

# Topic 12: Behavioral Biases

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# General Model of Bias

- I like rational models :-)
- They provide a starting point for understanding behavior and forming normative opinions about policies
- But, there is evidence in a wide range of settings that behavior is not well-described by the canonical rational model
- This lecture: consider implications of violations of rational/canonical model
- Then present evidence in several settings:
  - Take Up of Benefits and EITC
  - Inertia in Health Insurance
  - Unemployment and Job Search
  - Savings
  - Slutsky symmetry and consideration sets

- 1 General Model of Bias: Information versus Understanding
- 2 Imperfect Take Up of Benefits: The Case of EITC
- 3 Inertia in Health Insurance
- 4 Unemployment and Job Search
- 5 Savings
- 6 Unsolicited Thoughts

# General Model of Bias

- At the outset, I think it's important to discuss bias vs. imperfect information – what do we mean by “behavioral bias” or “rational”?
  - My view: it relates to if/how we can invoke the envelope theorem
- Suppose individuals make choices  $a \in \Omega(p)$ , where  $\Omega(p)$  is some choice set that depends on some vector of policies,  $p$ 
  - $a$  can be labor supply, savings, consumption, etc.
  - $p$  can be taxes, the ease-of-use of the Obamacare website, the frequency and use of IRS EITC eligibility notices, 401K default option settings, etc.
- Results in “experienced utility”,  $v(a)$
- Individuals make decisions to maximize potentially different utility function,  $u(a)$

$$U(p) = \max_{a \in \Omega(p)} u(a) = u(a^*(p))$$

where  $a^*(p)$  is the set of choices the individual makes under policy  $p$ .

# General Model of Bias

- Consider marginal policy change, “ $dp$ ”, that changes behavior,  $\frac{da^*}{dp}$ .
  - Do we care?
- Envelope theorem: Welfare impact only depends on how  $dp$  affects constraint set,  $\Omega$ , weighted by marginal utilities,  $u_a$  (formally:  $U'(p) = \partial_p \Omega \nabla_a u$ )
  - If increases budget by \$1, then policy is valued at \$1
  - Irrespective of whether the policy causes a change in behavior,  $\frac{da^*}{dp}$  !

# “Violation” of the Envelope Theorem

- When people are not maximizing their experienced utility, behavioral responses can have first order welfare impacts
- Write experienced utility as

$$V(p) = v(a^*(p)) = U(p) + \underbrace{v(a^*(p)) - u(a^*(p))}_{\text{Behavioral Bias}}$$

so that

$$V'(p) = \underbrace{U'(p)}_{\text{Std Welfare}} + \underbrace{\frac{da^*}{dp} [v_a - u_a]}_{\text{Improved Choices}}$$

- Additional welfare impact if the policy causes people to make better (or worse) decisions
  - Increasing  $a$  increases welfare if people's decisions under-value their experienced utility,  $v_a > u_a$
  - And vice-versa if  $v_a < u_a$
- Like an externality with marginal damage valued at  $v_a - u_a$ :  
“Internality”

# Divergences of Decision and Experienced Utility

- Why might experienced and decision utility diverge?
- Inherent biases
  - Present biasedness
  - Difficulty with probability inference
- Cognitive constraints
- Lack of knowledge (Statistical decision theory analogue)
- Lack of understanding of how actions today affect outcomes in future

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# Imperfect Take-Up of Benefits


- Large literature documenting how people do not take up benefits that they are seemingly eligible for
  - e.g. Deshpande paper for DI
- Here: focus on two studies analyzing the EITC
  - Information treatment: Bhargava and Manoli (2015, AER)
  - Geographic variation in take-up: Chetty, Friedman, Saez (2013)

- Study imperfect take up of EITC benefits
  - Roughly 25% of benefits are unclaimed
  - Average of \$1K per person (roughly 1 month of earnings...)
- Two models of low take up:
  - 1 Confusion and lack of understanding
  - 2 Stigma
- In model 1, increasing take up improves welfare,
  - “ $u_a < v_a$ ” as choosing to take up benefits increases utility
- In model 2, increasing take up is pure social waste because of envelope theorem
  - $u_a = v_a$  as individuals were indifferent to taking up benefits because of the social stigma cost

- To distinguish these theories, paper conducts randomized experiment with the IRS to increase knowledge of benefits
- Send mailers to all CA taxpayers who failed to claim 2009 EITC credit despite presumed eligibility given information on their return
  - Provided information about EITC and offered opportunity to re-file
- Informed people of roughly \$26M in unclaimed benefits
  - Roughly \$4M was paid as a result of the experiment
- Experimental conditions included:
  - Simple and Complex Notices
  - Variation in potential benefit advertising
  - Stigma: include wording saying that money is from the result of hard work

# Simple and Complex Notices

## Panel A1. Simple notice (control)

 Department of the Treasury Internal Revenue Service Submission Processing Center Fresno, CA 93888-0405	Notice	EIC0927
	Tax Year	2009
	Notice Date	November 2010
	Social Security Number	999-99-9999
	To Contact Us	1-800-829-1040
	Page 1 of 4	

JAMES Q HINDS  
22 BOULDER STREET  
HANSON, CT 06000-7253

**Important information about the Earned Income Credit**  
**You may be eligible for a refund**

Do not discard or overlook this notice because you may be entitled to some additional money.

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**Summary**

Our records show that you may be eligible for a refund called the Earned Income Credit (EIC), which you did not claim on your 2009 tax form. The credit is for certain people who have worked and have earned income. You should complete the worksheet on Page 3 to determine if you are eligible for the credit.

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**What you need to do**

Complete the Earned Income Credit Worksheet on Page 3.

**if the worksheet confirms that you are eligible for the credit**  
Sign and date the attached worksheet, and mail it to us in the enclosed envelope.

**if the worksheet indicates that you are not eligible for the credit**  
Please do not return the worksheet to us.

---

**Next steps**

If you are eligible for the credit, we will send you a refund check in 6 to 8 weeks. If you owe back taxes or other debts, such as child support which we are required to collect, we will use your credit to reduce or pay off those debts.

Next year, to receive your refund more quickly, write "EIC" on the EIC line of your form 1040. If you qualify for the credit, the IRS will calculate it for you and send you a check.


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**Additional information**

If you need additional assistance, please call 1-800-829-1040, or visit online at [www.irs.gov/efile](http://www.irs.gov/efile). For tax forms, call 1-800-TAX-FORM (1-800-829-3676).

You can also find tax forms and other helpful documents which explain the EIC program in greater detail (e.g., Publication 596) at [www.irs.gov](http://www.irs.gov).

## Panel A2. Complex notice (page 1 of 2)

 Department of the Treasury Internal Revenue Service Submission Processing Center Fresno, CA 93888-0405	Notice	EIC0927
	Tax Year	2009
	Notice Date	November 2010
	Social Security Number	999-99-9999
	To Contact us	1-800-829-1040
	Page 1 of 4	

JAMES Q HINDS  
22 BOULDER STREET  
HANSON, CT 06000-7253

**You May Be Eligible for a Refund  
If You Qualify for the Earned Income Credit**

**Why We Are Sending You this Notice**

You may qualify for the earned income credit (EIC). The EIC is for certain people who work and have earned income. This tax credit usually means more money in your pocket. It reduces the amount of tax you owe, and may give you a refund. Our records show:

- Your income falls in the eligible range to receive the EIC,
- You have a dependent who may be an EIC qualifying child, and
- You did not claim the EIC on your 2009 Individual Income Tax Return.

**What You Need to Do**


Income is not the only condition that determines if you qualify for EIC. We need you to complete the enclosed *EIC Eligibility Check-Sheet* to see if you may qualify for the EIC. Take the following steps to complete the check-sheet:

- Check that you are eligible for the EIC in Step 1.
  - If your Social Security Number is not valid or if you are a qualifying dependent of another person, you do not qualify.
- If your Social Security Number is valid and you are not a qualifying dependent of another person, you may qualify. Continue to Step 2 only if you did not place a check next to any of the eligibility criteria in Step 1.
- In Steps 2 and 3, fill in the name and Social Security number for each child who may qualify you for the EIC and check that each child meets the stated requirements.
  - Any NO answer for a child means that child is not your qualifying child for the EIC. Do not respond to this notice unless you have a qualifying child.
  - All YES answers mean a child is your qualifying child for the EIC. Sign and date the declaration on the last page of this notice. Mail the completed *EIC Eligibility Worksheet* to us in the enclosed envelope.

*Note: Return the EIC Worksheet to us only if you determine you may qualify for the EIC.*

# High and Low Benefit Treatments

## Panel C1. Benefit display (high)

 <p>Department of the Treasury Internal Revenue Service Submission Processing Center Fresno, CA 93888-0425</p>	<table><tr><td>Notice</td><td>EIC0927</td></tr><tr><td>Tax Year</td><td>2009</td></tr><tr><td>Notice Date</td><td>November 2010</td></tr><tr><td>Social Security Number</td><td>999 99 9999</td></tr><tr><td>To Contact Us</td><td>1-800-829-1040</td></tr></table> <p>Page 1 of 4</p>	Notice	EIC0927	Tax Year	2009	Notice Date	November 2010	Social Security Number	999 99 9999	To Contact Us	1-800-829-1040
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To Contact Us	1-800-829-1040										

JAMES Q.HINDS  
22 BOULDER STREET  
HANSON, CT 06030-7253

**Important information about the Earned Income Credit**  
**You may be eligible for a refund of up to \$5,657**

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**Do not discard or overlook this notice** because you may be entitled to some additional money.

Depending on your earnings and eligibility, your benefit can be up to \$5,657.

**Summary**

Our records show that you may be eligible for a refund called the Earned Income Credit (EIC), which you did not claim on your 2009 tax form. The credit, which can be up to \$5,657, is for certain people who have worked and have earned income. You should complete the worksheet on Page 3 to determine if you are eligible for the credit.

**What you need to do**

Complete the Earned Income Credit Worksheet on Page 3.

If the worksheet confirms that you are eligible for the credit, sign and date the attached worksheet, and mail it to us in the enclosed envelope.

If the worksheet indicates that you are not eligible for the credit, please do not return the worksheet to us.

**Next steps**

If you are eligible for the credit, we will send you a refund check in 6 to 8 weeks. If you owe back taxes or other debts, such as child support which we are required to collect, we will use your credit to reduce or pay off those debts.


Next year, to receive your refund more quickly, write "EIC" on the EIC line of your form 1040. If you qualify for the credit, the IRS will calculate it for you and send you a check.

**Additional information**

If you need additional assistance, please call 1-800-829-1040, or visit online at [www.irs.gov/efile](http://www.irs.gov/efile). For tax forms, call 1-800-TAX-FORM (1-800-829-3676).

You can also find tax forms and other helpful documents which explain the EIC program in greater detail (e.g., Publication 596) at [www.irs.gov](http://www.irs.gov).

## Panel C2. Benefit display (low)

 <p>Department of the Treasury Internal Revenue Service Submission Processing Center Fresno, CA 93888-0425</p>	<table><tr><td>Notice</td><td>EIC0927</td></tr><tr><td>Tax Year</td><td>2009</td></tr><tr><td>Notice Date</td><td>November 2010</td></tr><tr><td>Social Security Number</td><td>999 99 9999</td></tr><tr><td>To Contact Us</td><td>1-800-829-1040</td></tr></table> <p>Page 1 of 4</p>	Notice	EIC0927	Tax Year	2009	Notice Date	November 2010	Social Security Number	999 99 9999	To Contact Us	1-800-829-1040
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JAMES Q.HINDS  
22 BOULDER STREET  
HANSON, CT 06030-7253

**Important information about the Earned Income Credit**  
**You may be eligible for a refund of up to \$457**

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**Do not discard or overlook this notice** because you may be entitled to some additional money.

