

Econ 219B
Psychology and Economics: Applications
(Lecture 14 and last)

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April 29, 2015

Outline

1. Behavioral Public Economics
2. Market Reaction to Biases: Political Economy II
3. Methodology: Structural Behavioral Economics
4. Welfare Response to Biases
5. Concluding Remarks
6. Teaching Evaluation

1 Behavioral Public Economics

- Dmitry Taubinsky

Behavioral Welfare Analysis: A Sufficient Statistics Approach

Dmitry Taubinsky

Applications of Psychology and Economics (219B)
April 29, 2015

Plan for today:

1. Review of “neoclassical sufficient statistics”
2. Overview of “behavioral sufficient statistics”
3. Example: Allcott and Taubinsky (forthcoming)

A standard policy problem

- N goods: $x = (x_1, \dots, x_N)$; prices (p_1, \dots, p_N) ; wealth Z
- Normalize $p_N = 1$ (x_N is numeraire)
- Government levies a tax t on good 1
- Individual takes t as given and solves

$$\max u(x_1, \dots, x_{N-1}) + x_N \text{ s.t. } (p_1 + t)x_1 + \sum_{i=2}^N p_i x_i = Z$$

Government objective:

$$W(t) = \max_x \{u(x_1, \dots, x_{N-1}) + Z - (p_1 + t)x_1 - \sum_{i=2}^{N-1} p_i x_i\} + tx_1$$

Goal: measure $\frac{dW}{dt}$ = change in social surplus caused by tax change

How to measure $\frac{dW}{dt}$?

- Structural method: estimate N good demand system, recover u
 - Ex: use Stone-Geary or AIDS to recover preference parameters; then calculate “exact consumer surplus” as in Hausman (1981)
- Alternative: Harberger’s deadweight loss triangle formula
 - Private sector choices made to maximize term in red (private surplus)

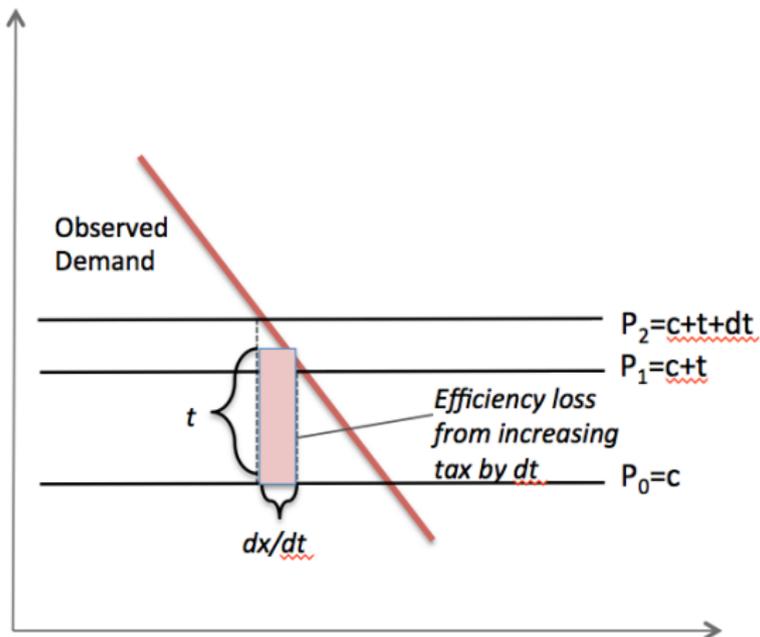
$$W(t) = \left\{ \max_x u(x_1, \dots, x_{N-1}) + Z - (p_1 + t)x_1 - \sum_{i=2}^{N-1} p_i x_i \right\} + tx_1$$

- Envelope conditions for (x_1, \dots, x_N) allow us to eliminate response terms ($\frac{dx_i}{dt}$) in red, yielding

$$\frac{dW}{dt} = -x_1 + x_1 + t \frac{dx_1}{dt} = t \frac{dx_1}{dt}$$

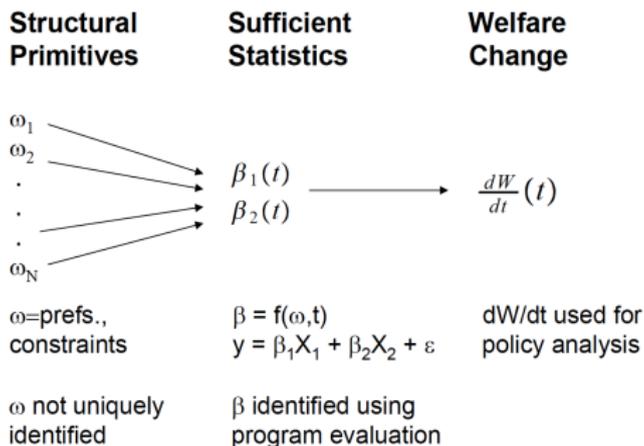
$\Rightarrow \frac{dx_1}{dt}$ is a “sufficient statistic” for calculating $\frac{dW}{dt}$

Graphical illustration



Basic idea behind sufficient statistics

THE SUFFICIENT STATISTIC APPROACH



Source: Chetty (2009)

Heterogeneity

- Benefit of suff stat approach particularly evident with heterogeneity
- K agents, each with utility $u_k(x_1, \dots, x_{N-1}) + x_N$
- Social welfare function under utilitarian criterion:

$$W(t) = \left\{ \max_x \sum_{k=1}^K [u_k(x_1^k, \dots, x_{N-1}^k) + Z - (p_1 + t)x_1^k - \sum_{i=2}^{N-1} p_i x_i^k] \right\} + \sum_{k=1}^K t x_1^k$$

- Structural method: estimate demand systems for all agents
- Sufficient statistic formula is unchanged—still need only slope of aggregate demand $\frac{dx_1}{dt}$

$$\frac{dW}{dt} = - \sum_{k=1}^K x_1^k + \sum_{k=1}^K x_1^k + t \frac{d \sum_{k=1}^K x_1^k}{dt} = t \frac{dx_1}{dt}$$

Economic intuition

- Deadweight loss is fully determined by difference between marginal willingness to pay for good x_1 and its cost (c_1)
 - To do welfare calculation, only need to know marginal utility between p and $p + dt$

$$dW = \int_{q=p}^{q=p+dt} u'(q) dq$$

- Rationality \Rightarrow no matter how complex or heterogeneous the preferences are, marginal utility at price p will always equal p

A (behavioral) policy problem

- 2 goods: $x = (x_1, x_2)$; prices (p_1, p_2) ; wealth Z
- Government levies a tax t on good 1
- Individual takes t as given and solves

$$\max u(x_1) + x_2 \text{ s.t. } (p_1 + t)x_1 + x_2 = Z$$

Government objective:

$$W(t) = \max_x \{v(x_1) + Z - (p_1 + t)x_1\} + tx_1$$

New wrinkle: v might differ from u because of psychological biases

How to measure $\frac{dW}{dt}$?

- Structural method: Assume a specific, parametric model of a behavioral bias (e.g., β - δ , rational inattention, overoptimistic beliefs, Matthew's favorite Greek letter), estimate the specific model, and then compute welfare exactly.
 - Note: Human psychology is a primitive, but behavioral models are not. Typically, structural behavioral models are analogous to making functional form assumptions about a demand system.
 - “All models are wrong, some are useful”

How to measure $\frac{dW}{dt}$?

- Sufficient statistics approach:
 - Private sector choices made to maximize term in red (*perceived private surplus*)

$$W(t) = \max_x \{u(x_1) + Z - (p_1 + t)x_1 + [v(x_1) - u(x_1)]\} + tx_1$$

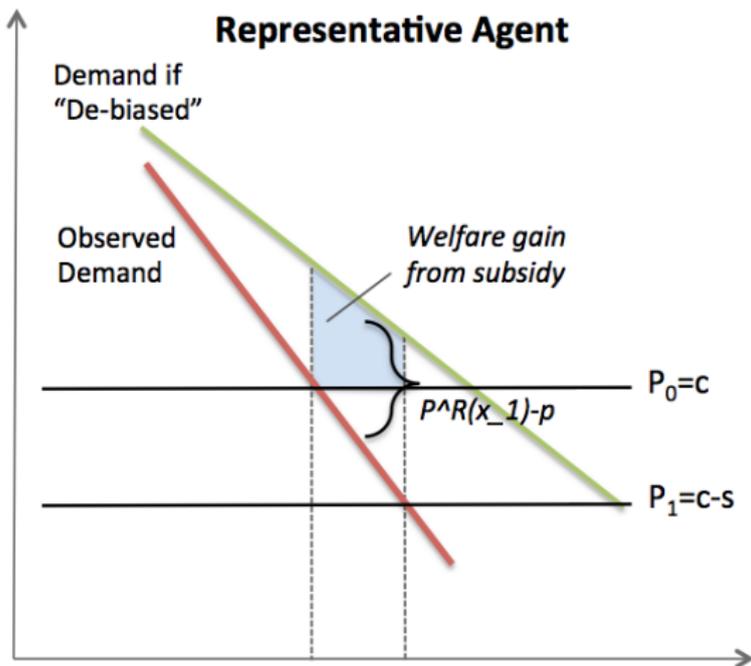
- Envelope conditions for x_1 imply

$$\begin{aligned} \frac{dW}{dt} &= -x_1 + x_1 + t \frac{dx_1}{dt} + (v'(x_1) - u'(x_1)) \frac{dx_1}{dt} \\ &= t \frac{dx_1}{dt} + (P^R(x_1) - p) \frac{dx_1}{dt} \end{aligned}$$

where P^R is the inverse rational demand curve that would result if the consumer chose according to v

⇒ Two demand curves are together sufficient statistics: the observed demand curve and the “rational” demand curve

Graphical illustration



Example from Allcott and Taubinsky

Many policymakers conjecture that consumers don't purchase energy efficient products because of inattention and/or incorrect beliefs

Energy-efficiency regulations and fuel economy regulations are therefore justified only by presuming that consumers are unable to make market decisions that yield personal savings, that the regulator is able to identify these consumer mistakes, and that the regulator should correct economic harm that people do to themselves.

(Gayer, 2011)

Regulation in the Lightbulb Market

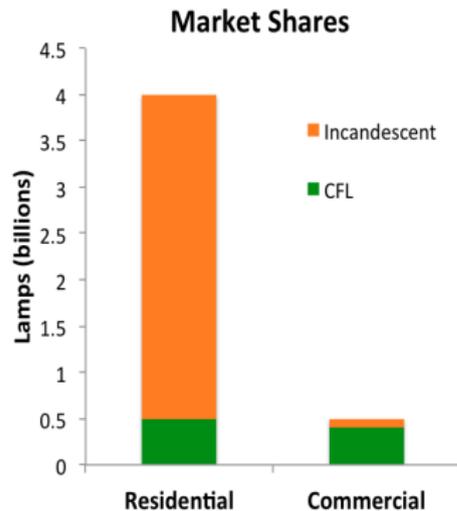
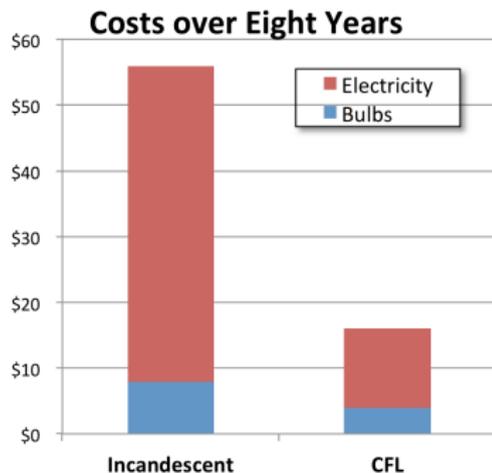
Subsidies

- Utilities spent at least \$252 million subsidizing and promoting compact fluorescent lightbulbs (CFLs) in 2010 (U.S. DOE 2010)

Bans

- Energy Independence and Security Act of 2007
 - 2012-2014: Minimum standards ban traditional incandescents
 - 2020: Tighter standards require CFL-level efficiency
 - California implementing early
- Argentina, Australia, Brazil, Canada, China, Cuba, the European Union, Israel, Malaysia, Russia, Switzerland have banned some or all incandescent light bulbs.

Priors: Are consumers leaving money on the table?



But lightbulbs differ in other ways:

- CFLs contain mercury and take longer to warm up
- Revealed preference \Rightarrow consumers pay premium to avoid other features?

The policy question

- Policymakers conjecture that observed demand curves do not reflect people's true preferences ($u \neq v$)
- Allcott and Taubinsky approach: Calculate what the "rational" demand curve would look like if people were not making mistakes due to inattention and incorrect beliefs, and implement the sufficient statistics formula for subsidies
 - For now, will not get into issues about heterogeneous bias, will get back to that later
- Key *identification assumption*, consistent with many (though not all) models of inattention/incorrect beliefs: If shrouded costs are made salient and aggregated into the total cost, then consumers should stop ignoring them

Online Experiment: Choices

Participants receive \$10 shopping budget; choose between Incandescent and CFL packages at various prices

We have given you a \$10 shopping budget to purchase a package of light bulbs. Your first 15 purchase decisions will concern the two packages of light bulbs shown below.

Choice A
Philips 60-Watt-Equivalent
Compact Fluorescent Light Bulb, 1-Pack



Choice B
Philips 60-Watt Incandescent
Light Bulbs, 4-Pack



[Click for detailed product information](#)

Between the 15 decisions, the only thing that varies is the price. Each of these decisions has a chance of being the one choice (out of 30) that will become your official purchase, so you should think about each purchase carefully. Whatever money you do not spend on the light bulbs, you get to keep: any remaining money will be provided to you as cash-equivalent bonus points. Please think about each decision carefully.

Here is an example of how this might work. After you make all your decisions, suppose that Decision Number 6 from the set below were selected as your official purchase.

- If you had chosen Choice A, you would pay \$2 from your \$10 shopping budget. You would receive the Choice A light bulb package in the mail within 4-6 weeks, as well as the remaining \$10-\$2=\$8 in your shopping budget (You would receive that \$8 in the form of 8000 bonus points credited to your account.)
- If you had chosen Choice B, you would pay \$4 from your \$10 shopping budget. You would receive the Choice B light bulb package in the mail within 4-6 weeks, as well as the remaining \$10-\$4=\$6 in your shopping budget. (You would receive that \$6 in the form of 6000 bonus points credited to your account.)

Now please make your decisions for each of the 15 choices below.

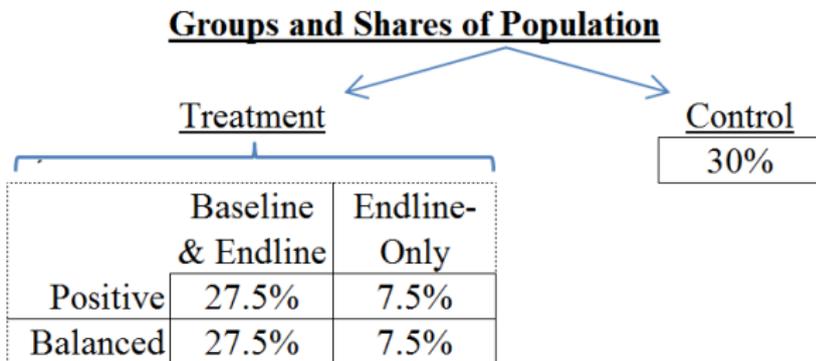
Online Experiment: Choices

Detailed Product Information

Choice:	A	B
Manufacturer:	Philips	Philips
Type:	Compact Fluorescent (CFL)	Incandescent
Number of Bulbs:	1	4
Light Output:	60 Watt-equivalent	60 Watts
Light Output:	900 Lumens	840 Lumens
Color Temperature:	2700K	2700K
Energy Use:	13 Watts	60 Watts
Manufacturer's Home Country:	USA	USA

[Back to Questionnaire](#)

Online experiment: Study Flow and Treatments



Process

1. **Baseline choices** (multiple price list)
2. **Information provision** (two screens, content varies by group)
3. **Endline choices** (multiple price list)
4. **Post-experiment survey** (beliefs, time preferences, etc.)

Nationally representative sample of **1533** subjects

Step 1: Multiple Price List

Now please make your decisions for each of the 15 choices below.

Decision Number	Choice A 60-Watt-Equivalent Compact Fluorescent Light Bulb, 1-Pack	Choice B 60-Watt Incandescent Light Bulbs, 4-Pack
1)	Purchase Choice A for free <input type="radio"/>	Purchase Choice B for \$10 <input type="radio"/>
2)	Purchase Choice A for free <input type="radio"/>	Purchase Choice B for \$8 <input type="radio"/>
3)	Purchase Choice A for free <input type="radio"/>	Purchase Choice B for \$6 <input type="radio"/>
4)	Purchase Choice A for free <input type="radio"/>	Purchase Choice B for \$4 <input type="radio"/>
5)	Purchase Choice A for \$1 <input type="radio"/>	Purchase Choice B for \$4 <input type="radio"/>
6)	Purchase Choice A for \$2 <input type="radio"/>	Purchase Choice B for \$4 <input type="radio"/>
7)	Purchase Choice A for \$3 <input type="radio"/>	Purchase Choice B for \$4 <input type="radio"/>
8)	Purchase Choice A for \$4 <input type="radio"/>	Purchase Choice B for \$4 <input type="radio"/>
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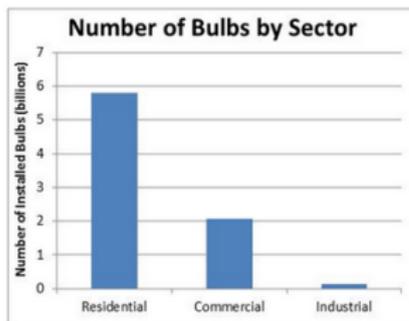
Step 2: Control, Screen 1

According to official estimates, there are slightly more than eight billion light bulbs installed in the United States.

The US economy can be divided into three major sectors: residential, commercial, and industrial. Each sector has a different number of light bulbs:

- There are about 5.8 billion light bulbs installed in residential buildings in the U.S.
- There are about 2.1 billion light bulbs installed in commercial buildings in the U.S.
- There are about 0.14 billion light bulbs installed in industrial buildings in the U.S.

