows better."

- Individual-level randomization
- Everyone is told explicitly about randomization

3. Inattention/memory

- SMS reminders
- Phone surveys

Present bias, measured in a price list, robustly predicts propensity to follow default.

Financial consultation intervention moves employees from their default.

- Financial consultation interpreted as reducing the mental costs of switching.
 - Or are people just worried about making mistakes?
 - Related twist: Individuals tend to delay the financial consultation visit
 - Interesting read: [Why Investing is So Complicated](#)

Very active literature studying defaults and mistakes in active choice in health insurance; see Chandra, Handel, and Schwartzstein (2019) for a review.

In US, people often have option of choosing their health insurance or prescription drug plan each year. There is typically a default option: *what you chose last year*.

- People are very likely to stick with default (inertia)
- Even when the plan loses them money relative to the best option
- As plans evolve over time, they often move even further from optimum (Handel, 2013b)
- Likelihood of making active choice does not seem to depend on how bad the default option is relative to the best option (Brot-Goldberg, Layton, Vabson, and Wang, 2021)

...But forcing active choice does not seem to help much!

- Largely, because people choose poorly.
- Often choose dominated plans, likely due to poor understanding of health insurance (e.g. Bhargava, Loewenstein, and Sydnor (2017))
- Seem to overweight premiums compared to out-of-pocket payments (Abaluck and Gruber, 2011)

Consumers are losing substantial amounts of money due to inertia and poor active choice in health insurance (around \$2000 per year in Handel (2013b))

Inertia + poor active choice also reduce market discipline for suppliers

- Less understanding of how to improve things
- Reducing the size of choice sets may not help in itself (Bhargava, Loewenstein, and Sydnor, 2017)
- Educating people about these plans seems difficult to do (Abaluck and Gruber, 2022)
- Removing bad choices (e.g. dominated options) from choice set is likely to improve welfare

How do we explain default effects?

(Issues with) Self Control. We'll look at theory, evidence, and measurement

Please read O'Donoghue and Rabin. It'll help to have read it in advance.

The nature of the conflict between selves is often seen in our daily activities.

However, as PhD Economists, we are often looking for smoking guns in the domain where our expertise lies (economics).

In the next mess of slides, I will make the argument that one domain worthy of lots of additional exploration is *household finance*.

I'll present a series of facts, many of which I will argue stem from a conflict between selves. But this is a bold assertion and you should be skeptical and inquisitive.

Households in the United States:

1. Have low levels of financial literacy
2. Have very few liquid assets (live hand to mouth)
3. Have substantial illiquid wealth
4. Have a high marginal propensity to consume out of liquid wealth
5. Have a low marginal propensity to consume out of illiquid wealth
6. Choose suboptimal financial service products
7. Barely change their behavior after financial education interventions
8. Have misaligned financial intentions and financial actions
9. Make financial choices that can be manipulated

(This is one of the only times I'll discuss such things in this course.)

Assessing literacy often comes down to simple questions such as:

Suppose you had \$100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow?

- i) More than \$102
- ii) Exactly \$102
- iii) Less than \$102
- iv) Don't know
- v) Refuse to answer

Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, would you be able to buy with the money in this account:"

- i) More than today
- ii) Exactly the same
- iii) Less than today
- iv) Don't know
- v) Refuse to answer

Do you think the following statement is true or false? Buying a single company stock usually provides a safer return than a stock mutual fund.

i) True

ii) False

iii) Don't know

iv) Refuse to answer

Data from Lusardi and Mitchell (2014)

TABLE 1
FINANCIAL LITERACY PATTERNS IN THE UNITED STATES

Panel A. Distribution of responses to financial literacy questions

	Responses			
	Correct	Incorrect	DK	Refuse
Compound interest	67.1%	22.2%	9.4%	1.3%
Inflation	75.2%	13.4%	9.9%	1.5%
Stock risk	52.3%	13.2%	33.7%	0.9%

Panel B. Joint probabilities of answering financial literacy questions correctly

	All 3 responses correct	Only 2 responses correct	Only 1 response correct	No responses correct
Proportion	34.3%	35.8%	16.3%	9.9%

Note: DK = respondent indicated “don’t know.”