Depending on your earnings and eligibility, your benefit can be up to \$457.

**Summary**

Our records show that you may be eligible for a refund called the Earned Income Credit (EIC), which you did not claim on your 2009 tax form. The credit, which can be up to \$457, is for certain people who have worked and have earned income. You should complete the worksheet on Page 3 to determine if you are eligible for the credit.

**What you need to do**

Complete the Earned Income Credit Worksheet on Page 3.

If the worksheet confirms that you are eligible for the credit, sign and date the attached worksheet, and mail it to us in the enclosed envelope.

If the worksheet indicates that you are not eligible for the credit, please do not return the worksheet to us.

**Next steps**

If you are eligible for the credit, we will send you a refund check in 6 to 8 weeks. If you owe back taxes or other debts, such as child support which we are required to collect, we will use your credit to reduce or pay off those debts.

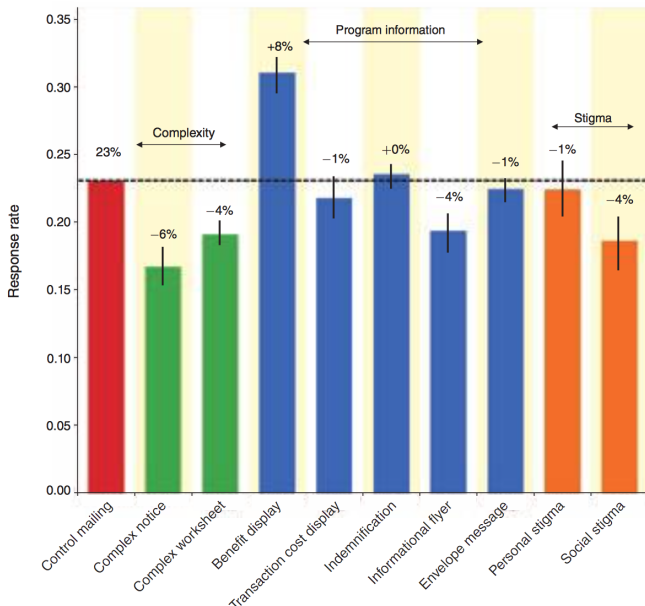
Next year, to receive your refund more quickly, write "EIC" on the EIC line of your form 1040. If you qualify for the credit, the IRS will calculate it for you and send you a check.

**Additional information**

If you need additional assistance, please call 1-800-829-1040, or visit online at [www.irs.gov/efile](http://www.irs.gov/efile). For tax forms, call 1-800-TAX-FORM (1-800-829-3676).

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# RCT Results



# RCT Results

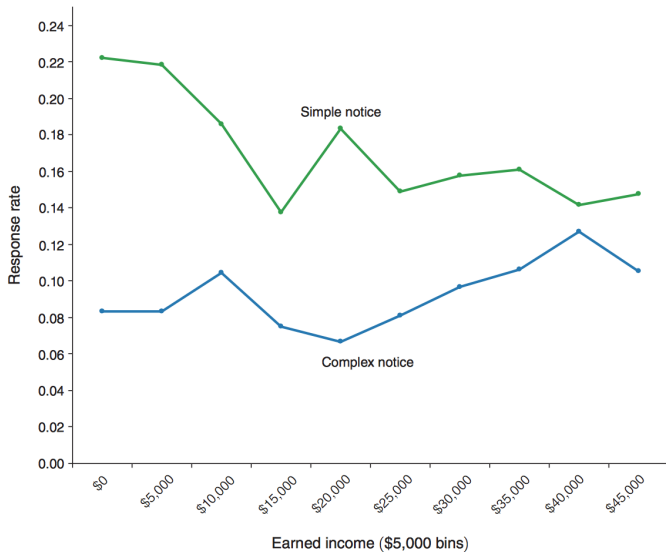


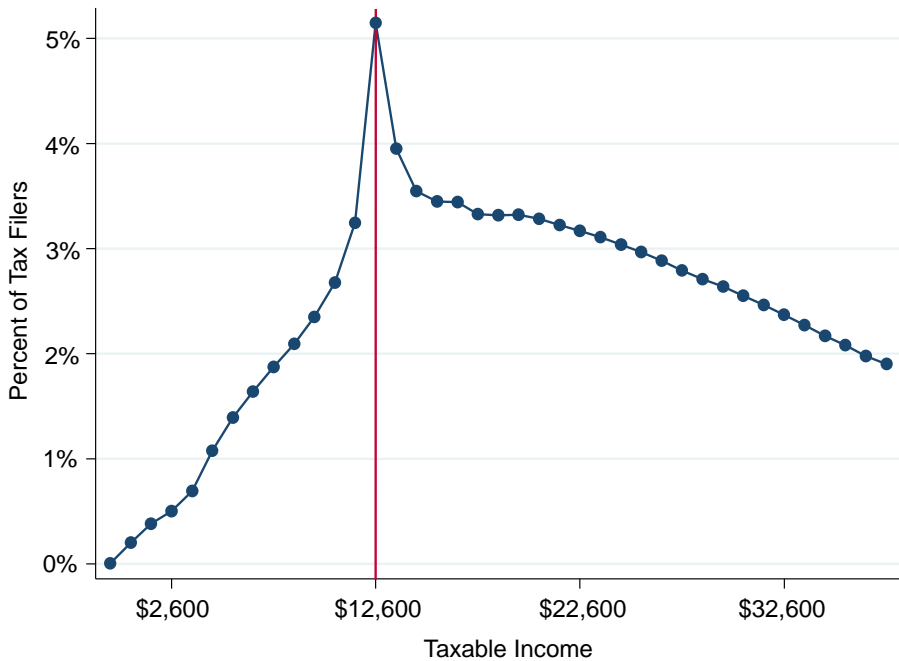
FIGURE 6. HETEROGENEITY IN RESPONSE TO SIMPLIFICATION BY EARNED INCOME  
(For recipients with dependents)

- Results suggest:
  - Imperfect information about benefits affects take up
  - Displaying potential benefits increases take up
  - Complicated forms reduce take up
  - Increases take up at all eligible income levels
- Does this suggest that increasing take up increases recipient welfare?

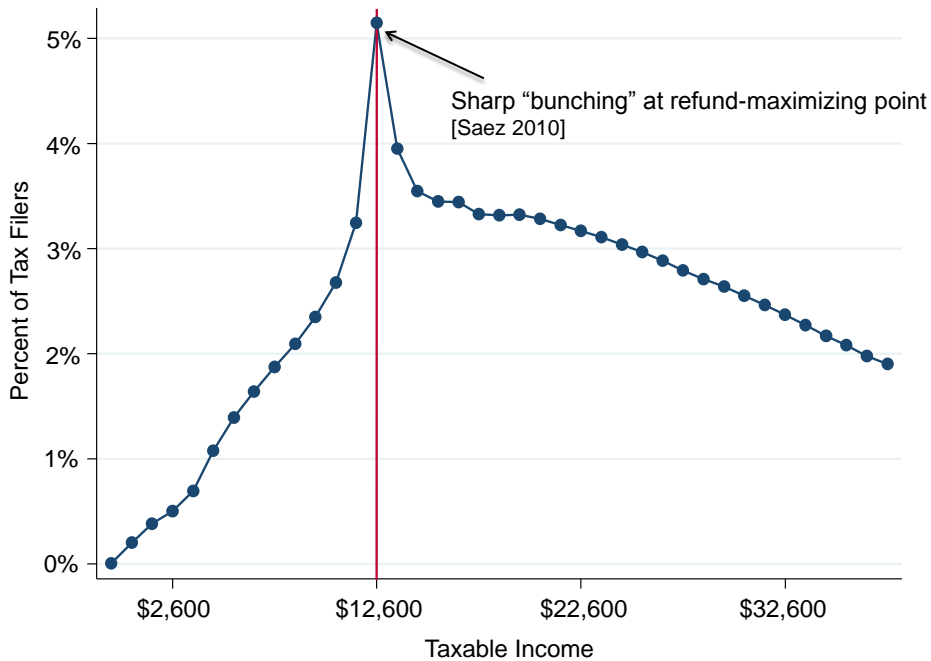


- Previous literature documents bunching of EITC recipients at the revenue-maximizing kink point (Saez 2010)
- Chetty Friedman and Saez (2013) study bunching of EITC claimants at the refund-maximizing kink point
- Here: borrow slides discussing this paper from Chetty (2015, AER)
  - Ely Lecture: “Behavioral Economics and Public Policy: A Pragmatic Perspective”

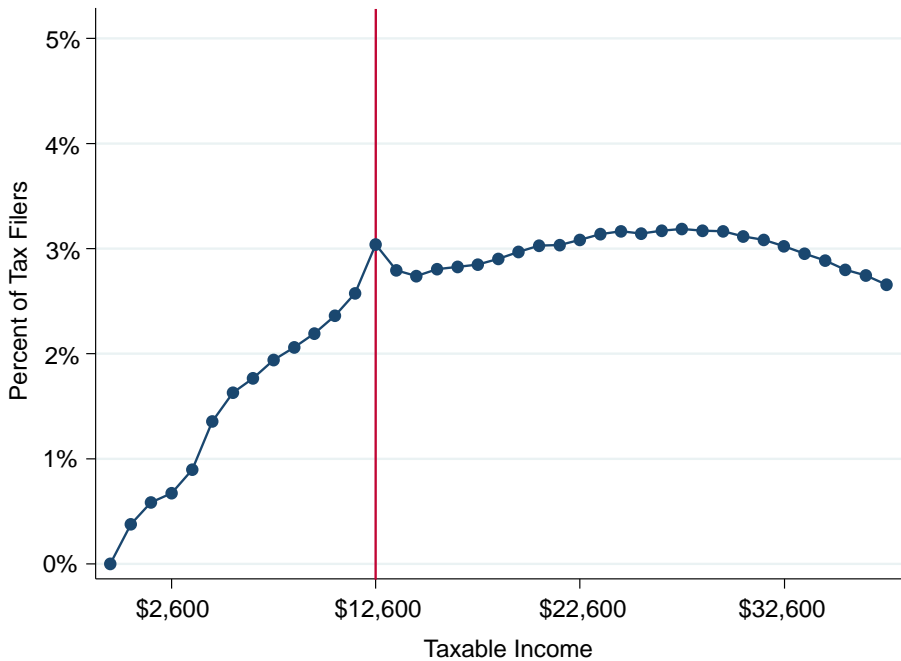
## Taxable Income Distribution for EITC Claimants in Texas