The graph below illustrates this:



Question: About how many more light bulbs are installed in residential buildings compared to commercial buildings in the U.S.?

To answer this question, you can enter whole numbers and/or decimals.

Type your answer below.

billion

Step 2: Control, Screen 2

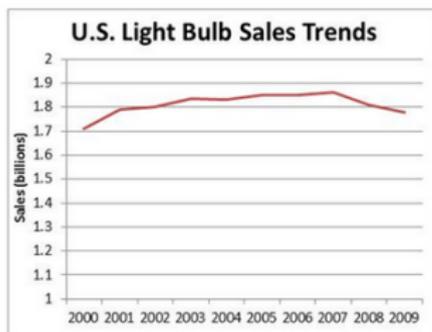
According to official sales data, sales of light bulbs in the United States have had the following trend:

- Sales increased in each year between 2000 and 2007.
- Sales decreased slightly in 2008 and 2009.

Total light bulb sales were different at the end of the decade compared to the beginning:

- Sales in 2000 were just over 1.7 billion bulbs.
- Sales in 2009 were just under 1.8 billion bulbs.

The graph below illustrates this:



Question: About how many light bulbs were sold in the United States in 2009?

To answer this question, you can enter whole numbers and/or decimals.

Type your answer below.

billion

Step 2: “Positive” Treatment, Screen 1

CFLs last longer than incandescents. At average usage:

- Incandescents burn out and have to be replaced every year.
- CFLs burn out and have to be replaced every eight years.

If one incandescent bulb costs \$1 and one CFL costs \$4, this means that the total purchase prices for eight years of light are:

- \$8 for incandescents
- \$4 for CFLs

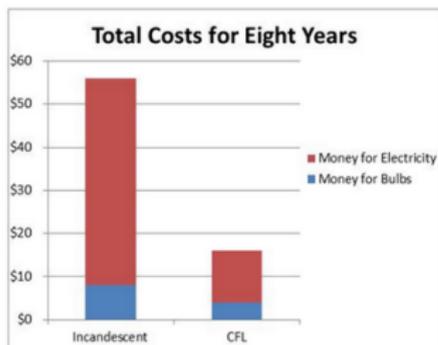
Also, CFLs use less electricity than incandescents. At national average usage and electricity prices:

- A standard (60-Watt) incandescent uses \$6 in electricity each year.
- An equivalent CFL uses \$1.50 in electricity each year.

Thus, for eight years of light, the total costs to purchase bulbs and electricity would be:

- \$56 for incandescents: \$8 for the bulbs plus \$48 for electricity
- \$16 for a CFL: \$4 for the bulbs plus \$12 for electricity

The graph below illustrates this:



Step 2: “Positive” Treatment, Screen 2

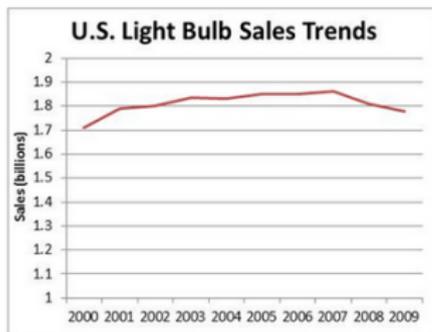
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The graph below illustrates this:



Question: About how many light bulbs were sold in the United States in 2009?

To answer this question, you can enter whole numbers and/or decimals.

Type your answer below.

billion

Step 2: Balanced Treatment, Screen 1

CFLs last longer than incandescents. At average usage:

- Incandescents burn out and have to be replaced every year.
- CFLs burn out and have to be replaced every eight years.

If one incandescent bulb costs \$1 and one CFL costs \$4, this means that the total purchase prices for eight years of light are:

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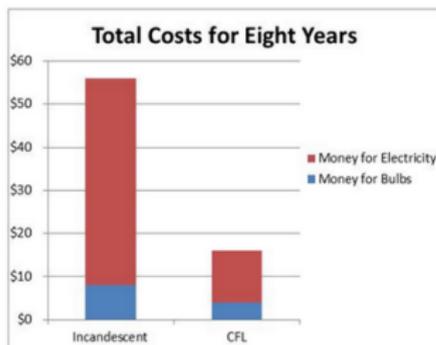
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Step 2: Balanced Treatment, Screen 2

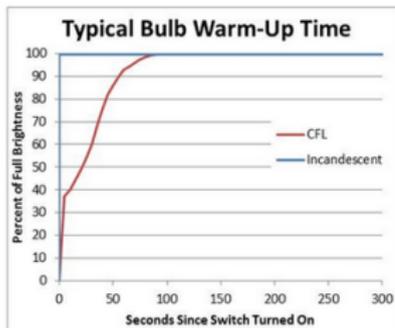
After they burn out, CFLs need proper disposal:

- Because CFLs contain mercury, it is recommended that they be properly recycled, and not simply disposed of in regular household trash. CFLs can be recycled through:
 - Local waste collection sites
 - Mail-back services that you can find online
 - Local retailers, including Ace Hardware, IKEA, Home Depot, and Lowe's, as well as other retailers.
- No special precautions need to be taken to dispose of an incandescent light bulb. Incandescents can be disposed of in regular household trash.

After the light switch is turned on, CFLs take longer to warm up than incandescents:

- An incandescent reaches full brightness immediately.
- A typical CFL can take 60 to 90 seconds to reach its full brightness.

The graph below illustrates this:



Question: About how much longer does it take a typical CFL to reach full brightness, as compared to an incandescent?

Type your answer below.

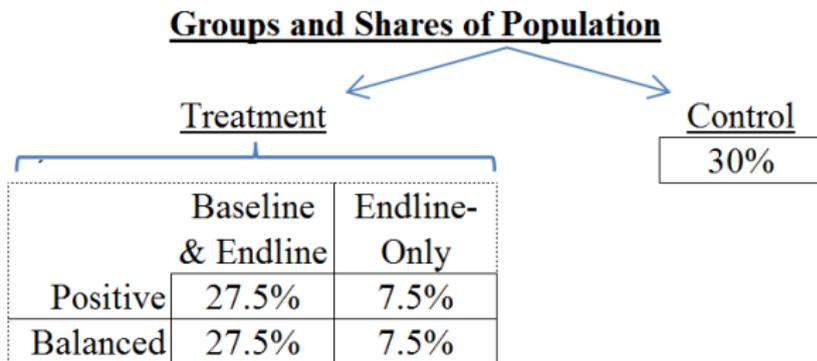
to seconds

Step 3: Multiple Price List

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8)	Purchase Choice A for \$4 <input type="radio"/>	Purchase Choice B for \$4 <input type="radio"/>
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Online Experiment: Study Flow and Treatments



Process

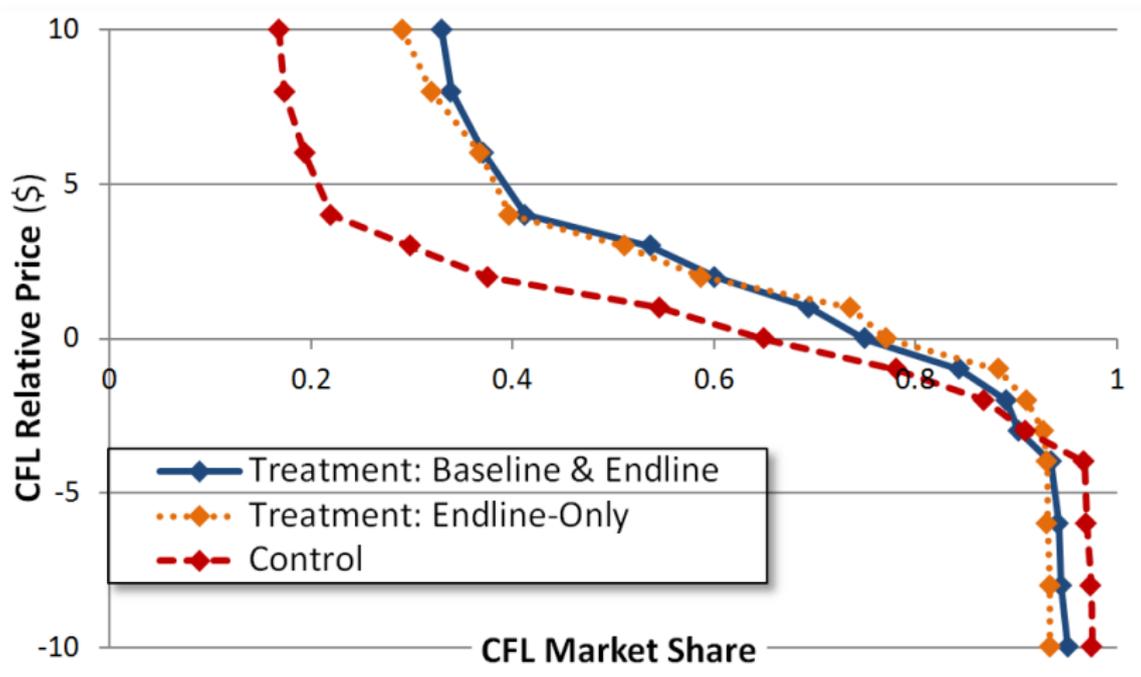
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Nationally representative sample of **1533** subjects

Overall Impact on WTP

	(1)	(2)	(3)	(4)
1(Treatment)	2.30 (0.37)***	3.16 (0.37)***	2.29 (0.54)***	2.14 (0.50)***
1(Endline-Only)			-0.44 (0.76)	
1(Positive Treatment)				0.35 (0.56)
R2	0.58	0.33	0.04	0.58
N	1,188	919	1,449	1,188
Baseline WTP Dummies μ	Yes	Yes	No	Yes
Individual Characteristics	Yes	Yes	Yes	Yes
Exclude Max./Min. Baseline WTP	No	Yes	No	No
Include Endline-Only Group	No	No	Yes	No

Experimental Results: Demand Curves



Using the sufficient statistics formula

If the demand curves corresponded to a representative consumer, we are done:

$$\frac{dW}{dt} = t \frac{dx_1}{dt} + (P^R(x_1) - p) \frac{dx_1}{dt}$$

- Know both the observed and rational demand curves
- Implement formula for each possible change in the subsidy
- Complication: Consumers are not homogeneous, and this time it matters!

Sufficient statistics with heterogeneous consumers

- Neoclassical world: No matter how heterogeneous consumers are, they are homogeneous on the margin ($u'(x) - p = 0$)
 - Major source of power of sufficient statistics in neoclassical model
- Behavioral world: If consumer are heterogeneously biased, they may also be heterogeneous on the margin
 - Because $v'(x) - u'(x) = v'(x) - p$ can be very different for different consumers

$$\begin{aligned}
 \frac{dW}{dt} &= \sum_k t \frac{dx_1^k}{dt} + \sum_k (P^{R,k}(x_1) - p) \frac{dx_1^k}{dt} \\
 &= \underbrace{t \frac{dx_1}{dt}}_{\text{Harberger term}} + \underbrace{\sum_k (P^{R,k}(x_1) - p) \frac{dx_1^k}{dt}}_{\text{Internality reduction}}
 \end{aligned}$$

- Can't use aggregate demand curves, because those don't inform us about the relationship between bias and elasticity

Heterogeneity in behavioral models: Graphical illustration

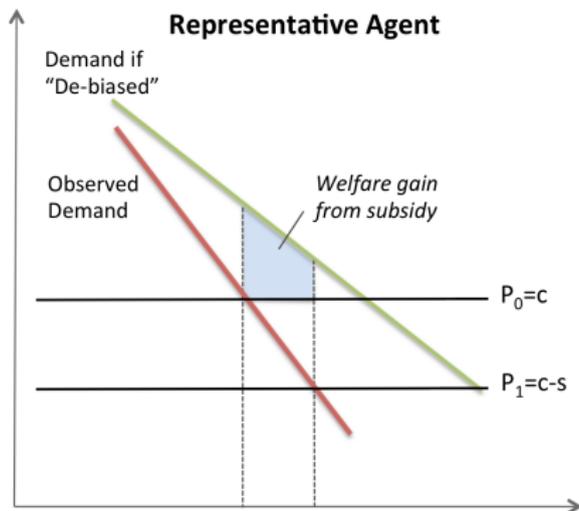


Figure: Aggregate demand curves

Heterogeneity in behavioral models: Graphical illustration

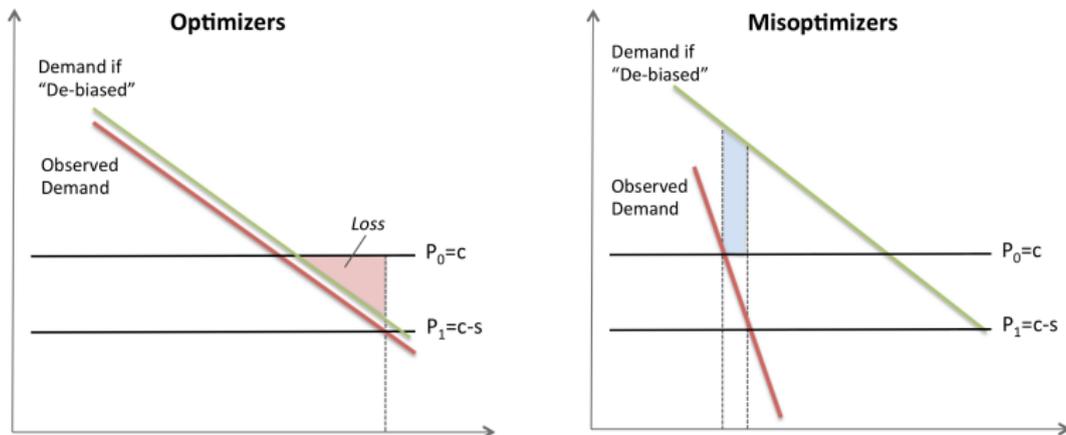
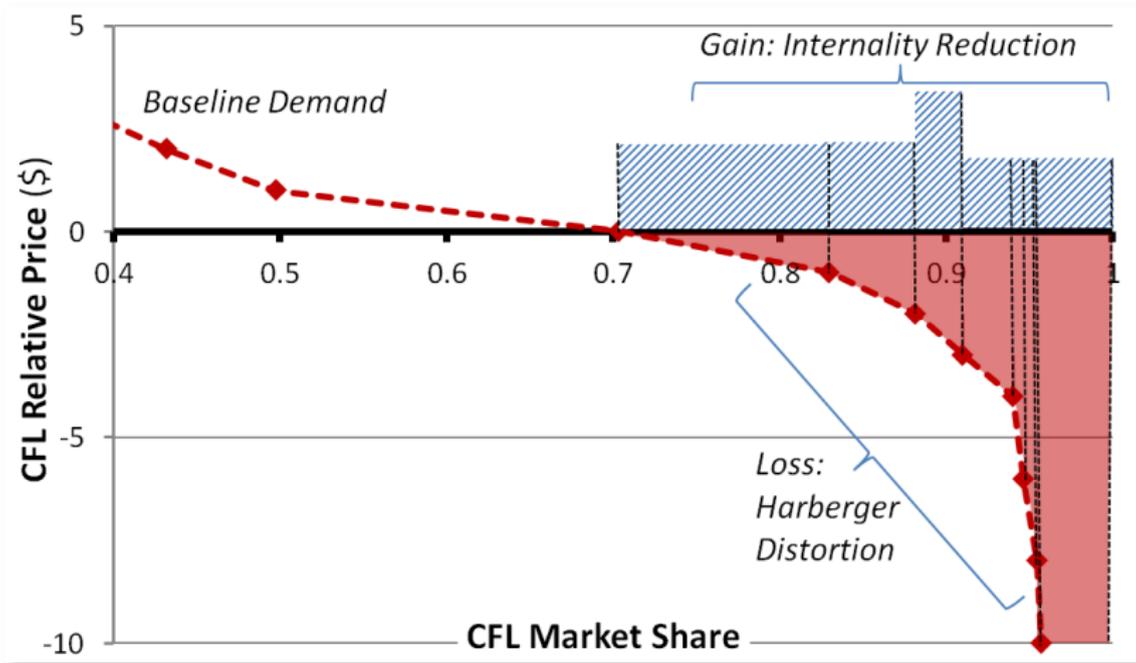


Figure: Heterogeneous behavioral consumers

The need for within-subject designs

- With behavioral sufficient statistics, critical to take heterogeneity seriously
- Allcott and Taubinsky approach: *Within-subject* design allows estimation of each person's individual demand curve
- Compute $\sum_k (P^{R,k}(x_1) - p) \frac{dx_1^k}{dt}$ directly by estimating biased and unbiased demand curves person by person

Welfare Analysis



Welfare Analysis

	(1)	(2)	(3)	(4)	(5)
CFL Subsidy	Average Relative WTP of Marginal Consumers	Average Marginal Bias	Change in Demand	Incremental Welfare Effect	Cumulative Welfare Effect
1	-0.5	2.11	0.126	0.20	0.20
2	-1.5	2.16	0.052	0.03	0.24
3	-2.5	3.41	0.028	0.03	0.26
4	-3.5	1.77	0.030	-0.05	0.21
6	-5	1.77	0.006	-0.02	0.19
8	-7	1.77	0.008	-0.04	0.15
10	-9	1.77	0.003	-0.02	0.13
∞	-15	1.77	0.043	-0.57	-0.44

Robustness to Alternative Assumptions

Row	Scenario	(1) Optimal Subsidy (\$/pckg)	(2) Welfare Effect of Ban (\$/pckg)	(3) Effect of Ban (Percent of "Perceived Surplus")
1	Base	3	-0.44	-41
<u>If censored, assume ...</u>				
2	WTP={\$12,-\$12}	3	-0.34	-36
3	WTP={\$20,-\$20}	3	-0.60	-47
4	self-reported hypothetical WTP	3	-0.61	-43
<u>Scale average marginal bias to match ...</u>				
5	consumers who pass review "quiz"	3	-0.41	-38
6	consumers w/ "correct" endline beliefs	3	-0.13	-12
7	Balanced Treatment group	3	-0.48	-45
8	10 percent confidence bound	1	-0.92	-86
9	90 percent confidence bound	(Ban)	0.05	4
<u>Additional Distortion Computed from Excess Mass Test</u>				
10	Excess mass consumers have $v = 7.66$	8	1.22	114

Conclusion: Advantages and disadvantages of sufficient statistics

Disadvantages: Results not generalizable across economic settings

- By not estimating structural parameters, cannot extrapolate from one domain to another
- Because sufficient statistics tied to specific policy instruments, cannot immediately consider new, more complex policy instruments

Advantages: More general and robust for a given economic setting

- Transparency about where identification is coming from
- More robust and more general with respect to a specific setting and specific policy instruments
 - Almost surely will not have a general theory of human behavior
 - But for a given economic and policy question, we can attempt to provide as general and robust a treatment as possible

2 Market Reaction to Biases: Political Economy

II

- What explains political participation?
 - Olson (1965): Public good problem: Even if think participation is right, individually better off staying at home
 - Example 1: Riots and protests
 - Example 2: Voter turnout at the polls -> Probability of being pivotal very small
- Series of papers introduce variants of social preferences to explain participation in political activities

- **Passarelli and Tabellini (2013):**
 - Focus on protests
 - Assume negative reciprocity and role of emotions
 - Individuals treated poorly by government get glow from protesting
- Model in a nutshell for individual i
 - Cost of participating to protest ε_i
 - Psychological benefit of participation to protest a_i

- Benefit a_i depends on aggrievement:

$$a_i = \begin{cases} 0 & \text{if } V_i \geq \hat{V} \\ \omega (V_i - \hat{V})^2 & \text{if } V_i < \hat{V} \end{cases}$$

- V_i is welfare of individual i with given policy
- \hat{V} is what individual thinks appropriate (can be self-biased)
- Ad-hoc form of reference dependence
- When aggrieved, individual willing to incur cost of participation because of glow from participation

- **DellaVigna, List, Malmendier, Rao (2013)**

- Related idea: Explain voter turnout with social preferences
- Tie to social interactions
- Identify using field experiment design

Why do people vote?