Source: Authors’ computations from 2004 HRS Planning Module

A Fact

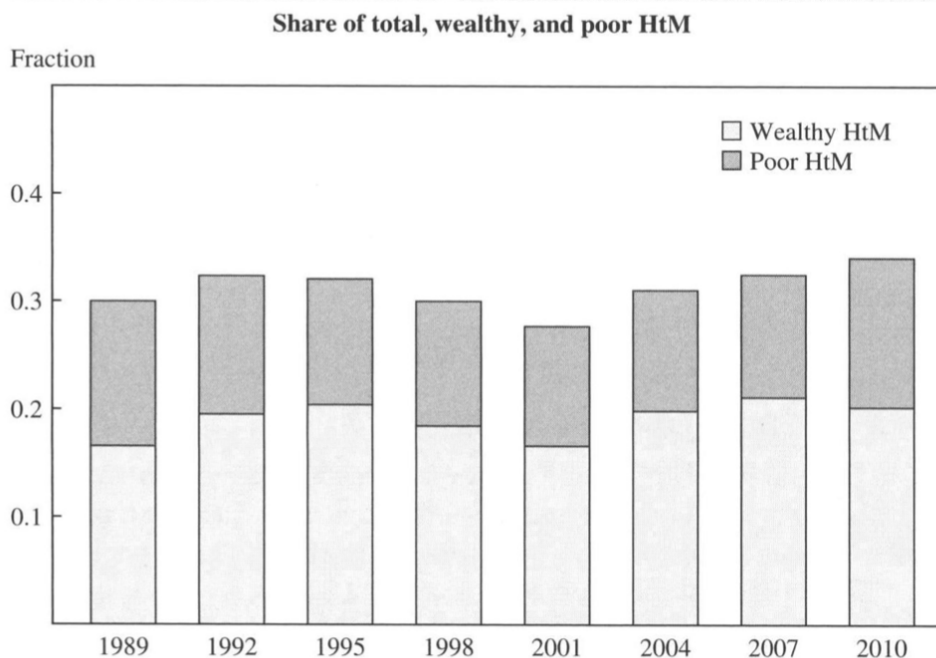
Forty-six percent of U.S. adults report that they either could not come up with \$400 to cover an emergency expense, or would have to borrow or sell something to do so. (Board of Governors of the Federal Reserve System, 2016).

Another Fact

Most of these households are not negative net worth.

Data from Kaplan, Violante, and Weidner (2014)

Figure 3. Fraction of HtM Households, United States, 1989–2010



Data from Laibson, Lee, Maxted, Repetto, Tobacman (2022) (*Composite of 2013, 2016, 2019 surveys*)

- Shapiro (2005): People on food stamps exhibit a monthly caloric cycle wherein calories drop 10-15% over the month
- Parker (2014): Nielsen data around 2008 Economic Stimulus Payments suggests a within-year MPX of 60%
- Ganong and Noel (2016): when unemployment insurance runs out (a predictable event), household consumption drops by 11%.
- Fagereng, Holm, and Natvik (2020): "Low-liquidity winners of the smallest prizes (around \$1500) are estimated to spend all within the year of winning. The corresponding estimate for high-liquidity winners of large prizes (\$8300-150K) is slightly below one half."
- Gerard and Naritomi (2021): "Displaced workers eligible for both UI and SP increase consumption at layoff by 35% despite experiencing a 17% consumption loss after they stop receiving any benefits"

Also see Shea (1995), Mastrobuoni and Weinberg (2009), Hastings and Washington (2010), Olafsson and Pagel (2018), Stephens and Toohey (2018)

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