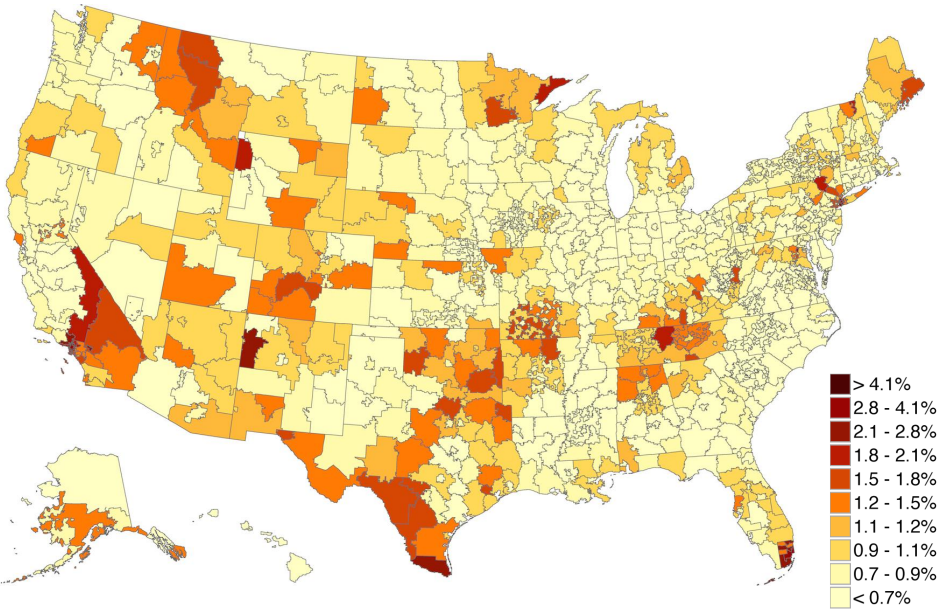
## Taxable Income Distribution for EITC Claimants in Texas



# Taxable Income Distribution for EITC Claimants in Kansas

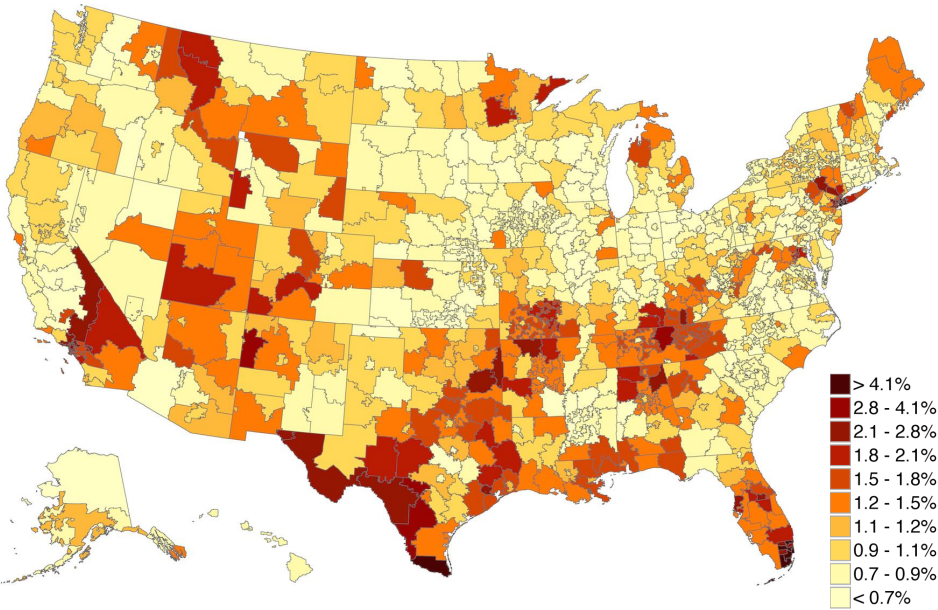


# Fraction of Tax Filers Who Report Income that Maximizes EITC Refund in 1996



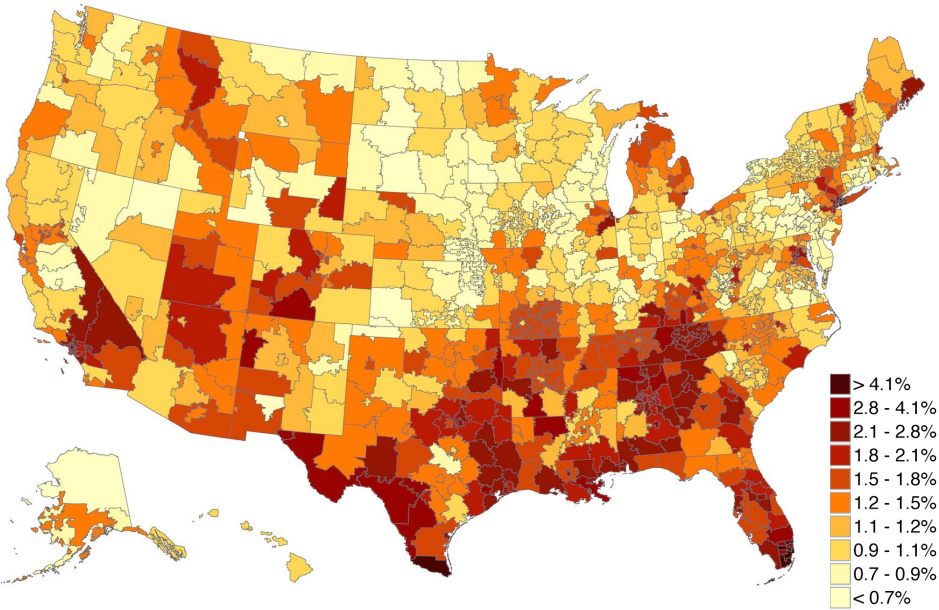
*Note: Darker Color = More EITC Sharp Bunching*

# Fraction of Tax Filers Who Report Income that Maximizes EITC Refund in 1999



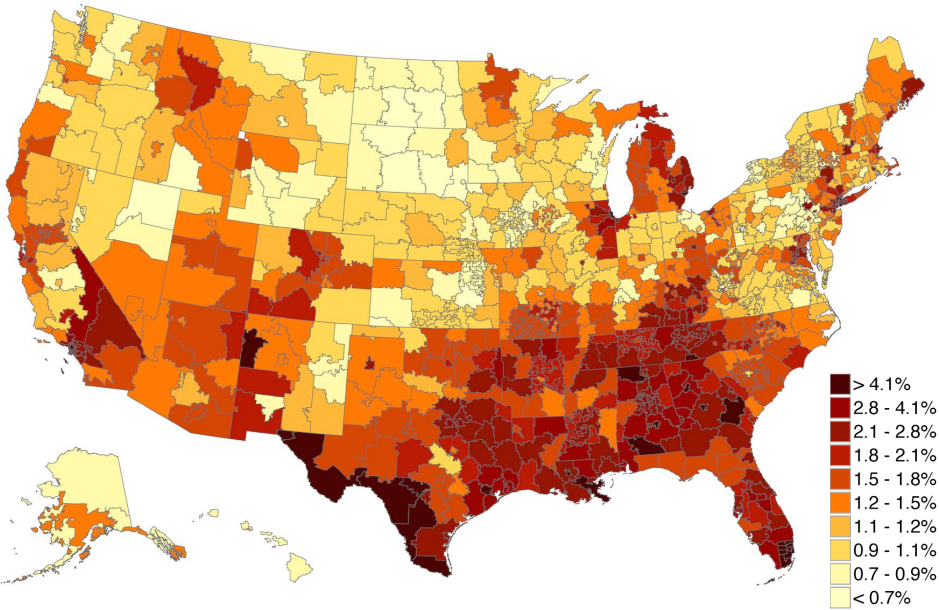
*Note: Darker Color = More EITC Sharp Bunching*

# Fraction of Tax Filers Who Report Income that Maximizes EITC Refund in 2002



*Note: Darker Color = More EITC Sharp Bunching*

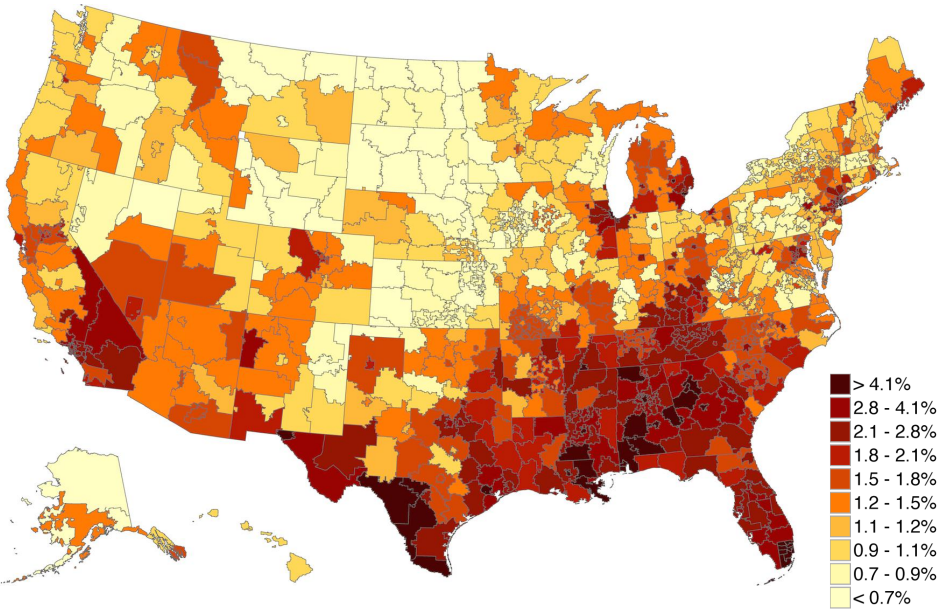
# Fraction of Tax Filers Who Report Income that Maximizes EITC Refund in 2005