Two classical answers:

- ***Pivotal voting***: Vote because of probability of affecting outcome (Downs 1957, Ledyard 1984, and Palfrey and Rosenthal 1983)
→ People act *as if* voting is pivotal, but magnitudes off
- ***Norm-based voting***: Vote because of norm / identity / signaling (Harsanyi 1977, 1992; Knack 1992; and Blais 2000)
→ But limited empirical content
- We design an experiment to test novel explanation:
Voting Because Others Will Ask
 - Post-election: Others will ask you whether you voted.
 - If voted → pride of saying “yes”
 - If did not vote → shame of admitting “no” OR cost of lying
 - Pre-election: Anticipation of being asked induces turnout
 - Motivation: 40 percent of non-voters say they voted (ANES)

Determinants of Voting

Four determinants of voting

1. Pivotality pV

p = subjective probability of being pivotal

V = value of deciding the election

2. Warm glow g

3. Cost of voting c

4. Social Image utility

s_V = utility from saying one voted

s_N = utility from saying one did not vote

L = psychological cost of lying

Focus of this paper

social image

dishonesty

- Non-voters lie about voting if $s_V - L > s_N \leftrightarrow s_V - s_N > L$
- Voters lie if $s_N - L > s_V$

(Net) Expected Utility from Voting

Voting iff

$$\underbrace{pV + g - c}_{= \varepsilon} + N \underbrace{[\max(s_V, s_N - L) - \max(s_N, s_V - L)]}_{= \text{net utility gain from having voted, due to being asked once}} \geq 0$$

Can rewrite as: $N\Phi(s_v - s_L, L) + \varepsilon \geq 0$

$$\text{where } \Phi(s_v - s_L, L) = \begin{cases} \min(s_V - s_N, L) & \text{if } s_V - s_N \geq 0 \\ \max(s_V - s_N, L) & \text{if } s_V - s_N < 0 \end{cases}$$

Experimental Design

- Field experiment: door-to-door survey
 - Match to voting records
 - Identify all-voter and all-non-voter households
 - No Flyer: unannounced survey
 - Flyer: flyer on doorknob day before provides advance notice about hour of visit - no information on sv. content
 - Election Flyer: flyer on doorknob on day before provides advance notice about hour of visit – says survey will be about “voter participation”

Flyer Design

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University of
Chicago Study

Researchers will
visit this address
tomorrow (/)
between and
to conduct a
5 minute survey.

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University of
Chicago Study

Researchers will visit this
address tomorrow
(/)
between and to
conduct a
**5 minute survey on your
voter participation in the
2010 congressional
election.**

Model Predictions

- **Prop. 1.** With pride in voting ($s_V > 0$), voters should be more likely to be at home and answer the door if informed of election survey
- **Prop. 2.** With stigma from not voting ($s_N < 0$), non-voters should be less likely to be at home and answer the door if informed of election survey
- **Prop. 3.** The probability of lying about voting should increase in the incentive to do so
- **Prop. 4.** The probability of voting should increase in the number of times asked N

Experimental Design

- Field experiment: door-to-door survey
 - Match to voting records
 - Identify all-voter and all-non-voter households
 - Control: unannounced survey
 - Flyer: flyer on doorknob day before provides advance notice about hour of visit - no information on sv. content
 - Election Flyer: flyer on doorknob on day before provides advance notice about hour of visit – says survey will be about “voter participation”
 - Duration of, and Payment for, Survey: Crossed with other treatments

Flyer Design

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tomorrow (/)
between and
to conduct a
5 minute survey.

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Chicago Study

Researchers will visit this
address tomorrow (/)
between and to
conduct a **10 minute
survey.**

You will be paid **\$10 in
cash** for your participation.

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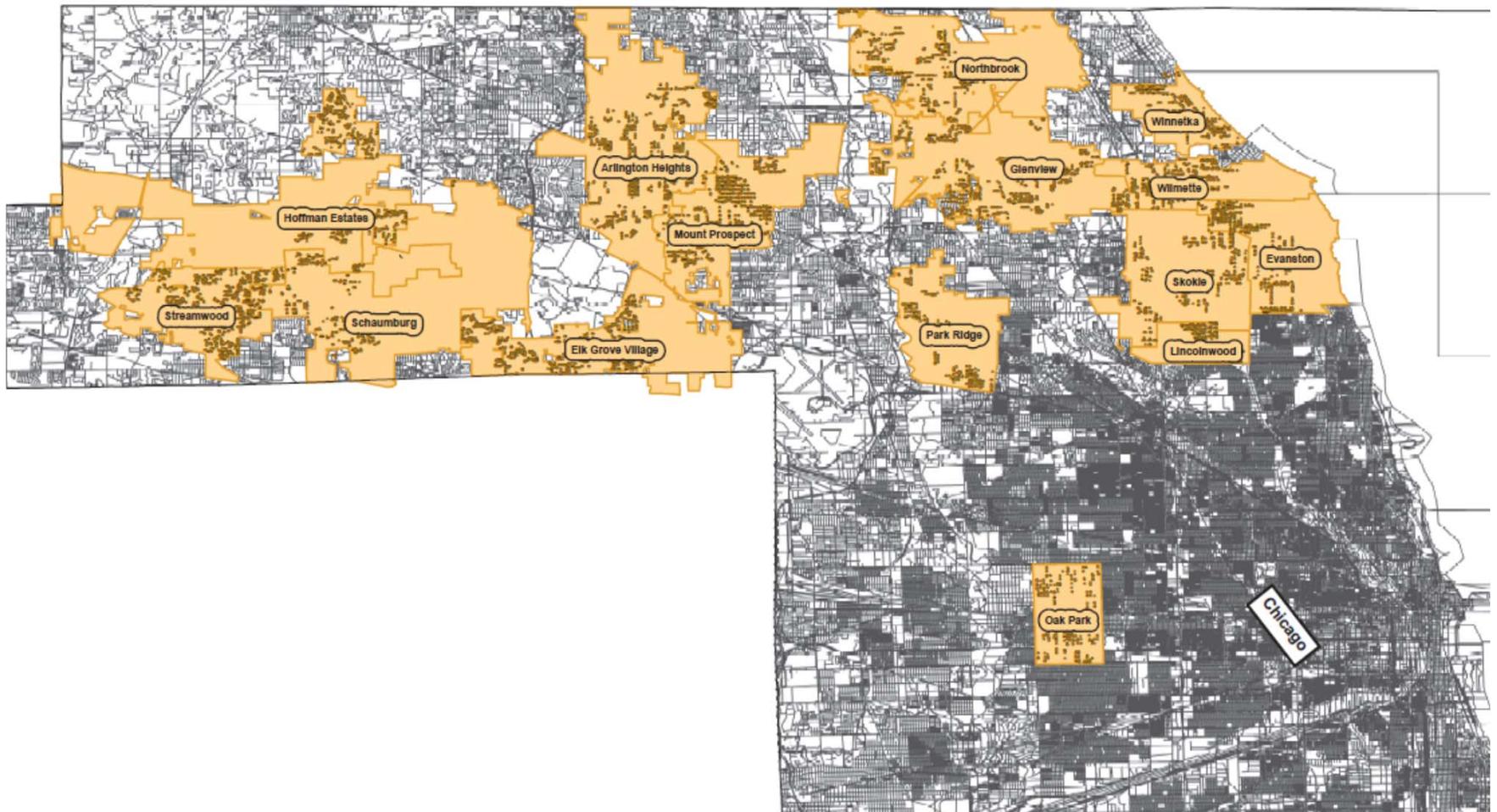
University of
Chicago Study

Researchers will visit this
address tomorrow (/)
between and to
conduct a **5 minute
survey.**

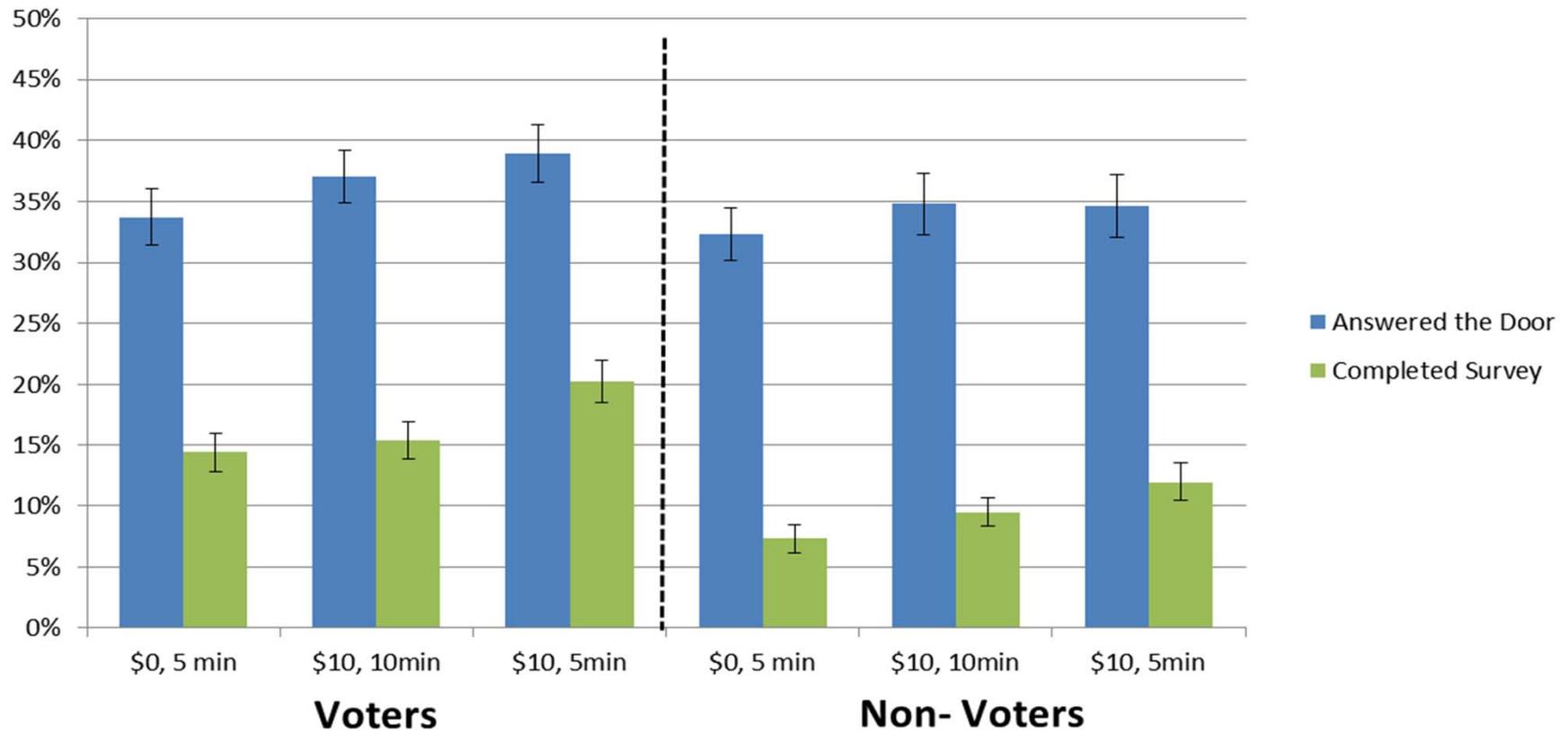
You will be paid **\$10 in
cash** for your participation.

Map of Locations Reached

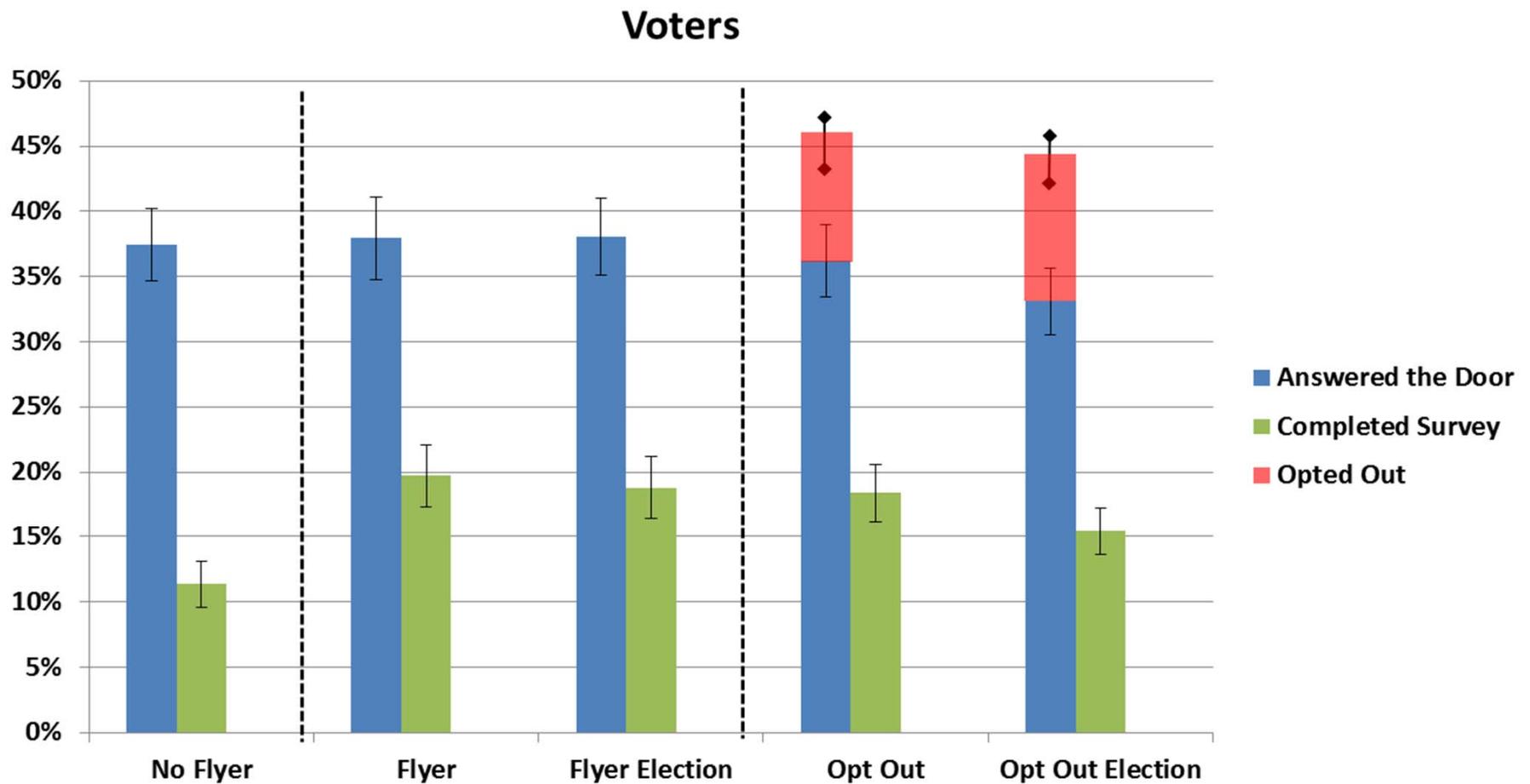
- Single-family homes in towns around Chicago



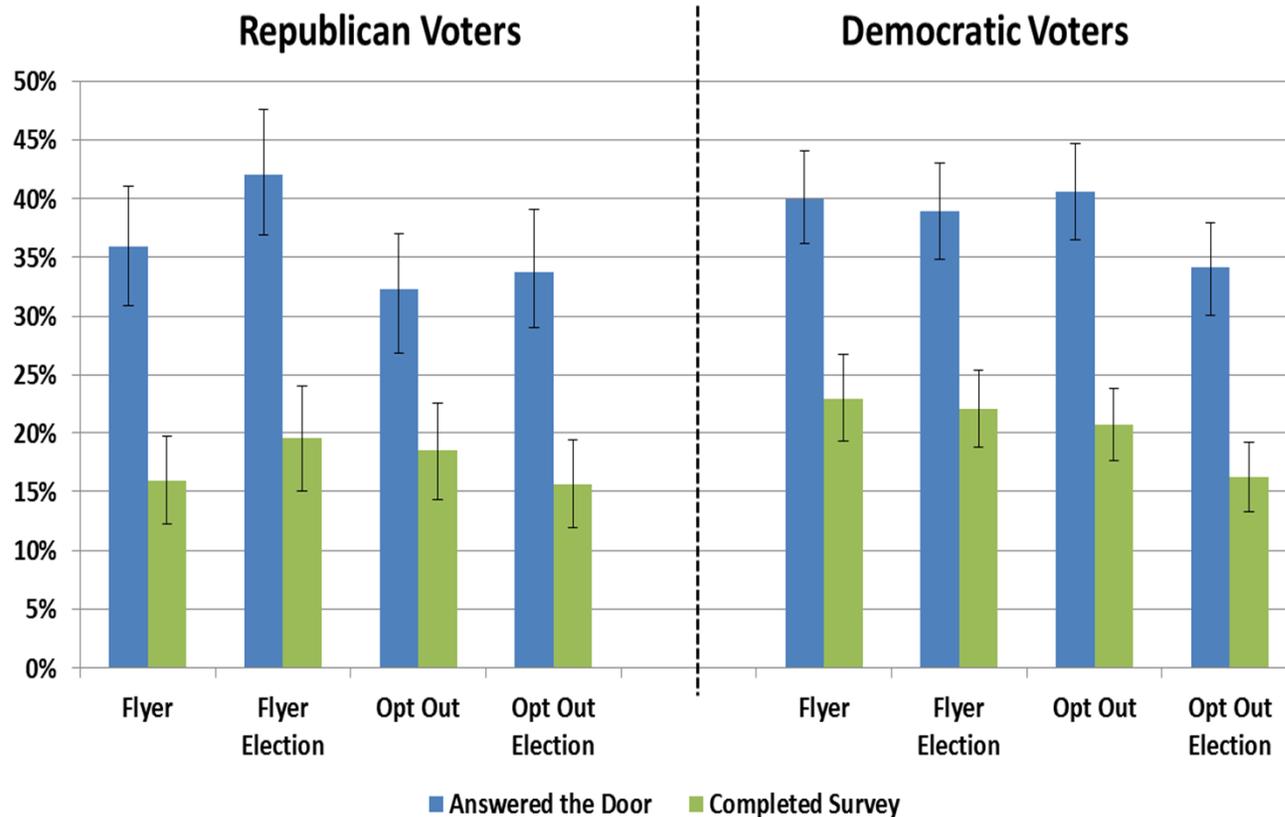
- **Response to Incentives (N = 11,331)**
- Response to payment and duration
- What about sorting in response to election content of survey?