*Note: Darker Color = More EITC Sharp Bunching*



# Fraction of Tax Filers Who Report Income that Maximizes EITC Refund in 2008

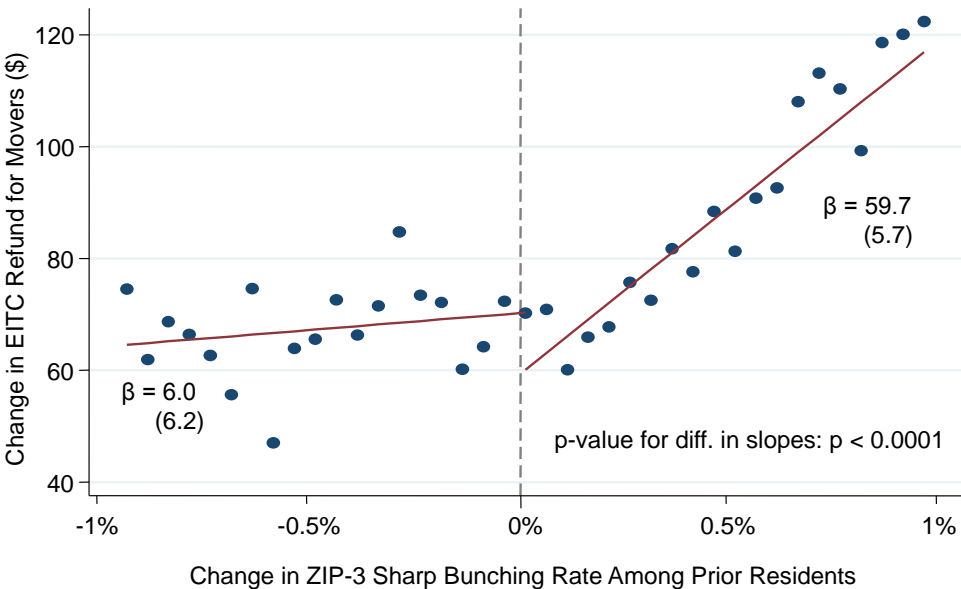


*Note: Darker Color = More EITC Sharp Bunching*

# Differences in Knowledge about the EITC?

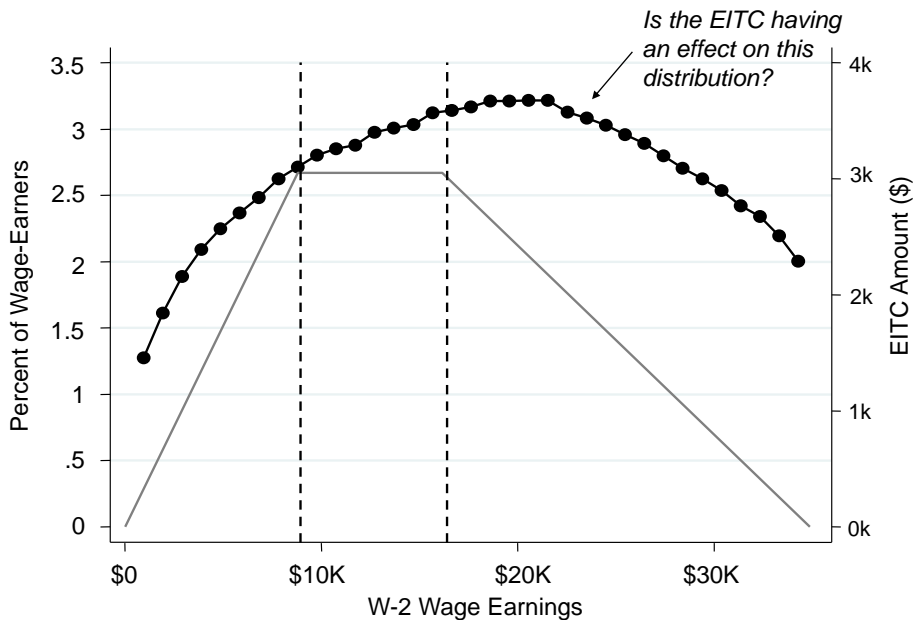
- Why does impact of EITC on income vary so much across areas?
- Plausible behavioral model: differences in knowledge about EITC
- To test this explanation, consider individuals who move
- Knowledge model predicts asymmetric impact of moving:
  - Moving to a higher-bunching area should raise EITC refund
  - Moving to a lower-bunching area should not affect EITC refund

## Effects of Moving to Higher vs. Lower Bunching Areas on EITC Refund Amounts

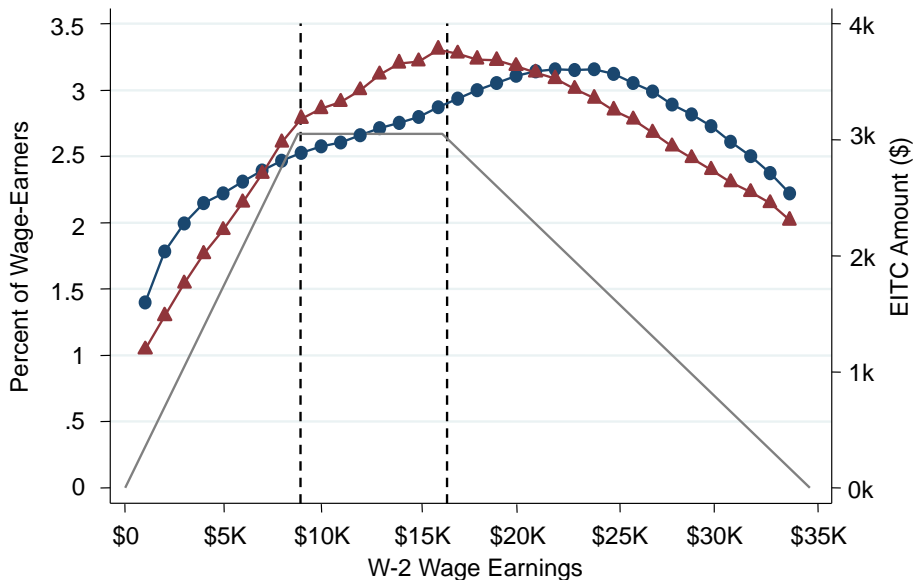


- Paper documents clear evidence of heterogeneous bunching across areas
  - Driven mainly by self-employed (Saez 2010)
  - Easy to manipulate income
- Paper goes on to exploit bunching variation to ask a much deeper (more difficult) question:
  - How does EITC affect real labor supply?

# Income Distribution For Single Wage Earners with One Child



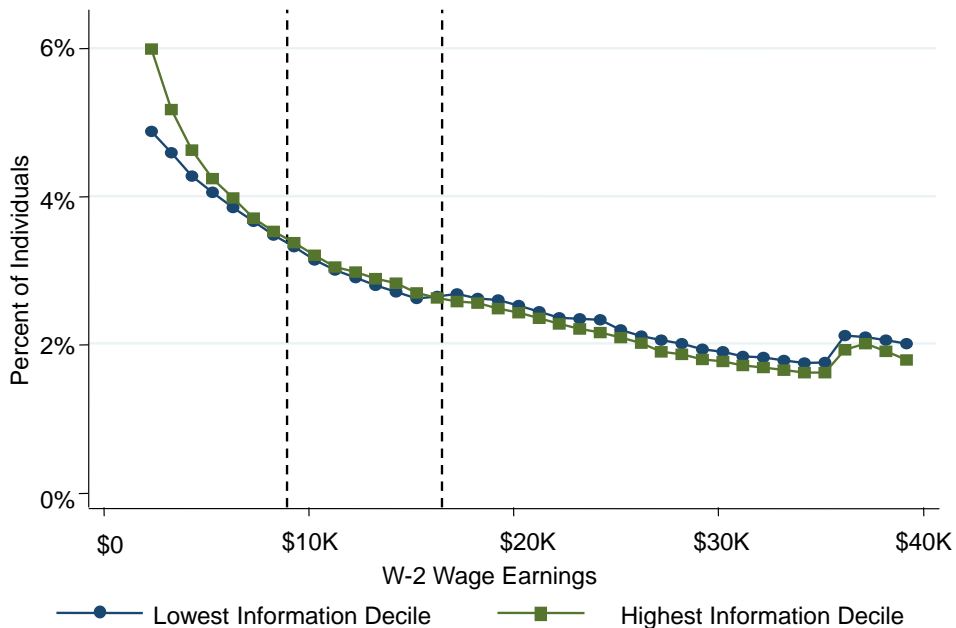
# Income Distribution For Single Wage Earners with One Child High vs. Low Sharp Bunching Areas



# Child Birth Research Design

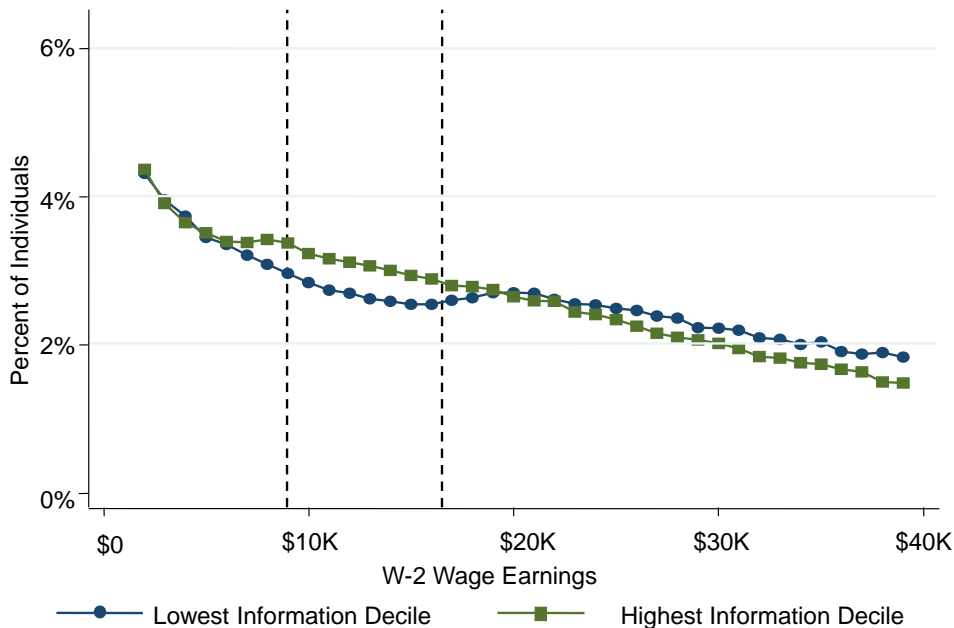
- Comparisons across areas could be biased by omitted variables
- Study changes in earnings around childbirth to address this concern
  - Individuals without children are essentially ineligible for the EITC
  - Birth of a child generates sharp variation in marginal incentives

## Earnings Distribution in the Year Before First Child Birth for Wage Earners





## Earnings Distribution in the Year of First Child Birth for Wage Earners



- Paper goes on to document that EITC primarily increases earnings in the phase-in region as opposed to reductions in phase-out region
  - Suggests EITC increases labor supply and real earnings
- Welfare implications?
  - Depends on whether we think it is good to increase labor supply...
    - Externalities?
    - Or does the envelope theorem apply?

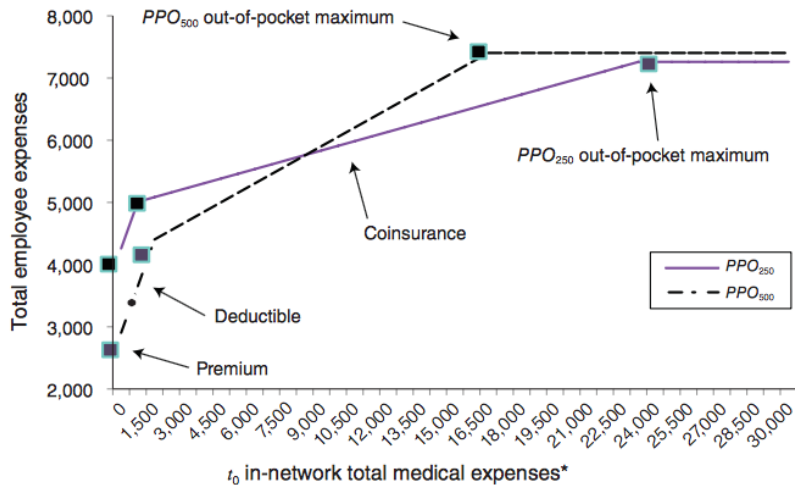
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# Health Insurance: Dominated Plan Choices

- Evidence people also make “sub-optimal” choices in health insurance contexts
  - Plans are often difficult to understand
- But, not clear privately inefficient choices lead to socially inefficient outcomes
- Handel (2013, AER): “Adverse Selection and Inertia in Health Insurance Markets: When Nudging Hurts”
- Studies choice of two PPO contracts
- In year 0, tradeoff between greater coverage and price
  - PPO500 is better if have high expenses
- In year 1, PPO500 completely dominates PPO250

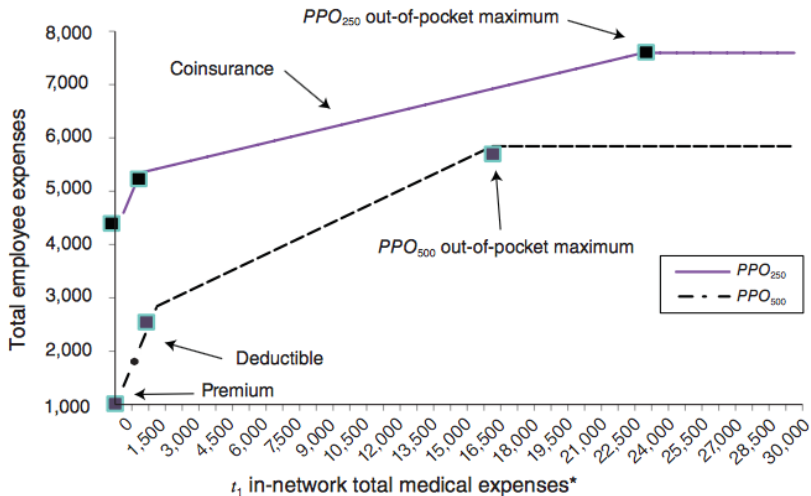
# Inertia: Handel (2013)