- **Sorting in Response to Election Survey -- Voters**
- Voters -> No evidence of sorting in, some evidence of sorting
- No evidence of pride in voting on average

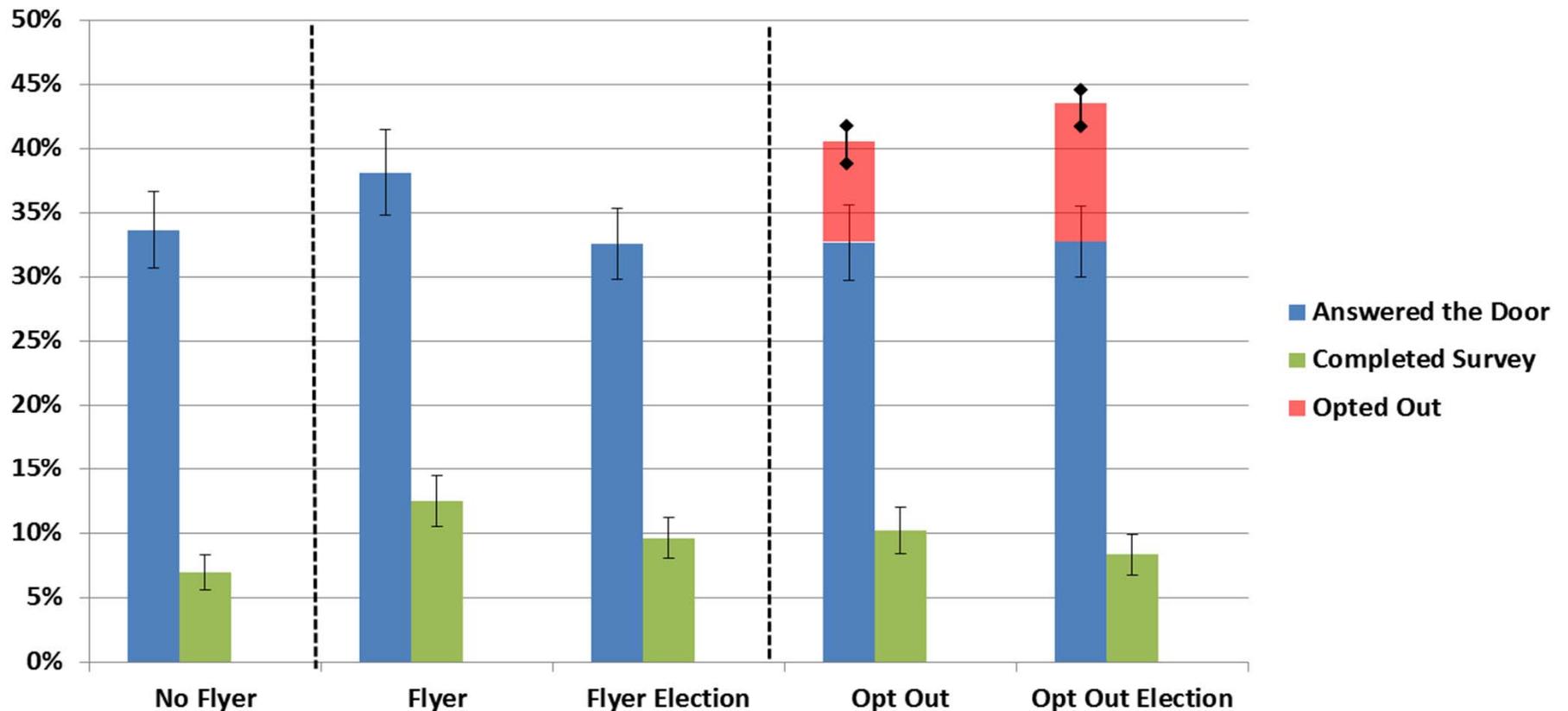


- **Sorting in Response to Election Survey -- Voters**
- However, 2010 election was low point for democratic voters
- 2/3 of registered voters in towns we reached are Democrats
- What if we split by voting record in primaries?
- Evidence of sorting in for Republicans



- **Sorting in Response to Election Survey – Non-Voters**
- Non-voters-> Strong evidence of sorting out
- Evidence of stigma from not voting and lying costs

Non-Voters



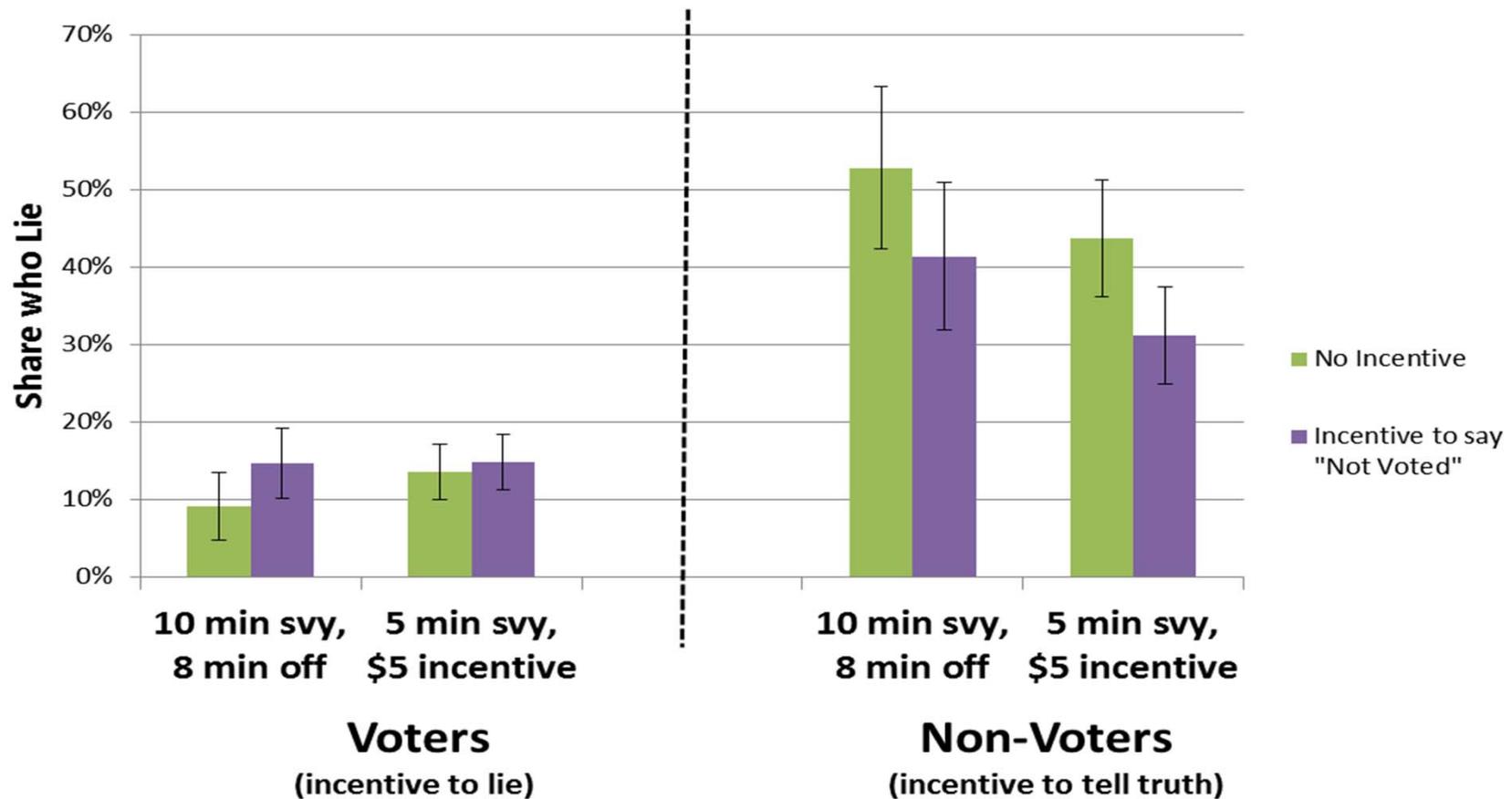
Lying Incentives

- Additional (crossed) experimental treatment: Incentive to lie in 10-minute survey
- *No Incentive*. Just ask whether voted in 2010 election
- *8-Minute Incentive*. (8 minute incentive to say 'did not vote')
 - We tell treatment households who agree to the (10-min,\$10) survey: **“We have 10 minutes of questions about your voter participation in the 2010 congressional election, but if you say that you did not vote then we only have 2 minutes of questions. Either way you answer you will be paid \$10. [Show the end of the survey if answer to #2 is NO]**
Did you vote in the 2010 congressional election?”
 - For voters it is incentive to lie
 - For non-voters this is incentive to tell truth
 - Use this to estimate *counterfactual* utility

Lying Incentives

- In 5-minute surveys:
- *No Incentive*. Just ask whether voted in 2010 election
- *\$5 Incentive*. (\$5 incentive to say did not vote)
 - We tell households who agree to the (5-min, unpaid or \$10) survey: **“We have 5 minutes of questions about your participation in the 2010 congressional election, but if you say that you did not vote then we would like to ask you an extra 1 minute of questions and we will pay you an extra \$5 for answering these additional questions [*IF PAID*: for a total of \$15]. If you say that you voted then we will just ask you the original 5 minutes of questions. [*IF PAID*: Either way you answer you will be paid \$10.]”**
 - **Did you vote in the 2010 congressional election?”**
 - As above, incentive to lie for voters, to tell the truth for non-voters

- **Response to Incentives to Say ‘Did Not Vote’**
- Small impact on voters: 2 percentage points increase in lying
→ Strong social image utility and/or lying cost
- Sizeable impact on non-voters: 12 percentage point decrease in lying
→ Non-voters are closer to indifference



Structural Estimation

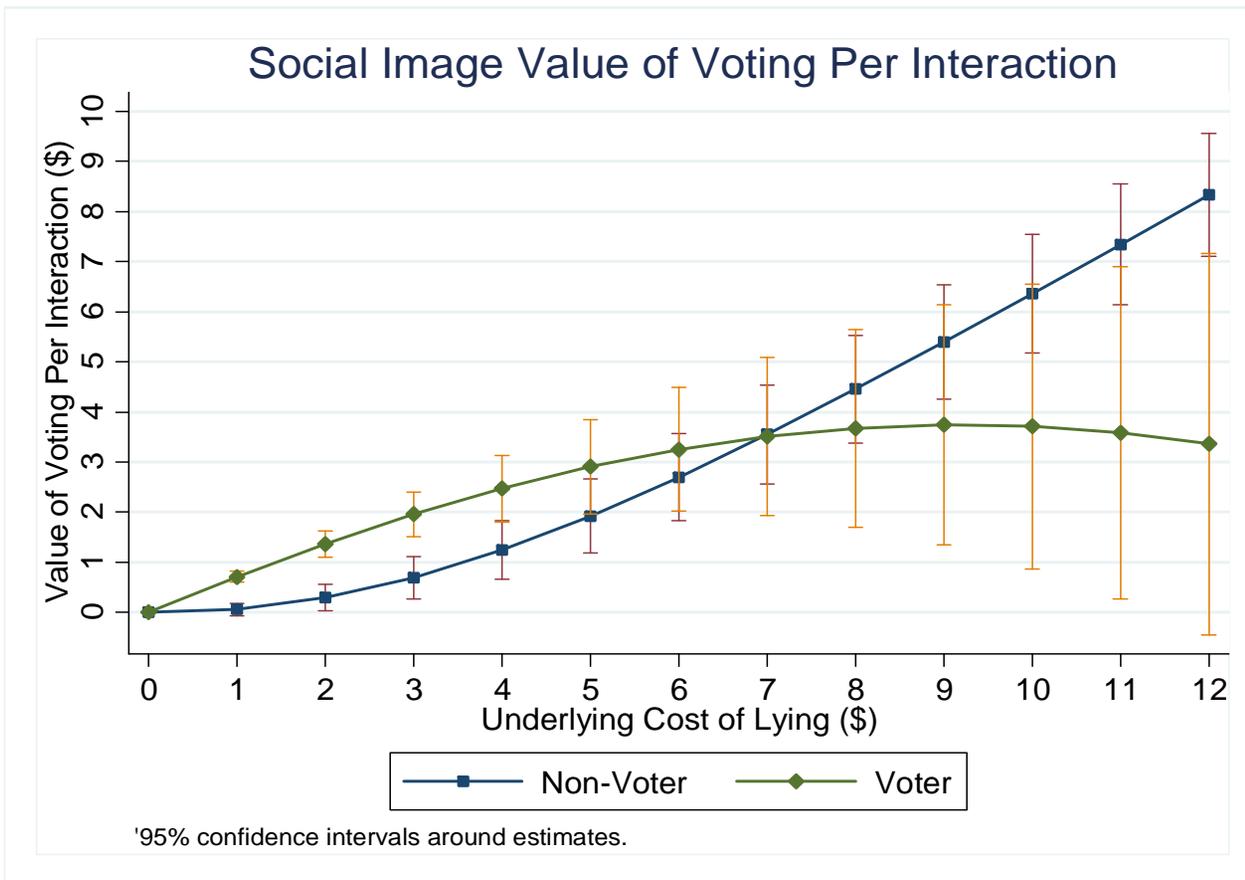
- **Structural estimates (Minimum-distance estimator)**
- Minimize distance between predicted moments $m(\vartheta)$ and observed ones \hat{m}

$$\min_{\vartheta} (m(\vartheta) - \hat{m})' W (m(\vartheta) - \hat{m})$$

- Moments $m(\vartheta)$:
 1. Probability of opening door to surveyor ($P(H)_j^S$)
 2. Probability of filling survey ($P(S)_j^S$)
 3. Probability of checking the opt-out box
 4. Probability of lying about voting
- All moments \hat{P} are probabilities, straight from Figures

Election Field Experiment - Estimation

- Cannot identify the lying cost L
- Can estimate social image value of voting *as function of L*
- Plot value of voting because asked *once*

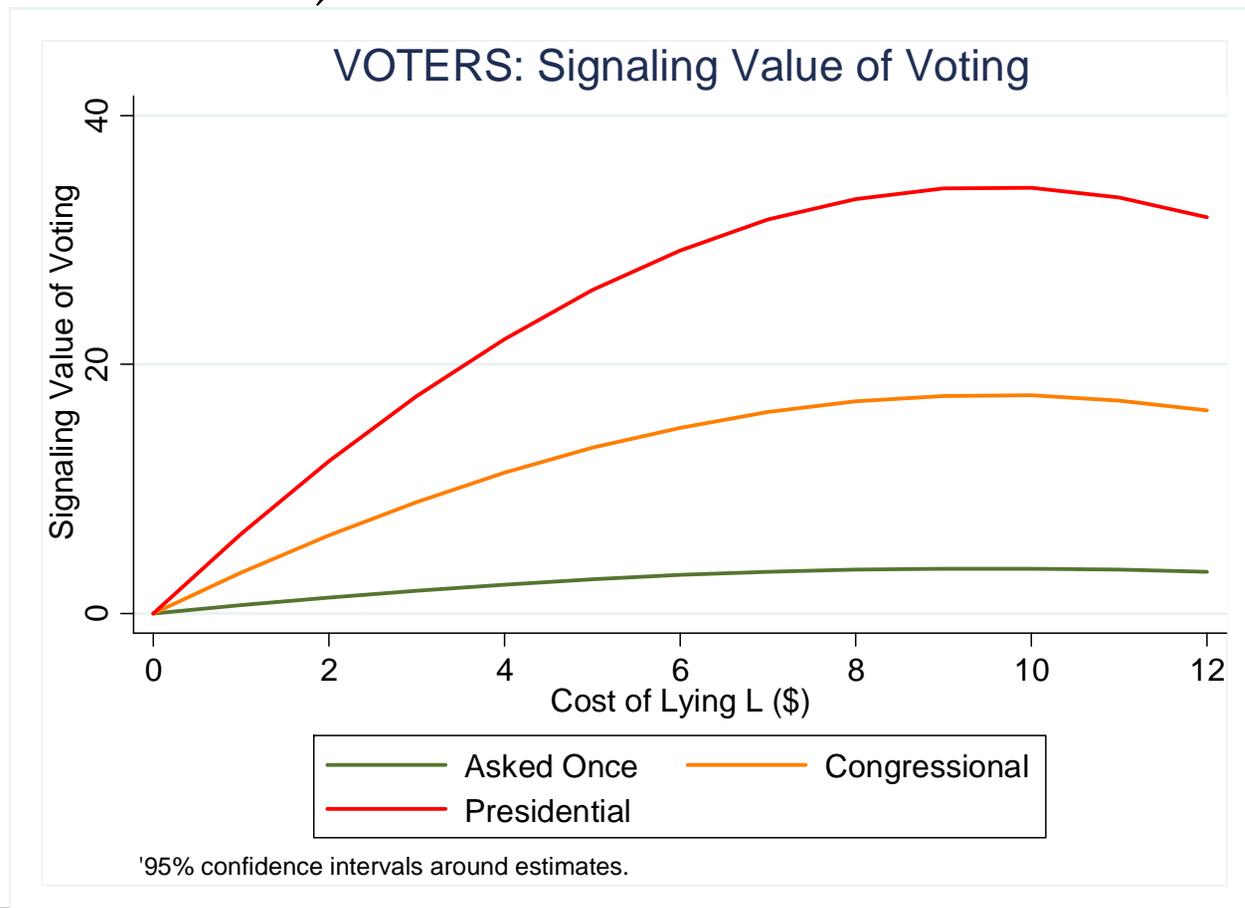


- Voters: Social image value of *one* interaction concave in L and between \$1.5 and \$3 for L above \$2
- Non-voters: Social image value convex in L , below \$1 for L below \$4

Election Field Experiment - Estimation

Total value of voting because others ask - Voters:

- Value of *congressional* voting around \$7-\$15 for L above \$2
- Value of *presidential* elections likely double (because asked more often)



Full Estimation

- Identify all parameters with additional assumption
- Exclude always-voters and never-voters -- Keep households with predicted voting probabilities [0.25 0.75]
- Assume remaining voters and non-voters have same parameters

Table 5: Subset with Intermediate propensity to vote

Voting Parameters

Mean Utility from <i>truthfully</i> saying voted (sv)	-0.08 (3.27)
Mean Utility from <i>truthfully</i> saying didn't vote (sn)	-4.69 (3.34)
Cost of Lying (L)	4.65 (1.08)
Total Signaling Value of Voting	7.66

- Lying cost of \$4, social image value of voting of \$7.6

Prospective Election Field Experiment

- Test of model: Manipulate the expected number of times asked N experimentally → Should affect turnout
- Experiment in week before elections in 2010 and 2012
 - Control (C) group: No contact
 - Control Flyer (CF) group: Flyer reminds households to vote
 - Treatment Flyer (TF) group: Flyer reminds households to vote, AND announces that a surveyor will come by to ask whether they voted in one of the following three weeks
- Comparison of TF group versus CF group

Prospective Election Field Experiment



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1
2 **Don't forget to vote in the
2012 Presidential Election.**

**Election Day is Tuesday,
November 6, 2012.**

- **Control
Flyer**



University of Chicago
Study

**Researchers will contact
you within three weeks of
the election (between 11/7
and 11/27) to conduct a
survey on your
voter participation.**

**Don't forget to vote in the
2012 Presidential Election.**

**Election Day is Tuesday,
November 6, 2012.**

- **Treatment
Flyer**



Prospective Election Experiment

Table 7. Results for Get-Out-The-Vote Treatments

Specification:	OLS Regressions			
Dependent Variable:	Indicator for Voting in Election in Year t			
Election:	Congressional Elections in Nov. 2010		Presidential Elections in Nov. 2012	
	(1)	(2)	(3)	(4)
Constant	0.6000*** (0.0109)		0.7312*** (0.0033)	
Flyer with Voting Reminder	-0.0020 (0.0152)	-0.0031 (0.0083)	0.0060 (0.0056)	0.0046 (0.0034)
Flyer with Announcement Will Ask About Voting	0.0120 (0.0157)	0.0102 (0.0084)	0.0023 (0.0056)	0.0056 (0.0034)
Omitted Treatment		No Flyer		No Flyer
Control for past Voting since 2004		X		X
Difference (Flyer Will Ask - Flyer Reminder)	0.0140	0.0133	-0.0037	0.0010
p-value for test of equality, 2-sided	p=0.365	p=0.120	p=0.561	p=0.811
p-value for test of equality, 1-sided	p=0.182	p=0.060*		p=0.405
R2	0.0001	0.4024	0.0000	0.3251
N	N = 31,306	N = 31,304	N = 93,805	N = 93,805

- 1.3pp. effect in 2010 (marg. Significant 1-sided)
- 0.1pp. Effect in 2012 (highly competitive election)

Conclusion

- Model of voting: “*because others ask*”
 - Voting in anticipation of being asked about voting
 - Voting decision takes into account social image utility
- We designed a field experiment to test model
 - Sorting in/out of home when informed about voting question
 - Lying about voting when incentivized
 - GOTV intervention: expecting to be asked
- Value of voting due to this signaling motive is estimated to be sizeable
 - \$10-\$15 for congressional elections
 - \$15-\$25 for presidential elections (if parameters are same)
 - Plausibly significant impact on voting
- Model allows for measurement of value of voting

3 Methodology: Structural Behavioral Economics

- We have seen several examples in the class
- **Conlin, O'Donoghue, Vogelsang (AER 2007)**
 - Estimate projection bias parameter in decision to return cold weather items
 - Observational data
 - [maximum likelihood]
- **Laibson, Repetto, and Tobacman (2007)**
 - Estimate β and δ in consumption-savings model
 - Observational data
 - [simulated minimum distance]

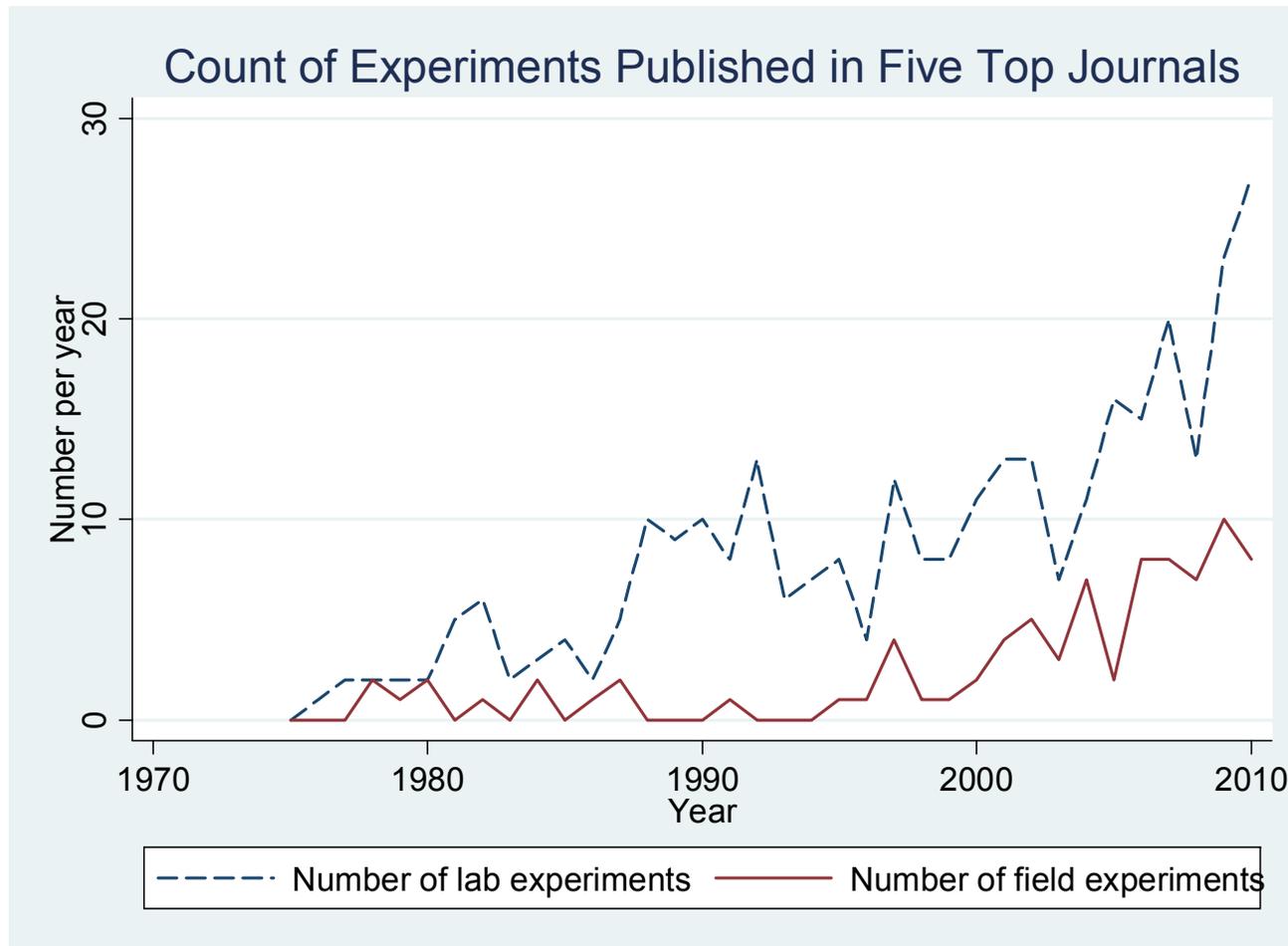
- **Lacetera, Pope, and Sydnor (AER 2013)**
 - Inattention to left-digit bias for odometer readings
 - Observational data
 - [OLS!]
- **DellaVigna, List, and Malmendier (QJE 2012)**
 - Estimate altruism versus social pressure
 - Field experiment
 - [minimum distance]
- **DellaVigna, List, Malmendier, and Rao (2014)**
 - Estimate why people vote, and why people lie about voting
 - Field experiment
 - [minimum distance]

- Some other examples
- **Paserman (EJ 2008)**
 - Estimate β - δ model of job search decisions for unemployed workers from DellaVigna and Paserman (JOLE)
 - observational data
 - [maximum likelihood]

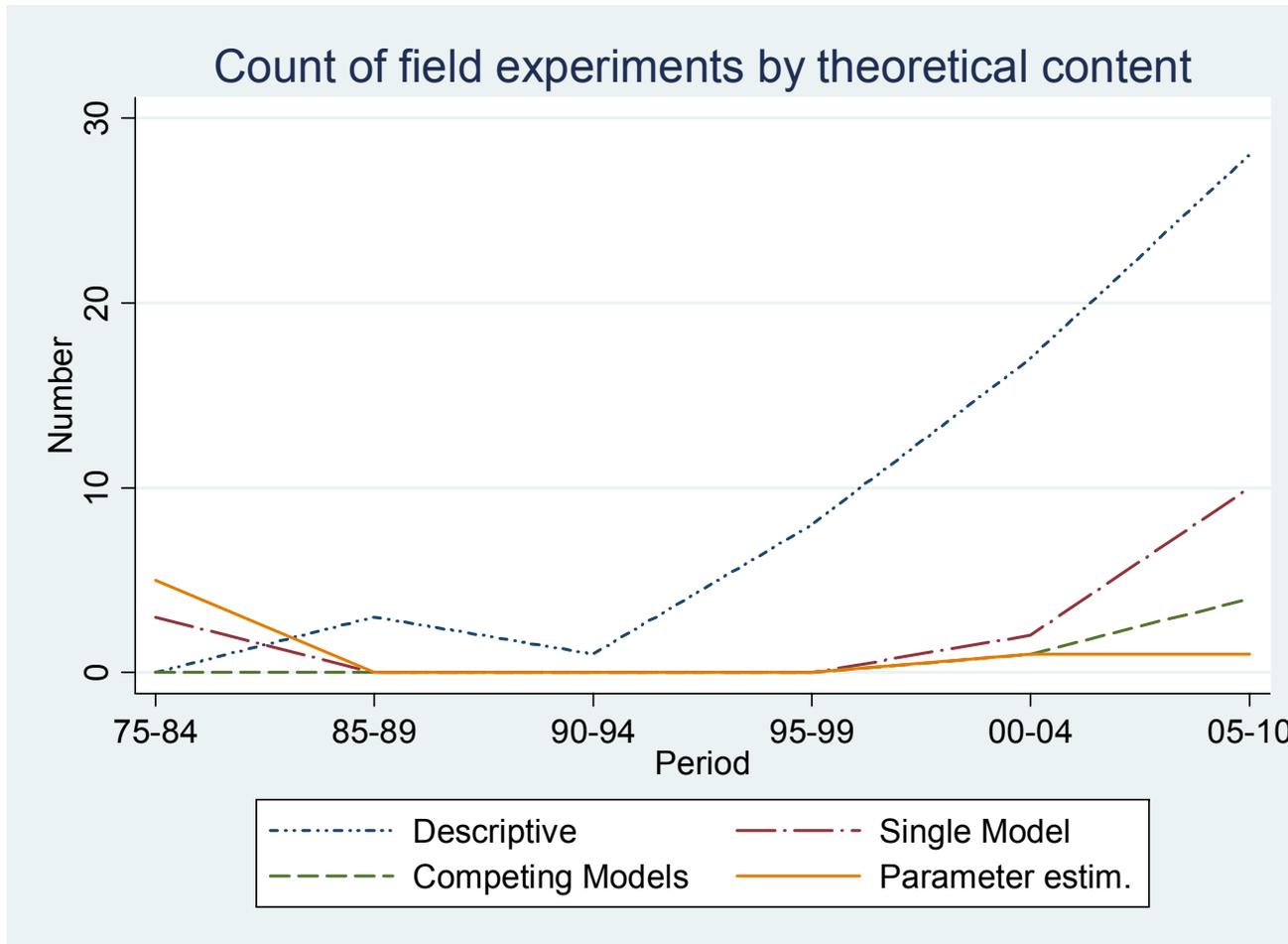
- Benefits of structural estimates:
 - Obtain estimates of parameters of interest: S , a in charity paper. Elsewhere: β , δ , λ , etc.
 - Get calibration check on magnitudes: Did value of time make sense? Does risk aversion make sense?
 - Compute welfare implications: Is going door-to-door good? Elsewhere: Set policies for beta-delta unemployed
 - Understand your model much better: For example, what identifies social pressure?
- Costs:
 - Results are black-box. But have the reduced-form results. Beauty of structural field experiments. Notice: Not true in, say, many IO papers
 - Time cost. Papers take *much* longer, about 3x

- How common are field experiments with structural estimates?
 - Even: How common are model-based field experiments?
 - **Card, DellaVigna, Malmendier (JEP, 2011)**
 - * Document the use of theory in laboratory and field experiments published in the top-five journals (AER, QJE, JPE, EMA, REStud) from 1975 to 2010
 - * Categorize experiments into 4 groups: Descriptive, Single Model, Competing Models, Parameter Estimation

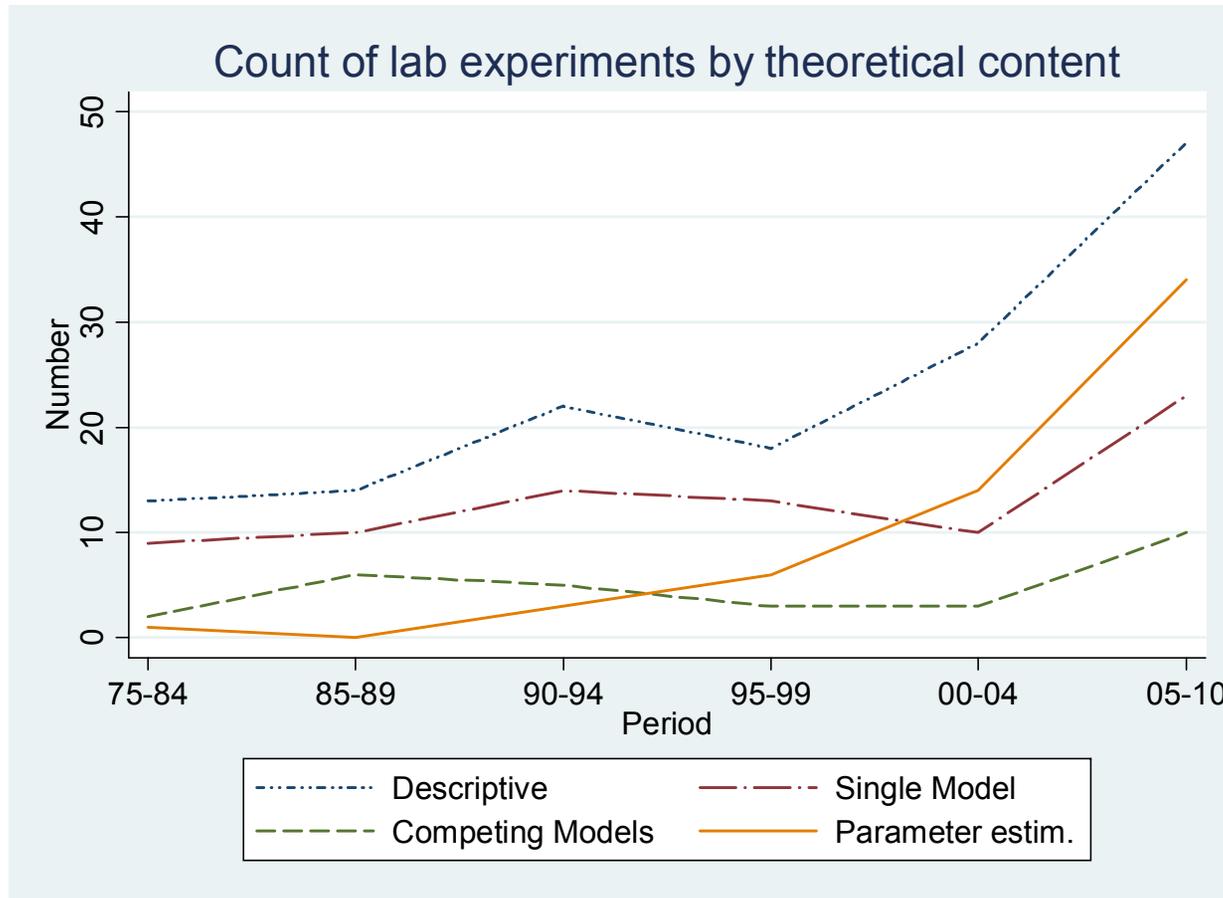
- Notice explosion in unnumber field experiments published



- Yet, very few model-based – an important gap to be filled!