Panel A. PPO health insurance plan characteristics,  $t_0$  low-income family



# Inertia: Handel (2013)

Panel B. PPO health insurance plan characteristics,  $t_1$  low-income family



# How Many People Switched?

TABLE 3—DOMINATED PLAN CHOICE ANALYSIS

Dominated plan analysis	$t_1$ Dominated stay	$t_1$ Dominated switch	$t_2$ Dominated stay	$t_2$ Dominated switch
<i>N</i>	498	61	378	126
Minimum money lost <sup>a</sup>	\$374	\$453	\$396	\$306
<i>PPO</i> <sub>500</sub>	—	44 (72%)	—	103 (81%)
<i>PPO</i> <sub>250</sub>	—	4 (7%)	—	6 (5%)
Any <i>HMO</i>	—	13 (21%)	—	17 (14%)
FSA $t_1$	25.4%	32.1%	27.2%	28.6%
FSA $t_2$	—	—	28.1%	30.9%
Dental switch $t_1$	4.3%	14.1%	3.5%	10.9%
Dental switch $t_2$	—	—	6.9%	17.2%
Age (mean)	44.9	38.3	46.2	41.4
Income tier (mean) <sup>b</sup>	1.6	1.4	1.6	1.7
Quant. manager	11%	8%	11%	11%
Single (percent)	40%	41%	40%	33%
Male (percent)	42%	46%	39%	55%
All plan analysis	<i>PPO</i> <sub>250</sub> stay $t_1$	<i>PPO</i> <sub>250</sub> switch $t_1$	All plans $t_1$ stay	All plans $t_1$ switch
Sample size	1,626	174	2,786	384
FSA $t_1$ enrollee	31%	41%	25%	39%
Dental switch	3.2%	13.1%	3.8%	14.5%
Age (mean)	48.3	40.6	44.0	39.1
Income tier (mean) <sup>b</sup>	2.5	2.2	2.3	2.1
Quant. manager	20%	17%	17%	14%
Single (percent)	50%	56%	53%	59%
Male (percent)	48%	42%	49%	40%

*Notes:* This top panel in this table profiles the choices and demographics of the employees enrolled in *PPO*<sub>250</sub> at  $t_0$  who (i) continue to enroll in a firm plan in  $t_1$  and (ii) have *PPO*<sub>250</sub> become dominated for them at  $t_1$ . The majority of these employees (498 out of 559 (89 percent)) remain in *PPO*<sub>250</sub> even after it becomes dominated by *PPO*<sub>500</sub> with 378 of 504 (25 percent) still remaining in this plan at  $t_2$ . People who do switch are more likely to exhibit a pattern of active choice behavior in general as evidenced by their higher FSA enrollments and level of dental plan switching. Apart from this, these populations are similar though switchers in this group are slightly younger. The bottom panel studies the profiles of those who switch at  $t_1$  and those who don't for the two groups of (i) *PPO*<sub>250</sub> enrollees at  $t_0$  and (ii) the entire universe of PPO plan enrollees present in  $t_0$  and  $t_1$ . This reveals a similar pattern of active decision making as switchers in these populations are also more likely to enroll in FSAs and switch dental plans.

# Health Insurance: Dominated Plan Choices

- Everyone has the option to switch to PPO250
- But, only 11% of those who chose PPO500 in year 0 switch to PPO250
- 89% remain in dominated plan!
- Leave at least \$374 per family on the table
- Those who switched would have left more money on the table (\$453)
  - Some evidence of rationality
- Is this inertia bad?
  - Significant evidence that PPO 250 had much higher cost enrollees
    - This was why they increased the price...
  - Inertia kept many healthy people enrolled in the more generous 250 deductible plan
    - Lowers prices of the more generous policy



# Costs Went Up for PPO250

TABLE 4—ADVERSE SELECTION AND EMPLOYEE COSTS

Final sample total expenses	<i>PPO</i> <sub>-1</sub>	<i>PPO</i> <sub>250</sub>	<i>PPO</i> <sub>500</sub>	<i>PPO</i> <sub>1200</sub>
<i>Family t<sub>-1</sub> total expenses (\$)</i>				
<i>t<sub>-1</sub></i>				
<i>N</i> employees (mean family size)	2,022 (2.24)	—	—	—
Mean (median)	13,331 (4,916)	—	—	—
25th percentile	1,257	—	—	—
75th percentile	13,022	—	—	—
<i>t<sub>0</sub></i>				
<i>N</i> (mean family size)	—	1,328 (2.18)	414 (2.20)	280 (2.53)
Mean (median)	—	16,976 (6,628)	6,151 (2,244)	6,742 (2,958)
25th percentile	—	2,041	554	658
75th percentile	—	16,135	6,989	8,073
<i>t<sub>1</sub></i>				
<i>N</i> (mean family size)	—	1,244 (2.19)	546 (2.19)	232 (2.57)
Mean (median)	—	17,270 (6,651)	7,759 (2,659)	6,008 (2,815)
25th percentile	—	2,041	708	589
75th percentile	—	16,707	8,588	7,191
<i>Individual category expenses (dollars)</i>				
<i>Pharmacy</i>				
Mean	973	1,420	586	388
Median	81	246	72	22
<i>Mental health (&gt; 0)</i>				
Mean	2,401	2,228	1,744	2,134
Median	1,260	1,211	1,243	924
<i>Hospital/physician</i>				
Mean	4,588	5,772	2,537	2,722
Median	428	717	255	366
<i>Physician OV</i>				
Mean	461	571	381	223
Median	278	356	226	120

*Notes:* This table investigates the extent of adverse selection across *PPO* options after the *t<sub>0</sub>* menu change for those in the final estimation sample. All individuals in this sample were enrolled in *PPO*<sub>-1</sub> in *t<sub>-1</sub>* and continue to be enrolled in some plan at the firm for the following two years. The numbers in the table for all choices represent *t<sub>-1</sub>* total claims in dollars so that these costs can proxy for health risk without being confounded by moral hazard (*t<sub>0</sub>* and *t<sub>1</sub>* cost differences could be the result of selection or moral hazard). The table reveals that those who choose *PPO*<sub>250</sub> have much higher expenditures at *t<sub>-1</sub>* than those who choose the other two plans, implying substantial selection on observables in the vein of Finkelstein and Poterba (2006). The bottom panel presents a breakdown of these costs according to our cost model expenditure categories.

# Handel (2013): Nudging versus Adverse Selection

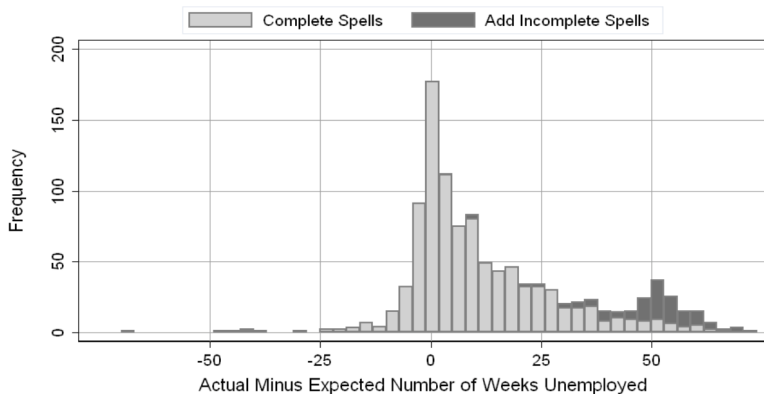
- Develops model with inertia (switching costs) to explain why only 11% switched
- Uses model to study impact of reducing inertia
- Results suggest adverse selection would increase
- Would overall reduce welfare despite improving individual choices

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# Behavioral Bias and Unemployment

- Large literature documenting behavioral anomalies in job search and unemployment contexts
- Discuss two papers here:
  - 1 Spinnewijn (2015): “Unemployed but Optimistic: Optimal Insurance Design with Biased Beliefs”
  - 2 Della Vigna et al. (2016): “Reference-Dependent Job Search: Evidence from Hungary”

# Spinnewijn (2015): Unemployment Duration Expectations



- On average, beliefs are 6.8 weeks less than actual experience
- Implications of biased beliefs:
  - People may under-search?
  - Under-save?
  - Deplete savings too quickly during unemployment?
    - Explain why consumption drops at benefit exhaustion in Ganong and Noel (2016)?
- Optimal policy implications:
  - Increase benefits during unemployment? Why?

- Provide evidence of reference-dependent job search
- Follow model of Koszegi and Rabin (2006) with loss aversion:

$$u(c|r) = v(c) + \eta_{gain} \mathbf{1}\{c \geq r\} [v(c) - v(r)] + \eta_{loss} \mathbf{1}\{c < r\} [v(c) - v(r)] - \psi(e)$$

where  $e$  is search effort and

$$r = \frac{1}{N} \sum_{k=t-N}^{t-1} y_k$$

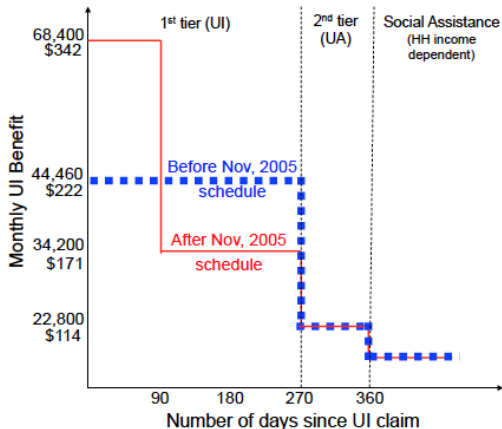
is the average income in the past  $N$  periods

- Model predicts:
  - Upon unemployment onset, search hard because consumption falls below reference point
  - But, effort declines throughout the spell as the reference point adjusts
  - Search effort rises in anticipation of a future benefit cut or exhaustion
- Exploit data from Hungary
  - Change in benefit formula
  - Compare groups who entered just before vs. after the reform



# Policy change

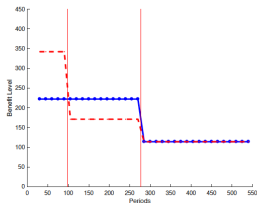
Figure II: Institutional Setting: Change in Benefit Path and Sample Periods



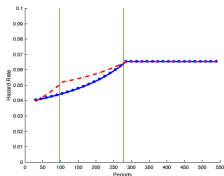
(a) Benefit Path Change, Main Sample

# Reference Dependent Model Prediction

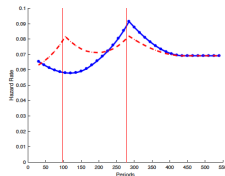
Figure I: Model Simulations of the Standard and the Reference-Dependent model