- Compare to same plot for lab experiments



4 Welfare Response to Biases

- Room for government/social planner intervention?
 - No if:
 - * Sophistication about biases
 - * Markets to correct biases exist
 - No if:
 - * Naivete' of agents
 - * Missing markets
 - * Example: sin taxes on goods
- Government intervention does not need to be heavy-handed:
 - Require active decision
 - Change default

- **Benartzi-Thaler, 2004** (First behavioral paper in JPE since 1991!)
- Setting:
 - Midsize manufacturing company
 - 1998 onward
 - Company constrained by anti-discrimination rules —> Interested in increasing savings
- Features of SMT 401(k) plan:
 - No current increase in contribution rate
 - Increase in contribution rate by 3% per future pay increase
 - Can quit plan at any time

- Biases targeted:

1. Self-control

- Desire to Save more
- Demand for commitment

2. Partial naivete'

- Partial Sophistication → Demand of commitment
- Partial Naiveté → Procrastination in quitting plan

3. Loss Aversion with respect to nominal wage cuts

- Hate nominal wage cuts
- Accept real wage cuts

- Solutions:
 1. Increase savings in the future (not in present)
 2. Set default so that procrastination leads to **more** (not less) savings
 3. Schedule increase only at time of pay raise

- Implementation:

TABLE 1
PARTICIPATION DATA FOR THE FIRST IMPLEMENTATION OF
SMarT

Number of plan participants prior to the adoption of the SMarT plan	315
Number of plan participants who elected to receive a recommendation from the consultant	286
Number of plan participants who implemented the consultant's recommended saving rate	79
Number of plan participants who were offered the SMarT plan as an alternative	207
Number of plan participants who accepted the SMarT plan	162
Number of plan participants who opted out of the SMarT plan between the first and second pay raises	3
Number of plan participants who opted out of the SMarT plan between the second and third pay raises	23
Number of plan participants who opted out of the SMarT plan between the third and fourth pay raises	6
Overall participation rate prior to the advice	64%
Overall participation rate shortly after the advice	81%

- Result 1: High demand for commitment device
- Result 2: Phenomenal effects on savings rates

TABLE 2
AVERAGE SAVING RATES (%) FOR THE FIRST IMPLEMENTATION OF SMAR T

	Participants Who Did Not Contact the Financial Consultant	Participants Who Accepted the Consultant's Recommended Saving Rate	Participants Who Joined the SMarT Plan	Participants Who Declined the SMarT Plan	All
Participants initially choosing each option*	29	79	162	45	315
Pre-advice	6.6	4.4	3.5	6.1	4.4
First pay raise	6.5	9.1	6.5	6.3	7.1
Second pay raise	6.8	8.9	9.4	6.2	8.6
Third pay raise	6.6	8.7	11.6	6.1	9.8
Fourth pay raise	6.2	8.8	13.6	5.9	10.6

* There is attrition from each group over time. The number of employees who remain by the time of the fourth pay raise is 229.

- Second implementation: Simple letter sent, no seminar / additional information + 2% increase per year
- Lower take-up rate (as expected), equally high increase in savings

TABLE 3
AVERAGE SAVING RATES FOR ISPAT INLAND (%)

	EMPLOYEES WHO WERE ALREADY SAVING ON MAY 31, 2001		EMPLOYEES WHO WERE NOT SAVING ON MAY 31, 2001		ALL ELIGIBLE EMPLOYEES (N= 5,817)
	Joined SMarT (N=615)	Did Not Join SMarT (N= 3,197)	Joined SMarT (N= 165)	Did Not Join SMarT (N= 1,840)	
Pre-SMarT (May 2001)	7.62	8.62	.00	.00	5.54
First pay raise (October 2001)	9.38	8.54	2.28	.26	5.83

NOTE.—The sample includes 5,817 employees who are eligible to participate in the 401(k) plan and have remained with the company from May 2001 through October 2001. The sample includes 414 employees who were already saving at the maximum rate of 18 percent, although they were not allowed to join the SMarT program. The reported saving rates represent the equally weighted average of the individual saving rates.

- Third Implementation with Randomization:
 - Division A: Invitation to attend an informational seminar (40% do)
 - Division O: 'Required' to attend information seminar (60% do)
 - 2 Control Divisions
- Two differences in design:
 - Increase in Savings take place on April 1 whether pay increase or not (April 1 is usual date for pay increase)
 - Choice of increase in contr. rate (1%, 2%, or 3%) (Default is 2%)
 - Increases capped at 10%
- Results: Sizeable demand for commitment, and large effects on savings +
Some spill-over effects

TABLE 4
AVERAGE SAVING RATES (%) FOR PHILIPS ELECTRONICS

DATE	EMPLOYEES WHO WERE ALREADY SAVING IN DECEMBER 2001		EMPLOYEES WHO WERE NOT SAVING IN DECEMBER 2001		ALL EMPLOYEES
	Joined SMarT	Did Not Join SMarT	Joined SMarT	Did Not Join SMarT	
	A. Control Group				
Observations		7,405		7,053	14,458
Pre-SMarT (December 2001)		5.65		.00	2.90
Post-SMarT (March 2002)		5.76		.70	3.29
B. Test Group (Divisions A and O Combined)					
Observations	180	339	36	260	815
Pre-SMarT (December 2001)	5.26	5.38	.00	.00	3.40
Post-SMarT (March 2002)	6.83	5.72	5.03	1.55	4.61
C. Division A					
Observations	66	190	10	163	449
Pre-SMarT (December 2001)	5.47	5.48	.00	.00	3.12
Post-SMarT (March 2002)	7.32	5.97	6.80	1.54	4.38
D. Division O					
Observations	114	149	26	77	366
Pre-SMarT (December 2001)	5.14	5.25	.00	.00	3.74
Post-SMarT (March 2002)	6.55	5.41	4.35	1.58	4.89

NOTE.—The “test” group consists of individuals at Divisions A and O.

- Issues: Saving too much? Ask people if would like to quit plan

TABLE 6
MEDIAN INCOME REPLACEMENT RATIOS (%)

INCOME	AGE			
	25	35	45	55
A. Pre-SMaT				
\$25,000	57	57	56	55
\$50,000	51	51	51	54
\$75,000	48	49	46	43
B. Post-SMaT				
\$25,000	108	90	75	63
\$50,000	98	83	70	62
\$75,000	90	77	63	50

NOTE.—The table displays the median income replacement ratios for different age and income profiles, using investment advice software by Financial Engines. The projections are based on the following assumptions: no defined-benefit pension, statutory social security benefits, employee saving rate of 4 percent before SMaT and 14 percent thereafter, employer match of 50 cents on the dollar up to 6 percent, portfolio mix of 60 percent stocks and 40 percent bonds, and retirement age of 65.

- – General equilibrium effect of increase in savings on returns
- Why didn't a company offer it? How about teaching people?

- Psychology & Economics & Public Policy:
 - Leverage biases to help biased agents
 - Do not hurt unbiased agents (cautious paternalism)
- SMartT Plan is great example:
 - From Design of an economist...
 - ...to Research Implementation with Natural Experiment and Field Experiment
 - ...to Policy Implementation into Law passed in Congress: *Automatic Savings and Pension Protection Act*

- However: SMRT may be a unique example for several reasons
 - Defaults are hard to leverage in many situations
 - * How to get people to exercise more?
 - * Eat less?
 - * Pay more attention to hidden information?
 - Saving more is desirable for almost all
 - * Interventions on other fronts are more open to criticism
 - Company was open to SMRT: Firm happy to increase savings of employees
 - * Often firm would often rather exploit biases than counter-act them

- * Example 1: Neglect of mutual fund fees
- * Example 2: Overconfidence in trading

- More generally, Nudge agenda (**Sunstein and Thaler, 2011**)
 - Use behavioral interventions
 - Induce a given behavior
- Great promise beyond savings:
 - *Energy*: Display energy consumption of neighbors to lower energy use (OPower)
 - *Organ donation*: Require active choice at DMV
 - *Taxes*: Reminder letters with deadlines to increase tax compliance
 - ...

- BUT: Potential problems
- Problem 1. Are we nudging *for good*?
 - Nudges could be used to pursue sinister objectives
 - (In fact, companies have used them for decades to increase sales)
 - Even when well intentioned, do we know that it is good to induce a given behavior?
 - * Savings: What is the right savings rate?
 - * Charitable giving: Does it raise welfare? (earlier lecture)

- Problem 2. (Related) What is the model?
 - A model helps assess the channels
 - Also, gives idea on welfare implications
 - SMRT: Very clear channel
 - Other interventions: not always clear

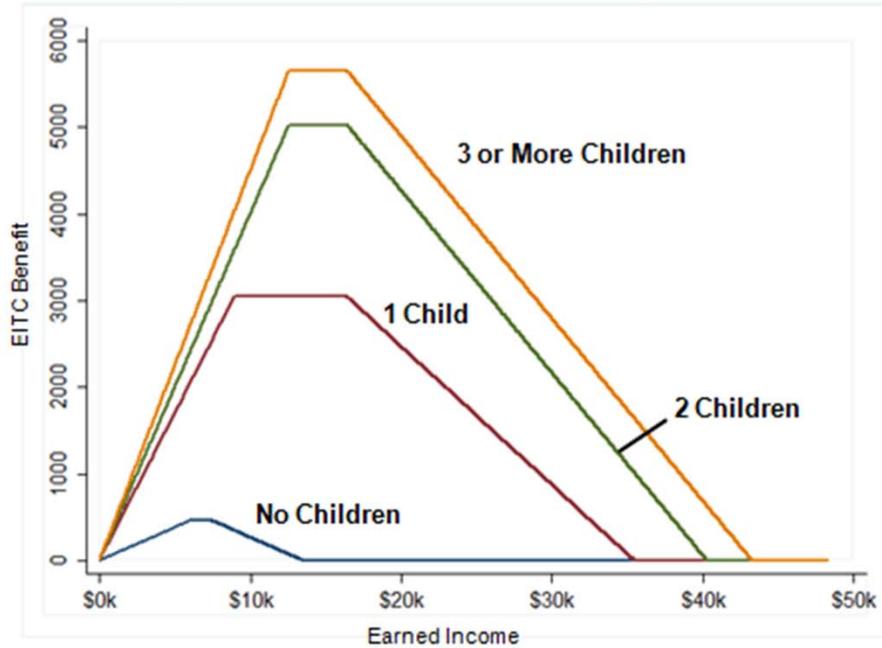
- Despite these difficulties, there are now numerous attempts in this direction
- Two more recent examples:
- **Loewenstein and Volpp's** work on health outcomes
 - Series of Randomized Trial
 - Leverage incentives with lotteries (probability weighting)
 - Use team incentives...
 - Outcomes: Weight loss, exercise, remembering to take pill,...
- **Bhargava and Manoli (2012)**

MOTIVATION & BACKGROUND

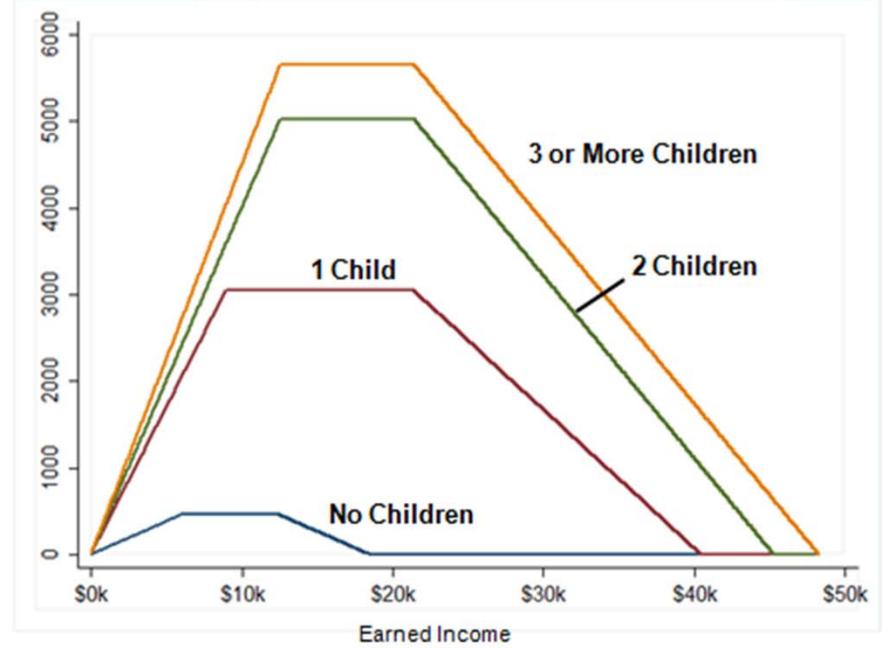
- **EITC is largest means-tested cash transfer program.** It disburses \$58 billion per year to 26 million recipients through income supplement that encourages work
- Fully refundable, supplements earned income by average of 17% which amounts to \$2,100. Must file your taxes to claim
- **25% of eligible do not take-up (~6.7m).** Of 25%, 16% do not file taxes, and 9% files taxes (~2.3 m) (Plueger 2010). 9% is focus of this study
- (Many) filing non-claimants receive a reminder notice / claiming worksheet (CP 09 or CP 27) from IRS
- **Policy consequences profound.** Foregone benefits amount to average of 31 days of income, up to ~115 days for some (est. \$1,096 benefit, \$8,900 income). Health, education, consumption benefits linked to EITC (Hoynes 2011; Dahl and Lochner 2011; Smeeding and Phillips and O'Connor 2001)
- Despite considerable research, incomplete take-up in benefit programs regarded as puzzle to economists (Currie 2006)

EITC BENEFIT SCHEDULE FOR TAX YEAR 2009

(A1A) EITC Benefit Schedule for Single/HOH Filers



(A1B) EITC Benefit Schedule for Married Filers



AWARENESS AND CONSTRUAL OF INCENTIVES

EITC3

A SURVEY TO HELP IMPROVE TAX FORMS

This survey has been prepared by researchers at the University of Chicago and UCLA, to help improve the Earned Income Tax Credit. Your response to this survey is voluntary, and you may choose not to answer any question. All responses are anonymous and meant only for research purposes; no identifying information will be recorded. If you have questions about this survey, please contact us at bhargava@uchicago.edu, or dmanoli@econ.ucla.edu.

This survey is expected to take less than 5 minutes to complete. Please answer questions to the best of your ability even if you are not completely sure of your answer. Thank you for your help!

Part 1: Background Information

First, we'd like to know a little about you.

1. What is your year of birth? _____
2. What is your zip-code? _____
3. What is your gender? Male Female
4. What is your highest level of education?
 College Degree Some College High School or GED Some High School No High School
5. Please check the box that best describes your income tax filing status:
 Single Married, filing jointly with spouse
 Head of household (e.g., Single with kids) Married, filing separately
6. What were your total earnings in 2010? (If married, what were your total household earnings?)
 Less than \$4,000 \$4,001 to \$8,000 \$8,001 to \$12,000 \$12,001 to \$16,000
 \$16,001 to \$20,000 \$20,001 to \$24,000 \$24,001 to \$28,000 \$28,001 to \$32,000
 \$32,001 to \$36,000 \$36,001 to \$40,000 \$40,001 to \$44,000 More than \$44,000
7. Now, we'd like a more exact estimate of your earnings. To the nearest \$1,000, what were your total earnings in 2010? (If married, write down your total household earnings)

\$ _____ (to the nearest \$1,000)
8. In 2010, how many kids younger than 19 lived with you?
 0 kids 1 kid 2 kids 3 or more kids

Please turn this page over and continue the survey...

- 1200 surveys administered across volunteer tax centers in Chicago (1050) and SF (150) in early 2011
- Administered during period when people wait for tax assistance
- Survey elicits (1) tax and demographic information (permits calculation of benefits/eligibility), (2) perceptions of cost and benefit parameters
- Perceived incentives matter (Liebman and Luttman 2011; Chetty and Saez 2009)
- Limits to survey (second survey of 2,800 on Amazon MechTurk)

SURVEY SAYS...

Many are filers are not aware of EITC

- 46% of filers not aware of program (45% of eligible)
- 15% do not regularly open mail from IRS

Perceptions of benefits are inaccurate

- 45% of filers had wrong beliefs of eligibility
- 33% believe they are ineligible, but they are
- 43% of filers underestimate benefits (by 68% on average)

Perceptions of worksheet claiming time are reasonable

- 5% believe worksheet will take > 1 hr, or have WTP > \$100

Filers vastly overestimate audit rate

- Median: 15%, Mean: 25%, Actual: 1.1% (EITC: ~1.8%),
- 75% of filers believe audit rate at least 5x actual

EXPERIMENTAL CONTEXT – ILLUSTRATIVE TIMELINE

2009

2010

Jan to Dec

Feb

March

May

Nov

Earn income, qualify for EITC, (CA only)

File TY 2009 taxes, neglect to claim EITC

IRS reminds you to claim with CP09/27 notice

For 41% who return CP, IRS mails check

Experimental notices mailed to CP non-respondents (CA)

The diagram illustrates the timeline of IRS communications and forms for the Earned Income Credit (EITC) process. It shows the flow from an initial notice in 2009 to a follow-up notice in 2010, and the associated forms: the EITC Eligibility Check-Sheet and the EITC Summary Worksheet. A red prohibition sign is overlaid on the 'Experimental notices' section, indicating that these notices were not sent to certain groups (CA).

2009

Jan to Dec: Earn income, qualify for EITC, (CA only)

2010

Feb: File TY 2009 taxes, neglect to claim EITC

March: IRS reminds you to claim with CP09/27 notice

May: For 41% who return CP, IRS mails check

Nov: **Experimental notices mailed to CP non-respondents (CA)**

Forms and Notices:

- CP09/27 Notice:** Department of the Treasury, Internal Revenue Service, Submission Processing Center, Fresno, CA 93888-0425. 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 G. Hinds:** 22 BOLDWIN STREET, HANSON, CT 06030-7263.
- EITC Eligibility Check-Sheet:** Includes questions about filing status, age of child, and Social Security Number. Includes a table for "Answer the question below and check" with YES/NO columns.
- EITC Summary Worksheet:** Includes sections for "What you need to do", "Next steps", and "Additional information".

ORGANIZATION OF TREATMENTS I

Table 3

EXPERIMENTAL INTERVENTIONS BY MECHANISM

MECHANISM	INTERVENTION	DESCRIPTION	SAMPLE
<u>Informational Complexity</u>			
Simplicity / Complexity (Design)	1. Simple Notice	Relative to complex (original CP) notice, "simple" single-sided notice has simplified layout and excludes eligibility information repeated in worksheet	3,676
Simplicity / Complexity (Length)	2. Simple Worksheet	Relative to simple worksheet, a complex worksheet includes additional, non-discriminatory, questions regarding eligibility	10,979
<u>Program Information</u>			
Benefit and Cost Information	1. Benefits (Low and High)	Simple notice reports upper bounds of benefit range	6,761
	2. Transaction Costs (Low and High)	Simple notice provides guidance as to worksheet completion time	3,475
Penalty/Audit Information	1. Indemnity Message	Worksheet with message to indemnify against penalty for unintentional error	17,027
General Program Information	1. Attention Envelope	Envelope with message indicating enclosed information is "good news"	17,044
	2. Informational Flyer	One page flyer offers program information and trapezoidal benefit schedule	4,019
<u>Program Stigma</u>			
Personal Stigma	1. Emphasis on Earned Income	Simple notice emphasizes that benefit is reward for hard work	1,844
Social Stigma	2. Social Influence	Simple notice communicates that similarly situated peers are also claiming	1,753

(A) INFORMATIONAL COMPLEXITY

THEORY

- Poor financial choices due to lack of experience and familiarity with complex documents or low “financial literacy”
- Transfer programs are complicated. EITC has 24 pages of instruction in tax book, 56 pages in separate Publication 596; average length of state FSP application is 12 pages (Bertrand and Mullainathan and Shafir 2006)
- Simplification appears to “improve” choice in many contexts (e.g., Bettinger et al. 2009)

INTERVENTIONS

- (1) **Complex Notice:** Tests “design complexity”. Features textually dense design, is two pages, and repeats eligibility information from worksheet. Resembles original CP Notice.
- (2) **Complex Worksheet:** Tests “length complexity”. Features additional, “non discriminatory” questions.

COMPLICATED NOTICE (ADAPTED FROM CP)

Department of the Treasury
Internal Revenue Service
Submission Processing Center
Fresno, CA 93889-0425

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 06030-7253

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.

Headline describing purpose of notice

Notice EIC0927
Tax Year 2009
Notice Date November 2010
Social Security Number 999-99-9999
To contact us 1-800-829-1040
Page 2 of 4

Qualifying Child of More than One Person
If you have a qualifying child of another person, you and the other person can decide who that child. If more than one person claims the credit using the same child, the IRS uses the following rules to determine which person can claim the credit with that child.

If	Then Only
child's parent,	The parent can treat the child as a qualifying child.
child's parents and they live together,	The parent with whom the child lived the longest during the year can treat the child as a qualifying child.
child's parents, the child has the same amount of income and the parents do not live together,	The parent with the highest adjusted gross income can treat the child as a qualifying child.
child's parent,	The person with the highest adjusted gross income can treat the child as a qualifying child.

If you complete the enclosed *EIC Eligibility Check-Sheet*, we will review the information you provide. If you do not receive a refund within the next six to eight weeks (if you owe no other amounts), we will send you a letter of explanation if you do not qualify for the credit.

Year
You can claim the earned income credit faster if you are eligible, and avoid getting a notice next year by doing so on your next Federal Income Tax return.

Amount
The amount of EIC on your return. The instruction booklets for Form 1040 and Form 1040-EZ show you how to figure your EIC.

How to Claim
You can claim the EIC for you by:
- checking the earned income credit line.
- checking the EIC for a qualifying child. *Remember, you do not need to claim a refund to receive the EIC.*

- Write "NO" on the EIC line of your return if you do not want or do not qualify for the credit.

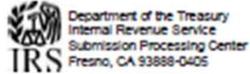
How to Get More Information
To learn more about the EIC, visit www.irs.gov/eitc or call 1-800-829-1040. Go to this website and click on the interactive EITC Assistant (available in English and Spanish) to see if you qualify. You can get Publication 596, *Earned Income Credit (Publicación 596/SP)* para la versión en español by calling 1-800-829-3676 or by downloading it directly from www.irs.gov.

For IRS use only - Code N2

Summary of the notice and program

Instructions for eligibility worksheet; very exclusionary language

Details of dependent eligibility, next steps, and instructions for further information



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 G.HINDS
22 BOULDER STREET
HANSON, CT 06030-7253

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.

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.

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.

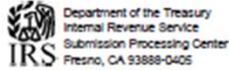
Additional information

If you need additional assistance, please call 1-800-829-1040, or visit online at www.irs.gov/eic. 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.

“BASELINE” NOTICE

- Headline communicates program eligibility.
- Summary explains purpose of letter and program. Tax Year is specified.
- Recipients instructed to complete worksheet to determine eligibility; eligibility criteria not repeated on notice
- Information on Notice + Worksheet held constant



Notice	EIC0927
Tax Year	2009
Notice Date	November 2010
Social Security Number	999-99-9999
To Contact Us	1-800-829-1040
Page 3 of 4	

INTERNAL REVENUE SERVICE
Submission Processing Center
Fresno, CA 93888-0405

Earned Income Credit Worksheet

Step 1 Read each statement listed below, and place a checkmark next to any that describes you.

- My Social Security card reads "Not Valid for Employment," AND my Social Security card was issued so I could receive federally funded benefits such as Medicaid
- I was an Earned Income Credit qualifying dependent of another person in 2009

You may be a qualifying dependent of another person if you live with your parents or other caretaker for more than half the year AND are either under the age of 19, are a student and under the age of 24, or are permanently or totally disabled at any age.

If you checked any of the above boxes, you are not eligible for the credit. Please do not continue completing this worksheet.

If you did not check any of the above boxes, you are likely eligible for the credit. Please continue to Step 2.

Please call 1-800-829-1040 or visit www.irs.gov/etc for additional information regarding the above requirements.

Step 2 Provide the information requested below for no more than three of your dependents who lived with you in 2009, and are related to you. A dependent is related to you if they are your son, daughter, stepchild, adopted child, brother, sister, stepbrother, stepsister, or any of their descendants, or a foster child.
Do not provide information if:

- The dependent has a Social Security card that reads "Not Valid for Employment," and the Social Security number was issued so the dependent could receive a federally funded benefit, such as Medicaid.
- The dependent filed a joint return for reasons other than claiming a tax refund.

Dependent #1

Name _____ Social Security number
or Taxpayer ID number _____

Dependent #2

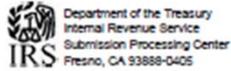
Name _____ Social Security number
or Taxpayer ID number _____

Dependent #3

Name _____ Social Security number
or Taxpayer ID number _____

SIMPLE WORKSHEET

- Guides reader through determination of eligibility (distinct version for dependent and non-dependents)
- Worksheet checks valid SSN, elicits names of eligible dependents, and instructs recipient to sign and return if eligible
- Original CP worksheet, with alternative formatting and organization, not tested



Notice	EIC0927
Tax Year	2009
Notice Date	November 2010
Social Security Number	999-99-9999
To Contact Us	1-800-829-1040

Page 3 of 4

INTERNAL REVENUE SERVICE
Submission Processing Center
Fresno, CA 93888-0405

Earned Income Credit Worksheet

Step 1 Read each statement listed below, and place a checkmark next to any that describes you.

- My Social Security card reads "Not Valid for Employment," AND my Social Security card was issued so I could receive federally funded benefits such as Medicaid
- I was an Earned Income Credit qualifying dependent of another person in 2009

You may be a qualifying dependent of another person if you live with your parents or other caretaker for more than half the year AND are either under the age of 19, are a student and under the age of 24, or are permanently or totally disabled at any age.

- My filing status in 2009 was "married filing separately"
- I was not a U.S. citizen (or resident alien) for any part of 2009
- I filed Form 2555 (Foreign Earned Income) or Form 2555-EZ (Foreign Earned Income Exclusion) in 2009
- My investment income was greater than \$3,100 in 2009
- I did not have earned income in 2009

If you checked any of the above boxes, you are **not eligible** for the credit. Please do not continue completing this worksheet.

If you did **not** check any of the above boxes, you are **likely eligible** for the credit. Please continue to Step 2.

Please call 1-800-829-1040 or visit www.irs.gov/efic for additional information regarding the above requirements.

COMPLEX WORKSHEET

- Same formatting and organization as simple worksheet
- Lengthier than simple worksheet due to additional eligibility criteria questions taken from IRS Pub 596 (in Step 1 for dependents version, and in Step 1 and 2 for non-dependents version)
- Example: "I was not a U.S. citizen (or resident alien) for any part of 2009"
- Additional criteria **do not** have bearing on true eligibility as per administrative records

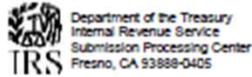
(B) INFORMATION ON BENEFITS, COSTS, RULES

THEORY

- Individuals optimize with respect to incentives
- Individuals have limited attention, may only respond to perceived or known incentives (Kahneman 1986; Taylor and Fiske 1975)
- Basic information regarding incentives helps optimize behavior (e.g., Liebman and Luttmer 2011)

INTERVENTIONS

1. **Benefit Notice:** Generic benefit information (high and low)
2. **Cost Notice:** Information on worksheet claiming time (high and low)
3. **Penalty Worksheet:** “Indemnification” message on claiming worksheet
4. **Informational Flyer:** Information on benefits and program on 1 page flyer
5. **Messaged Envelope:** Persuasion message on envelope



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 06030-7253

Important information about the Earned Income Credit
You may be eligible for a refund of up to \$3,043



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 \$3,043.

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 \$3,043, 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/etc. 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.

BENEFIT DISPLAY

- Identical to baseline notice in design and content except...
- Headline communicates refund may be up to specific amount determined by number of dependents [IRS did not allow exact benefit amounts]
- Indicated range is \$457 for those with no dependents, \$5,657 for those with 3 or more dependents, and randomized to be either dependent specific, or overall, maximum for 1 dependent (\$3,043), and 2 dependents (\$5,028)
- Summary reiterates benefit information



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 06030-7253

Important information about the Earned Income Credit

You may be eligible for a refund. Claiming your refund usually takes less than 60 minutes.

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

To claim your benefit, simply complete and return this form. This usually takes less than 60 minutes.

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.

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/efic. For tax forms, call 1-800-TAX-FORM (1-800-829-3676).

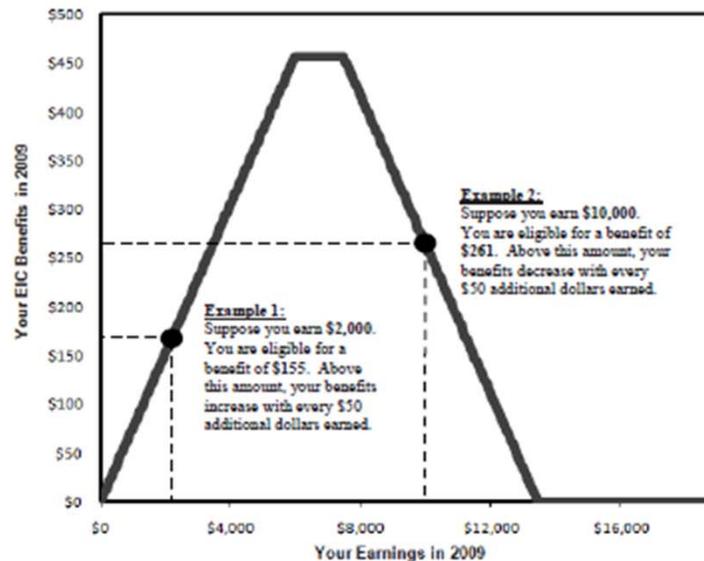
You can also find tax forms and other helpful documents which explain the EIC program in greater detail (e.g., Publication 596) at www.irs.gov.

COST DISPLAY

- Identical to baseline notice in design and content except...
- Headline communicates that completing worksheet should take less than 60 (or 10) minutes

DO YOU KNOW ABOUT THE EARNED INCOME CREDIT?

The Earned Income Credit (EIC) is designed to provide benefits to working individuals and families. The picture below describes how benefit amounts change based on your yearly earnings (note that the picture is drawn for a single filer with no dependents).



MYTHS AND REALITIES OF THE EIC

Myth: I cannot claim the EIC if I missed the April 15th deadline.

You can correct your tax return and claim the EIC up to 3 years after the April 15th deadline.

Myth: I can only claim the EIC if my income is very low.

You may qualify for benefits if your earnings are less than \$43,261 if single, and less than \$48,280, if married.

Myth: My child is over 18, so I do not qualify for higher benefits.

If your child is a full-time student or disabled, you may still qualify for higher benefits.

Myth: I need to have a bank account to receive EIC benefits.

A check for your EIC benefits can be mailed to you.

Myth: I cannot claim the EIC if I am unemployed or self-employed.

You can claim the EIC as long as you have some earned income such as wage income or self-employment income.

Myth: I can only claim EIC benefits if I have children.

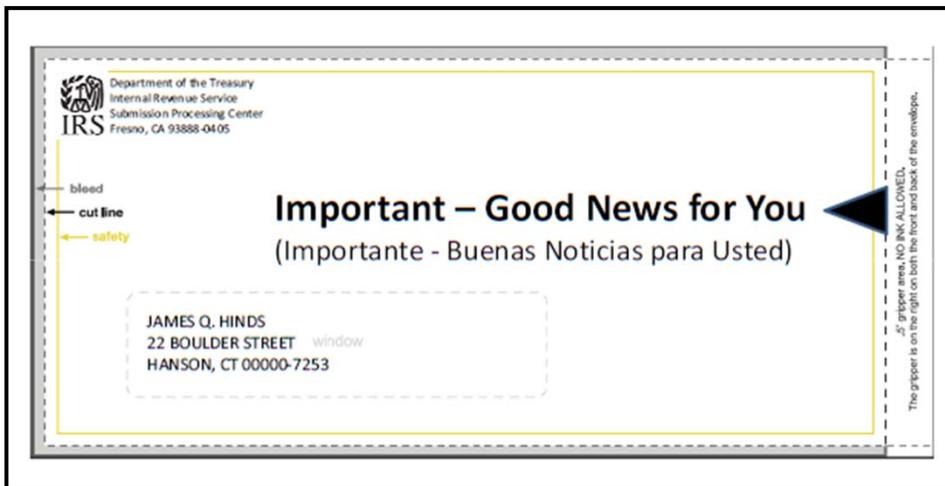
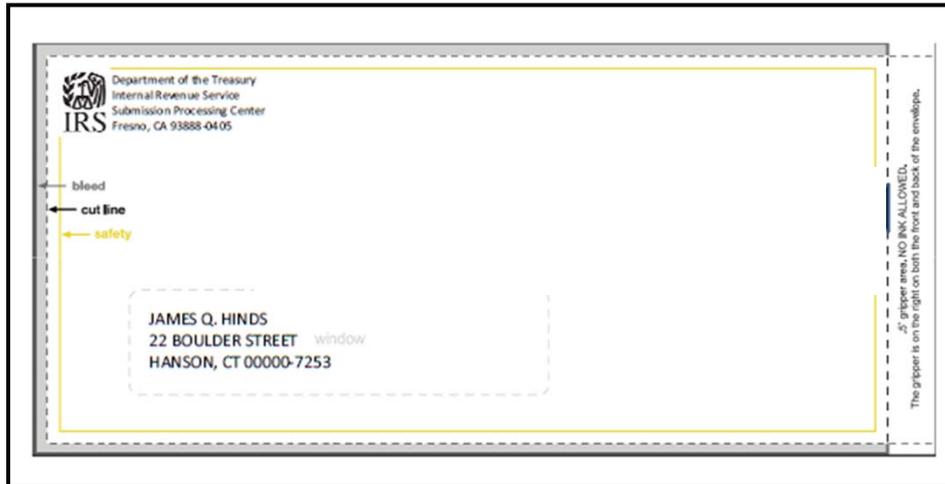
You can claim the EIC without children.

INFORMATIONAL FLYER

- One page sheet containing incentive information through a graphical display, and text clarifying confusing aspects of eligibility and requirements
- Graphics generally complicated to digest for those of low financial literacy
- Flyer accompanies select baseline notices

Message Envelopes

- Treatment envelopes communicate that contents contain beneficial and important information
- Mail marketing firms estimate that up to 44% of non-personal mail is *not opened*
- Our surveys indicate that 16% of low to moderate income filers do not open mail from IRS



(C) PROGRAM STIGMA

THEORY

- Stigma may deter participation in means-tested benefit programs (e.g., Weisbrod 1970; Moffit 1983; Currie 2006)
- Stigma due to either social sanction (social) or threat to identity (personal)
- Encourage behavior through social influence (Cialdini et al. 1990)
- Energy use and peer feedback (Costa and Kahn 2010)

INTERVENTIONS

“You may be eligible for a refund. Usually, 4 of every 5 eligible people claim their refunds.”