(a) Benefits



(b) Standard Model

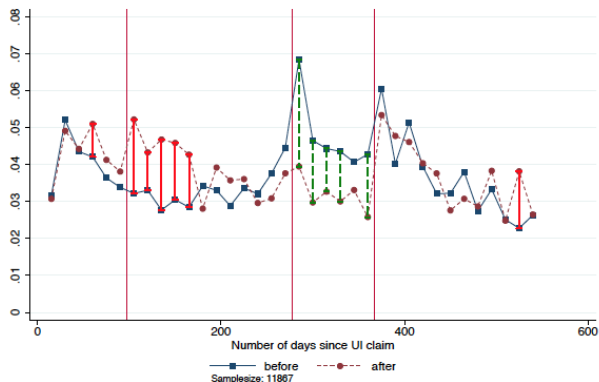


(c) Reference-Dependent Model

**Notes:** Panel (a) shows two benefit regimes, both of them having a step-down benefit system. After the first step benefits are higher in the regime represented by the circled blue line than in the regime represented by the red dashed line. After the second step benefits drop to the same level. Panel (b) shows the hazard rates predicted by the standard model (with  $k = 130$ ,  $\gamma = 0.2$ ,  $w = 555$ ,  $\delta = 0.99$ ) while Panel (c) the prediction of the reference-dependent model (with  $k = 130$ ,  $\gamma = 0.2$ ,  $w = 555$ ,  $\delta = 0.99$ ,  $\lambda = 2$ ,  $N = 10$  (150 days))

# Results: Empirical Hazard Rates

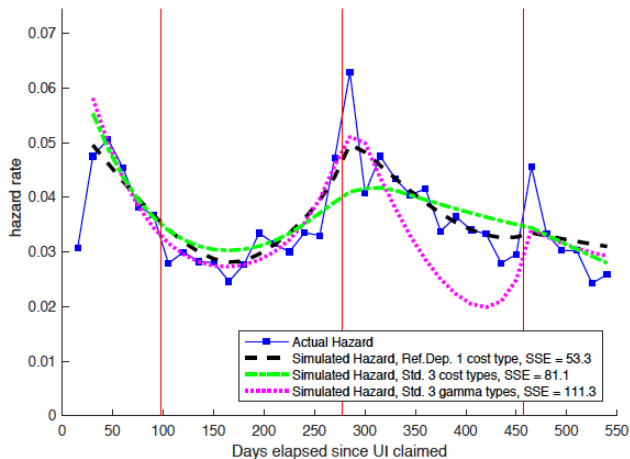
Figure III: Empirical Hazard and Survival Rates under the Old and the New Benefit Schedule



(a) Empirical hazard rates

# Reference Dependent Model Fits Spikes

Figure IX: Out-of-sample Performance of Models



(a) Out-of-sample predictions of models for unemployment system 2

- Evidence that people are over-optimistic about unemployment duration
  - Stated vs. true beliefs?
- Evidence of spike in job search around drops in benefits
  - Consistent with reference dependent preferences
- Implications for optimal UI?

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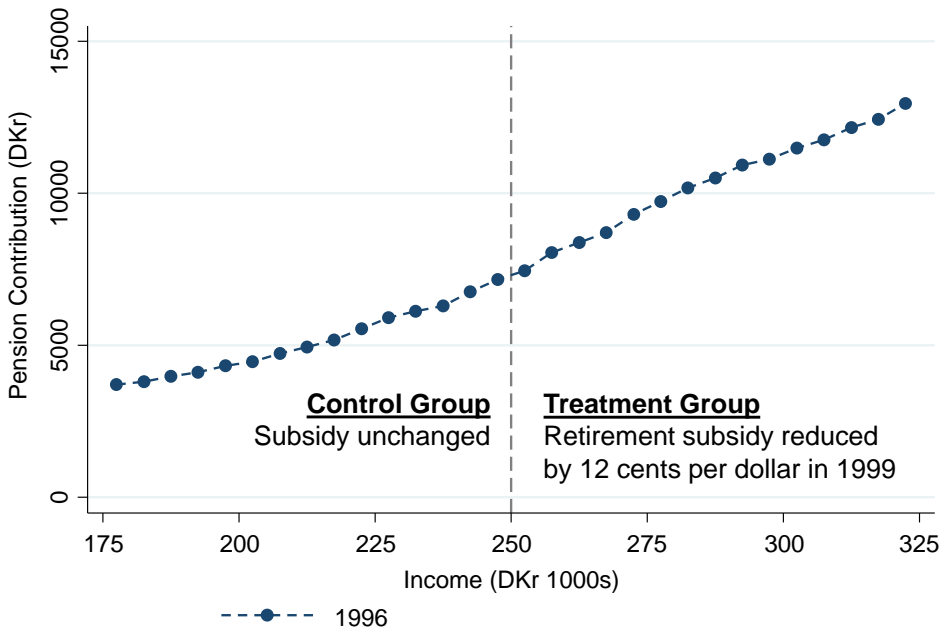
- Large debate about whether people are saving “enough” for retirement
- Scholz (2006, JPE): “Are Americans Savings “Optimally” for Retirement?”
  - Yes, argues structural model + savings suggests they are (or have been)
  - But, very sensitive to structural assumptions
- General concern: growing switch from pensions to 401Ks
  - Require individuals to save on their own
  - Growing use of tax dollars: \$100B per year on subsidies for 401Ks and IRAs (JCT, 2012)

# 401K and Tax-advantaged Retirement Savings

- Significant evidence that default options in 401K plans affect savings behavior
  - Choi et al (2002, 2004)
- Significant evidence that providing tax incentives for 401K contributions increases investments in those assets
  - Poterba, Venti, Wise (AER, 1994; JEP 1996)
- Given behavioral biases, are tax incentives the best way to increase savings?
- Chetty, Friedman, Leth-Petersen, Nielsen, Olsen (2014)
  - Use administrative wealth data for all Danish households
  - Begin by studying policy that changed retirement savings subsidy
- Note: Subsequent slides re-produced from Chetty (2015, AEA Ely Lecture)