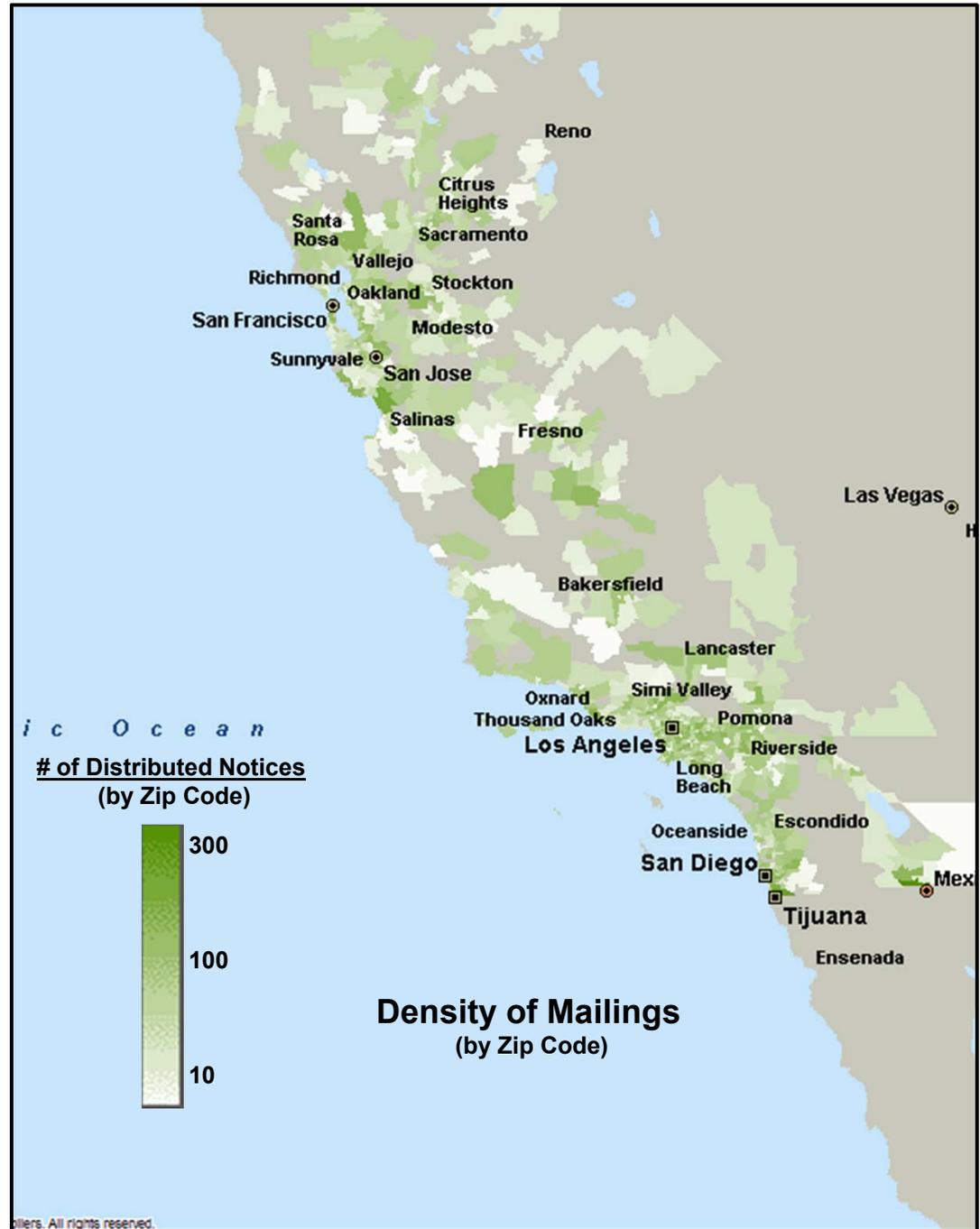
Notice Headline for Intervention 1

“You may be eligible for a refund due to all your hard work.”

Notice Headline for Intervention 2

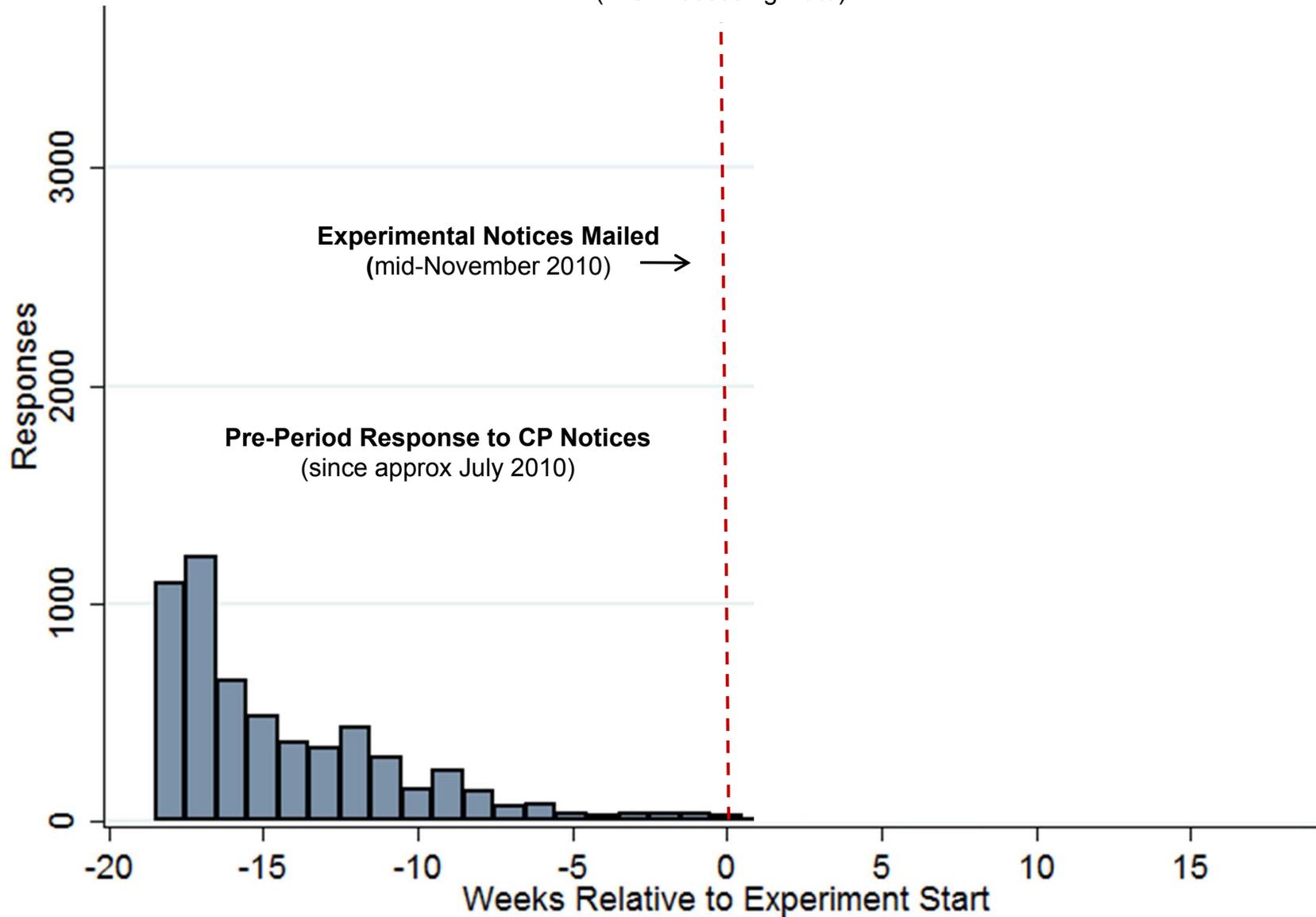
RANDOMIZATION

- Notice, worksheets, envelopes independently randomized
- Randomization by blocks defined by zip code and dependent indicator (3,148 blocks)
- Oversampling – Baseline notices 4x sample; salience, 3x sample; complex worksheet, .5x sample
- Balancing checks suggest randomization successful
- Mailed mid November 2010; data collected through May 2011



WHAT IS THE COUNTERFACTUAL RESPONSE?

CA Notice Response since July 2010
(IRS Processing Date)



SUMMARY OF OVERALL RESPONSE

SUMMARY OF RESPONSE FOR INITIAL & EXPERIMENTAL NOTICE

	ALL SAMPLE			W/O DEPENDENTS			W/ DEPENDENTS		
	Response	Benefit Size	Deny	Response	Benefit Size	Deny	Response	Benefit Size	Deny
CP First Notice (CA TY 2009)	0.41	\$570	0.02	--	--	--	--	--	--
Overall Response	0.22	\$511	0.01	0.25	\$247	0.00	0.16	\$1,531	0.03
Overall Response - Hispanic Adjusted	0.25	\$530	0.01	0.26	\$245	0.00	0.21	\$1,638	0.02
Control (Complex N + Complex WS)	0.14	\$546	0.01	0.17	\$294	0.00	0.10	\$1,570	0.02
Simple (Simple N + Simple WS)	0.23	\$514	0.01	0.27	\$246	0.00	0.16	\$1,616	0.03
Simple + Information	0.28	\$531	0.01	0.31	\$242	0.00	0.21	\$1,643	0.04
Simple + Low Stigma	0.22	\$452	0.01	0.25	\$255	0.00	0.14	\$1,330	0.03

Notes: This table summarizes the response rate, non-zero benefit size, and denial rate for various experimental samples of interest. The adjustment for the Spanish speaking population is estimated by a response model using 2007 zip code level data on the density of the hispanic population. Please see Appendix for details. The dependent specific response data is not available for the first CP notice.

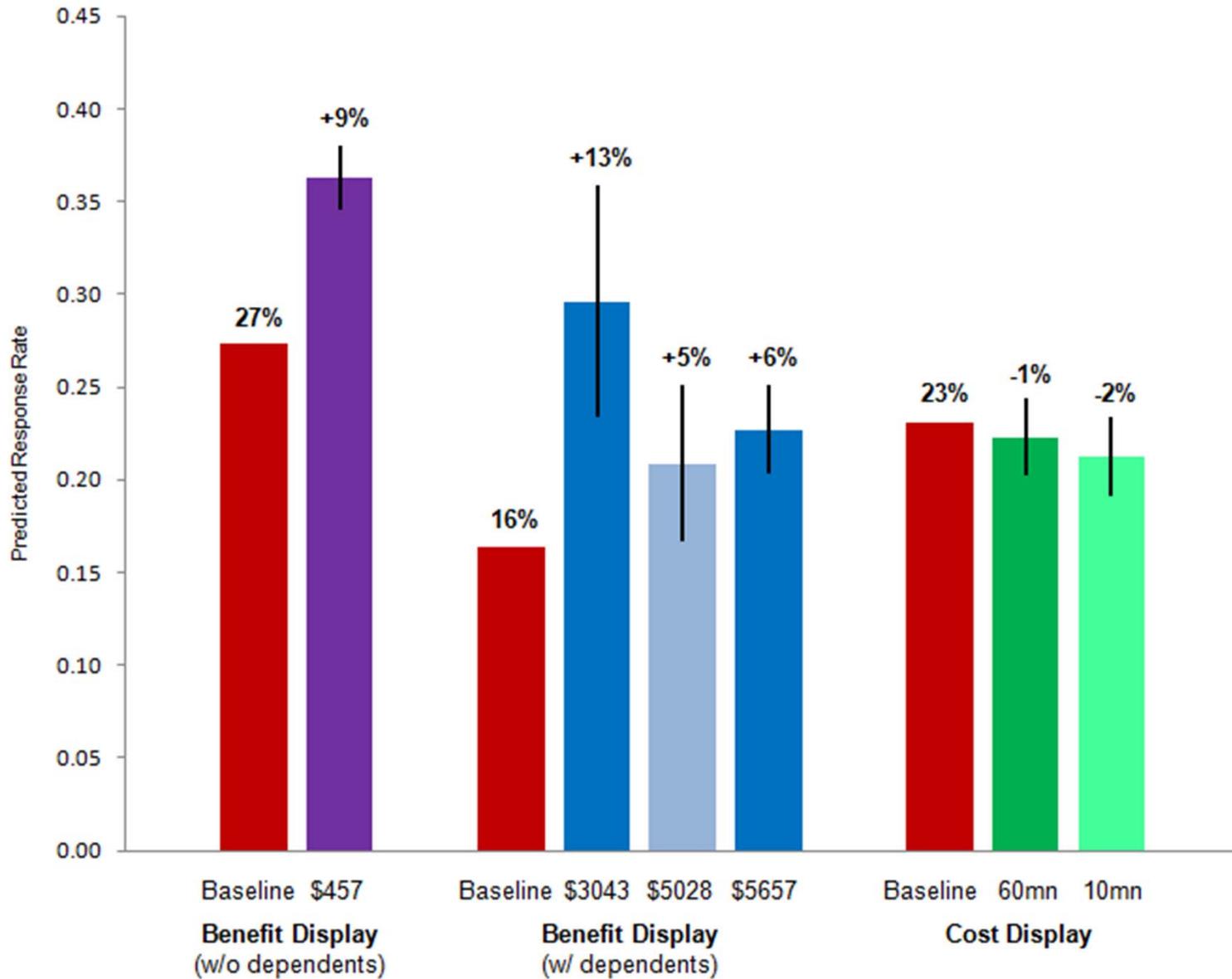
- Mere receipt of second notice yields 0.22 response (0.14 control condition)
- Language may be a barrier to response
- **Simplification raises response from .14 to .23; Information from .23 to .28; No beneficial effect of lower stigma**
- Effects not driven by denial of claims rate

RESPONSE AND DENIAL BY EXPERIMENTAL TREATMENTS						
	DEPENDENT VARIABLE - (PROBIT)					
	YES/NO RESPONSE				YES/NO DENIAL	
	Baseline (1)	w/ Controls (2)	w/o Deps (3)	w/ Deps (4)	Baseline (5)	w/ Controls (6)
[Simple Notice & Worksheet - Excluded]						
Complexity Interventions						
Complex Notice	-0.069*** (0.008) [-49%]	-0.065*** (0.008) [-46%]	-0.065*** (0.010) [-38%]	-0.060*** (0.010) [-60%]	-0.0001 (0.0000) ✓	-0.0001 (0.0000) ✓
Complex Worksheet	-0.043*** (0.005) [-31%]	-0.041*** (0.005) [-29%]	-0.054*** (0.006) [-32%]	-0.012 (0.007) [-12%]	-0.0001 (0.0000) ✓	-0.0001 (0.0000) ✓
Informational Interventions						
Benefit Display	0.084*** (0.007) [+37%]	0.083*** (0.007) [+36%]	0.085*** (0.009) [+31%]	0.066*** (0.011) [+41%]	0.0003* (0.0000) ✓	0.0003* (0.0000) ✓
Claiming Cost Display	-0.014 (0.009) [-6%]	-0.016* (0.008) [-7%]	-0.015 (0.010) [-6%]	-0.008 (0.012) [-5%]	0.0002 (0.0000) ✓	0.0003 (0.0000) ✓
Indemnity from Penalty Worksheet	0.005 (0.005) [+2%]	0.006 (0.005) [+3%]	0.003 (0.006) [+1%]	0.007 (0.007) [+4%]	0.0001 (0.0000) ✓	0.0001 (0.0000) ✓
Informational Flyer	-0.040*** (0.008) [-17%]	-0.039*** (0.008) [-17%]	-0.047*** (0.009) [-17%]	-0.019* (0.011) [-12%]	0.000 (0.0000) ✓	0.000 (0.0000) ✓
Envelope Message	-0.007 (0.005) [-3%]	-0.007 (0.005) [-3%]	-0.01 (0.006) [-4%]	-0.001 (0.007) [-1%]	0.000 (0.0000) ✓	0.000 (0.0000) ✓

Response and Denial by Experimental Treatments

Stigma Interventions						
Personal Stigma Reduction	-0.007 (0.011) [-3%]	-0.009 (0.011) [-4%]	-0.012 (0.014) [-4%]	0.001 (0.016) [+1%]	0.0003 (0.0000) ✓	0.0004 (0.0000) ✓
Social Stigma Reduction	-0.048*** (0.011) [-21%]	-0.046*** (0.010) [-20%]	-0.047*** (0.013) [-17%]	-0.037** (0.015) [-23%]	-0.0002 (0.0000) ✓	-0.0002 (0.0000) ✓
Fixed Effects, I(Deps)	X	X			X	X
Controls		X				X
N	35,050	35,050	23,618	11,432	35,050	35,050
Pseudo R-Squared	0.02	0.03	0.01	0.01	0.17	0.22
Baseline Response Rate (Simple N + V	0.23	0.23	0.27	0.16		
Control Response Rate (Complex N +	0.14	0.14	0.17	0.10		
P-value of F-Test - Complexity Interve	0.00	0.00	0.00	0.00	0.32	0.31
P-value of F-Test - Informational Inter	0.28	0.30	0.69	0.15	0.13	0.12
P-value of F-Test - Stigma Interventior	0.00	0.00	0.00	0.11	0.96	0.77

Predicted Response for Benefit and Cost Notices



5 Concluding Remarks

- How to complete a dissertation and be (approximately) happy
 1. Know yourself, and put yourself to work
 - Do you procrastinate?
 - Are you afraid of undirected research?
 - Not enough intuition?
 - Not enough technicality?
 - Work in teams with a classmate

2. Economics is about techniques AND about ideas

- *Rule 1.* Study the techniques

- Everyone needs a knowledge of:

- * Modelling skills (decisions, game theory, contracts, behavioral models)

- * Econometrics (asymptotics, applied metrics)

- * (At least) one field (methodology, questions, previous research)

- *Rule 2.* Think of interesting ideas
- Start from new idea, not from previous papers. Ex.: Mas-Moretti on Safeway data
- Think of an idea that can fix a broken literature (Levitt). Ex.: Fehr-Goette on cab drivers
- Connect two literatures which were unconnected. Ex.: Eisensee-Stromberg on political economy + behavioral
- *Rule 3.* Explore technique you need for idea
 - * Ideas often come first
 - * It will be much easier to learn technique once you have an interesting problem at hand

3. What are good ideas?

- 1% of *GDP* (Glaeser)
- New questions (better) or unknown answers
- Questions you care about and topics you know about (comparative advantage: List)
- Socially important topics (Akerlof)
- Good research is always useful, even if not policy-relevant

4. Look for occasions to learn:

- Attend seminars (including student lunch talks)
- Attend job market talks
- Do not read too much literature
- Discuss ideas with peers, over lunch, with yourself
- Get started on some data set
- Be curious

5. Above all, do not get discouraged...

- Unproductive periods are a fact of life
- Ideas keep getting better (and economics more fun) with exercise
- Work hard
- Keep up the exercise!