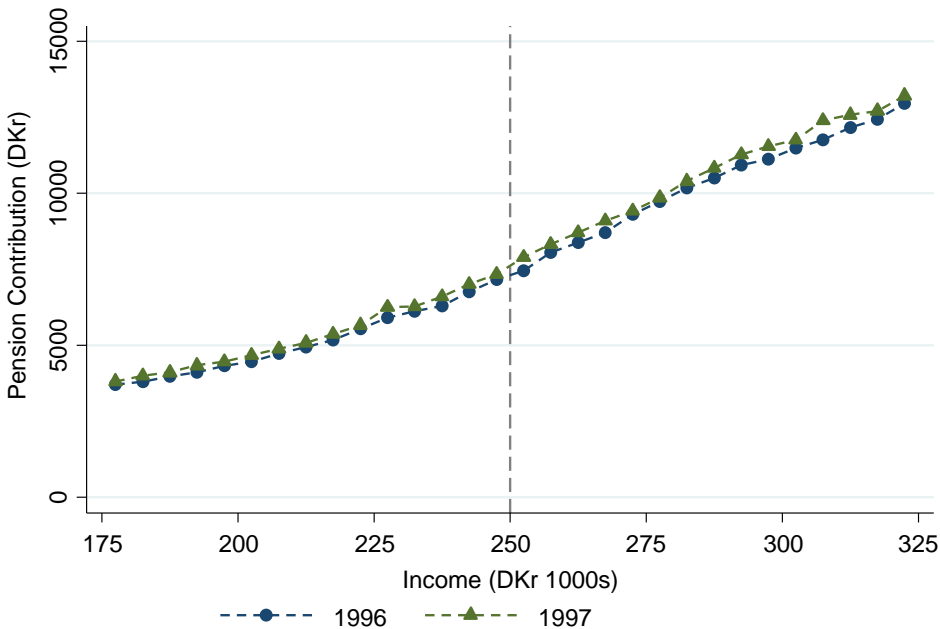


## Impact of 1999 Pension Subsidy Reduction On Pension Contributions

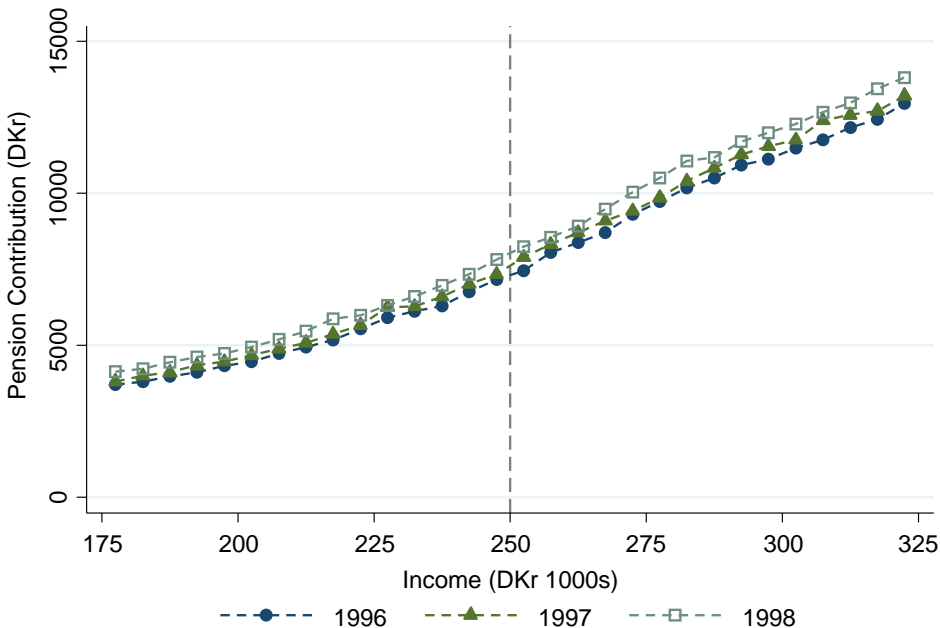


Note: \$1  $\cong$  6 DKr

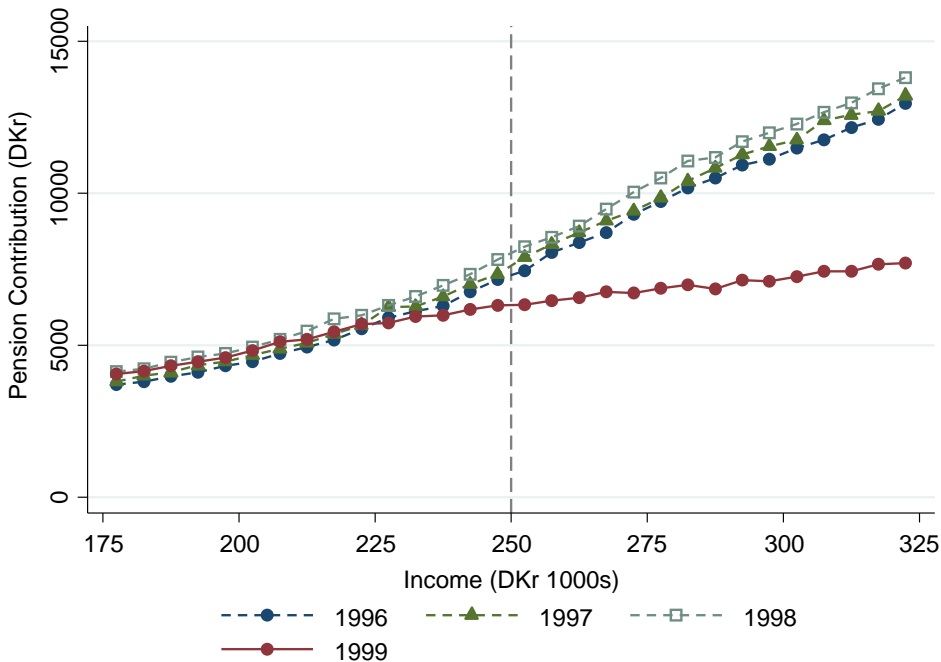
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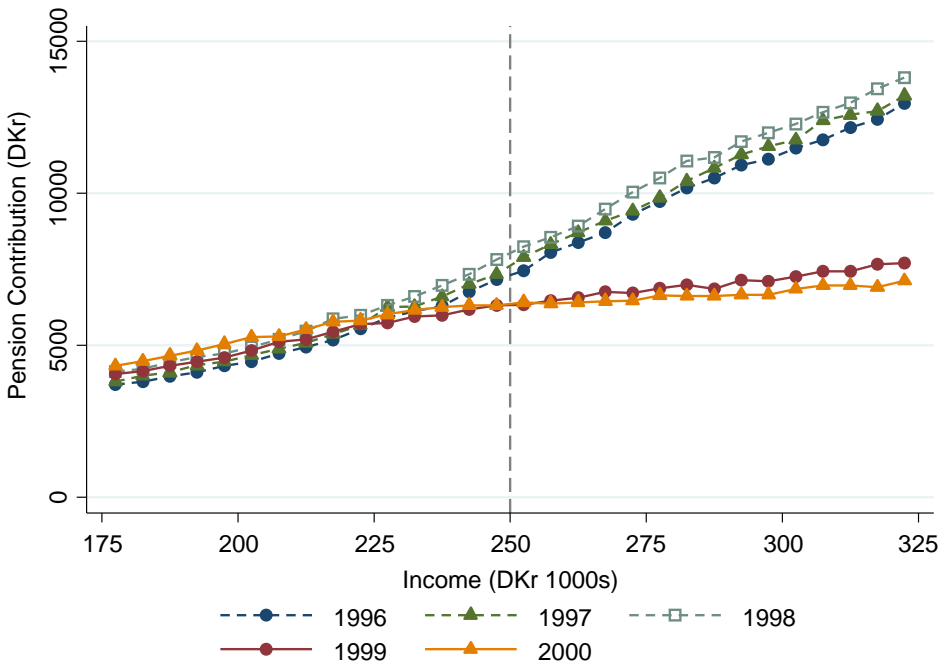
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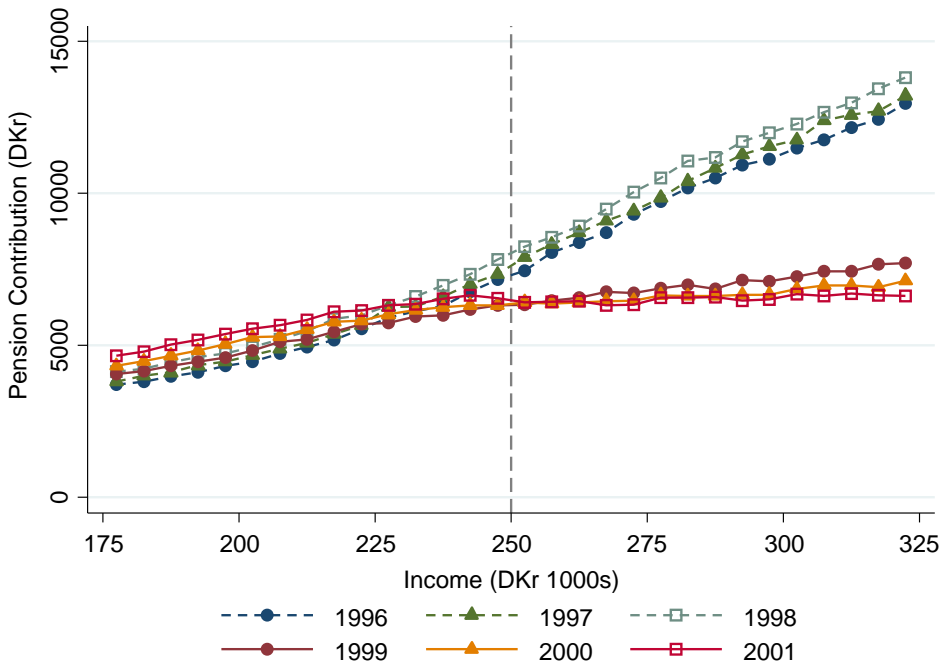
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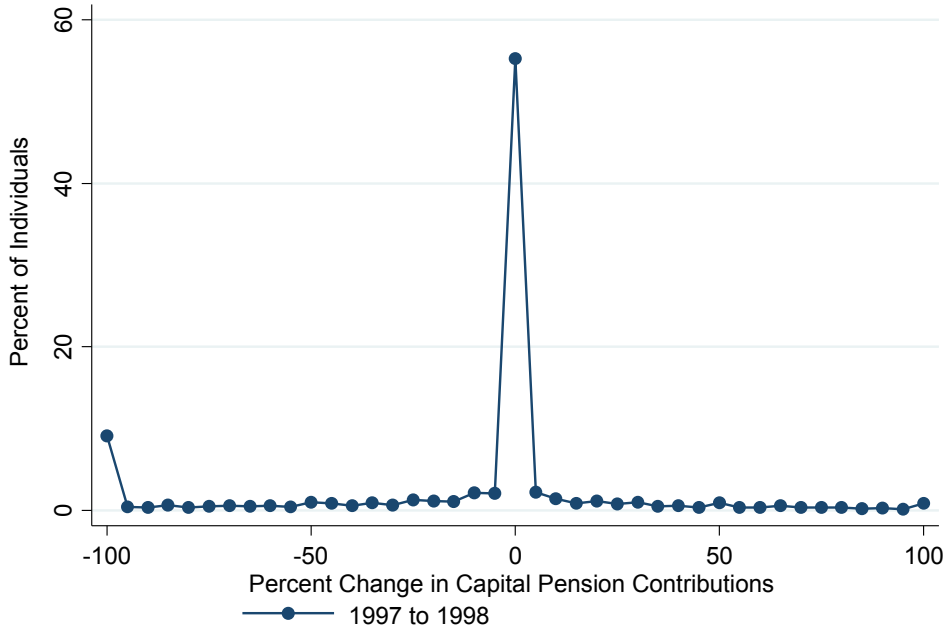
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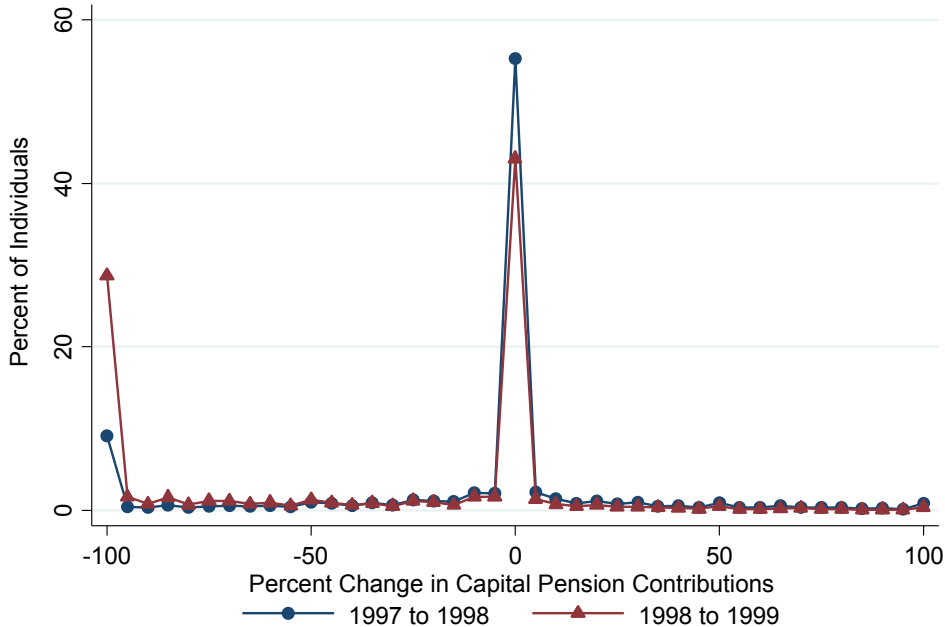
# Impact of 1999 Pension Subsidy Reduction On Pension Contributions



# Impact of 1999 Capital Pension Subsidy Reduction on Distribution of Capital Pension Contributions for Prior Contributors

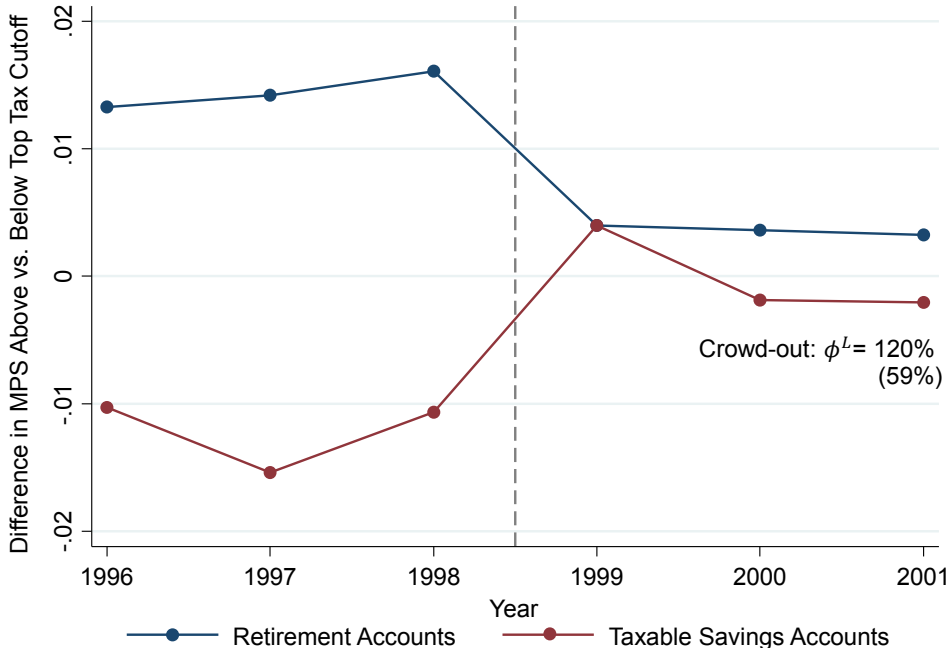


# Impact of 1999 Capital Pension Subsidy Reduction on Distribution of Capital Pension Contributions for Prior Contributors





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



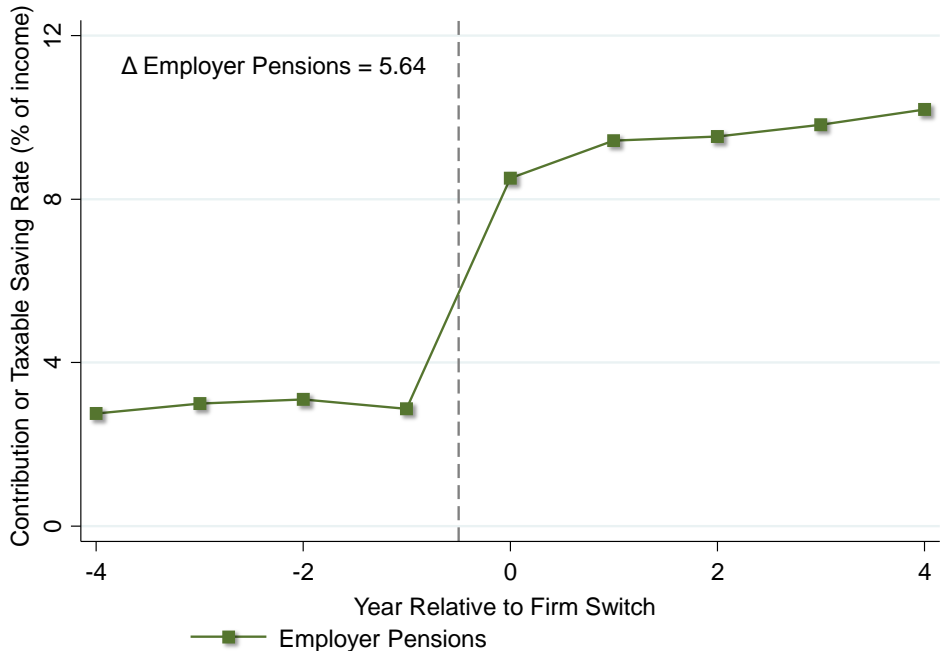
# Effect of Tax Subsidies

- Aggregate reduction is driven by 19% of treated households who entirely stop contributing to pensions
  - Remaining 81% do not change retirement contributions at all
  - Consistent with inattention model (Carroll et al. (2009, QJE))
- 90% of the reduction in retirement contributions is offset by more saving in non-retirement accounts
  - Crowd out -> smaller impact on total savings
  - \$1 of tax subsidy generates 1 cent increase in total savings

- Compare to impact of change in defaults
  - Madrian and Shea (2001); Choi et al (2004)
- Chetty et al (2013) study people switching firms with an opt-in versus an opt-out retirement savings program in the Danish data
- Key question: do defaults increase total savings or just a shift in assets?
  - Track savings around job changes, exploiting variation in employers' retirement plans
  - If you move to a firm where employers contribute more to retirement savings, do you offset this with decreased savings?

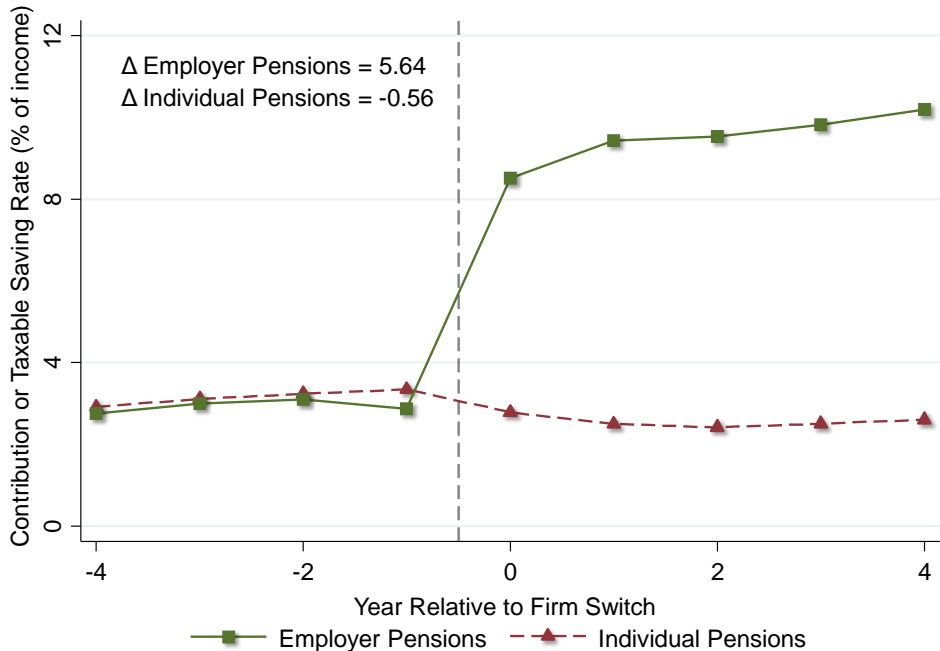
# Event Study around Switches to Firm with >3% Increase in Employer Pension Rate

Individuals with Positive Pension Contributions or Savings Prior to Switch



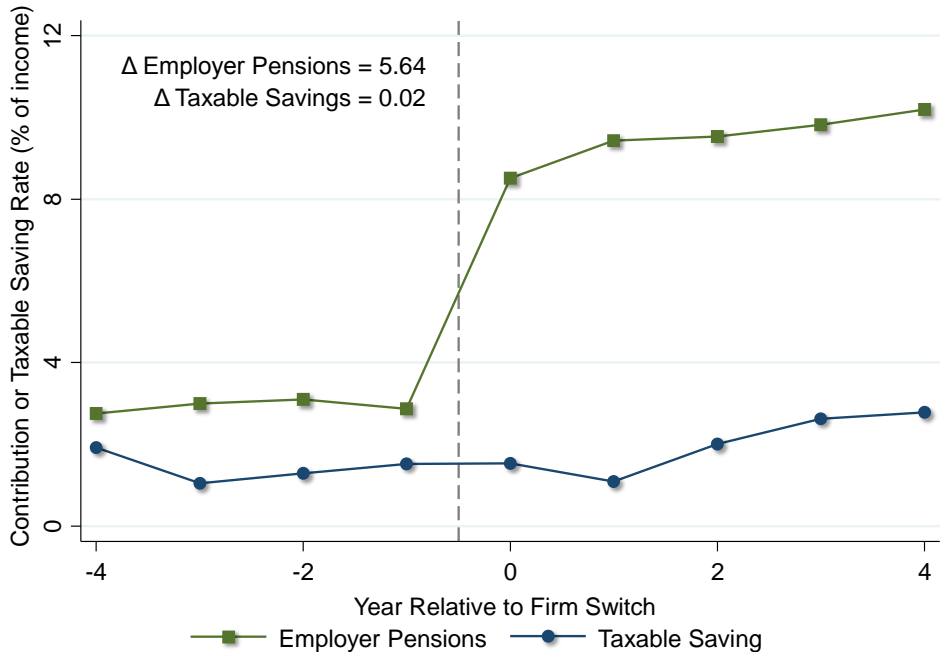
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# Summary of Nudge Effect

- Approximately 85% of individuals respond passively to changes in employer contributions
- They simply increase their savings
  - Savings increase is permanent and leads to increased wealth at retirement
- Suggests default policies can significantly increase savings rates for larger share of the population
- And potentially cost less too...

- Often, consumers don't consider all relevant options when making decisions
  - E.g. Handel evidence on switching costs. Is this a true "cost" of switching or just an "inattention" to the price of the other good?
- How can we identify what people consider? And their willingness to pay conditional on considering?
- Abaluck and Adams: think about Slutsky symmetry
- Slutsky: Compensated \$100 increase in price of good 1 should be equivalent to compensated \$100 decrease in price of all rival goods besides good 1
- Abaluck and Adams: Not true if people didn't consider good 1.



- To illustrate, consider an insurance plan choice between 0 and 1
- Suppose 0 is the default option and suppose individuals choose default unless it becomes sufficiently unattractive that it motivates attention on other goods. I.e. the attention on other goods is a function of the price of good 0.
- This implies that consumers only care about the price of good 0, not the price difference between good 0 and good 1
- Paper shows one can identify the probability of considering good 1 conditional on price of good 0 separately from violations of Slutsky symmetry.

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# Thoughts on Research Proposals

- Some common themes
  - Interests in fiscal externalities
    - Interest in COVID
    - Interest in long-run impacts of policies
    - I learned some things about new tax policies
  - Many of you are grappling with: Is this question worth pursuing?
  - Every research project takes years
    - When should you pursue the project?

# Thoughts on “Is it worth pursuing”?

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  - One-sided projects
  - Same variation of previous paper
  - Program not large enough to be of 'general interest'

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  - Start with a puzzle (and sometimes you have to find your puzzle)
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  - If you’re genuinely interest in a project – there’s no substitute for this!
  - One-sided projects can still be ok

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  - If you’re genuinely interest in a project – there’s no substitute for this!
  - One-sided projects can still be ok
- As you go, your project idea always evolves...let it! Iterate between empirics, theory, and ideas
  - Idea  $\leftrightarrow$  Theory  $\leftrightarrow$  Empirics
  - Papers never follow a linear path (e.g. ask me about my JMP / Movers paper w Raj / etc).
    - The “scientific method” is not about testing hypotheses in data, but rather a series of learning opportunities as you explore data.

# General Advice for Grad School

- Stay curious
  - Professors always joke that undergrads come up with better ideas than grad students
  - Don't be afraid to be creative – crazy questions are ok
  - Don't get caught up in the literature / what's been done
    - But once you have a “good” idea, read deeply in that literature and figure out what has been done, then iterate with your idea
- Choose topics that **you** are passionate about
  - Researching those topics isn't work!
  - Will be easier to convince others its interesting if you think it is

- After classes end in 2nd year, fewer opportunities for “discipline” – here’s how I wish I’d applied mine:
  - Write good code and document your exploratory results in comments in your code
  - When getting a dataset, first thing to do is open it up and look at it
    - Spend an hour to make sure the data looks reasonable
  - It’s always worth writing out a model to explain your patterns / derive your regression equations
    - Not always clear it goes in the paper but still useful regardless



- Most common question I am asked: How can I get access to US Tax / Census data?
  - My response:
    - Can your question be asked without tax data? e.g. can you use less-restricted census data / FSRDC
    - Do you have power? If you're using cross-state variation, you're ruining most of the value of population data
    - Can you do preliminary analysis using public data to have a sense of whether your pattern is there?
  - If you have a project worth pushing for census / tax data, here are the paths:
    - If you can only use Census data, submit an FSRDC application
    - Submit to the SOI call for proposals
    - Collaborate with a researcher at the Office of Tax Analysis at Treasury or the Joint Committee for Taxation (both of whom have access to the data).
  - Ask for advice from folks with access, but remember many (like me) may be prevented from working on your project idea because it requires formal approval

# Other Data Partners

- Other countries' admin data is often less restrictive:
  - Norway, Denmark, Sweden, Germany, Italy, France...
- Firms have an enormous amount of information
  - Generally under-explored in research:
    - Transactions / sales information
    - HR information
    - Search / website info
- Other good sources for merging to gain new outcomes:
  - Voterfiles (contains race/demographics)
  - credit reports / court records

- Graduate school has far too few opportunities to present
  - Take each presentation seriously, not just as feedback on your work but as an opportunity to improve your skills at presenting
  - But don't let the stress overwhelm you – everyone gets stressed in presentations (including me) but the hope is you can translate it into productive energy
- Practice your presentations (I have never given a seminar that I have not practiced at least 10 times through)
  - Think through how you want to make your arguments to the listener
  - Practice transitions between slides
  - Know your slides and the details
  - Put some effort into slide construction – often one graph can “make” a paper
  - More practice ex-ante can also reduce stress
- Appreciate feedback
  - You are not your paper

# Some Topics I Find Interesting

- 1 Desirability of place-based versus national policy
- 2 Endogeneity of public policies (i.e. political economy) – what are we missing by not thinking about political economy constraints?
- 3 Why don't people take up social benefits? (and should we incentivize them to?)
- 4 What other markets are missing because of private information and what are the welfare implications? (Credit? Reclassification risk? Income insurance?)
- 5 Career trajectories within the firm
- 6 Competition in insurance markets – what's the equilibrium? [Note: I've given up trying to think this can be solved...]
- 7 Government versus markets - should the govt, e.g., provide schooling directly or fund charter schools?
- 8 Endogenous preferences and impact on PF / role of policy (MVPP of being a jerk? Altruism? Endogenous altruism? Endogenous reductions in gender bias or racism?)
- 9 The economic incidence of COVID