

Econ 219B  
Psychology and Economics: Applications  
(Lecture 13 and last)

Stefano DellaVigna

April 26, 2017

## Outline

1. Market Reaction to Biases: Behavioral Finance
2. Market Reaction to Biases: Corporate Decisions
3. Market Reaction to Biases: Political Economy
4. Market Reaction to Biases: Employers
5. Welfare Response to Biases
6. Concluding Remarks
7. Teaching Evaluation

# 1 Market Reaction to Biases: Behavioral Finance

- Who do 'smart' investors respond to investors with biases?
- First, brief overview of anomalies in Asset Pricing (from Barberis and Thaler, 2004)

## 1. Underdiversification.

(a) Too few companies.

- Investors hold an average of 4-6 stocks in portfolio.
- Improvement with mutual funds

(b) Too few countries.

- Investors heavily invested in own country.
- Own country equity: 94% (US), 98% (Japan), 82% (UK)

- Own area: own local Bells (Huberman, 2001)

(c) Own company

- In companies offering own stock in 401(k) plan, substantial investment in employer stock

## 2. **Naive diversification.**

- Investors tend to distribute wealth ‘equally’ among alternatives in 401(k) plan (Benartzi and Thaler, 2001; Huberman and Jiang, 2005)

## 3. **Excessive Trading.**

- Trade too much given transaction costs (Odean, 2001)

#### 4. **Disposition Effect in selling**

- Investors more likely to sell winners than losers

#### 5. **Attention Effects in buying**

- Stocks with extreme price or volume movements attract attention (Odean, 2003)

#### 6. **Inattention to Fees**

- Should market forces and arbitrage eliminate these phenomena?

- **Arbitrage:**

- Individuals attempt to maximize individual wealth
- They take advantage of opportunities for free lunches

- Implications of arbitrage: 'Strange' preferences do not affect pricing

- Implication: For prices of assets, no need to worry about behavioral stories

- Is it true?

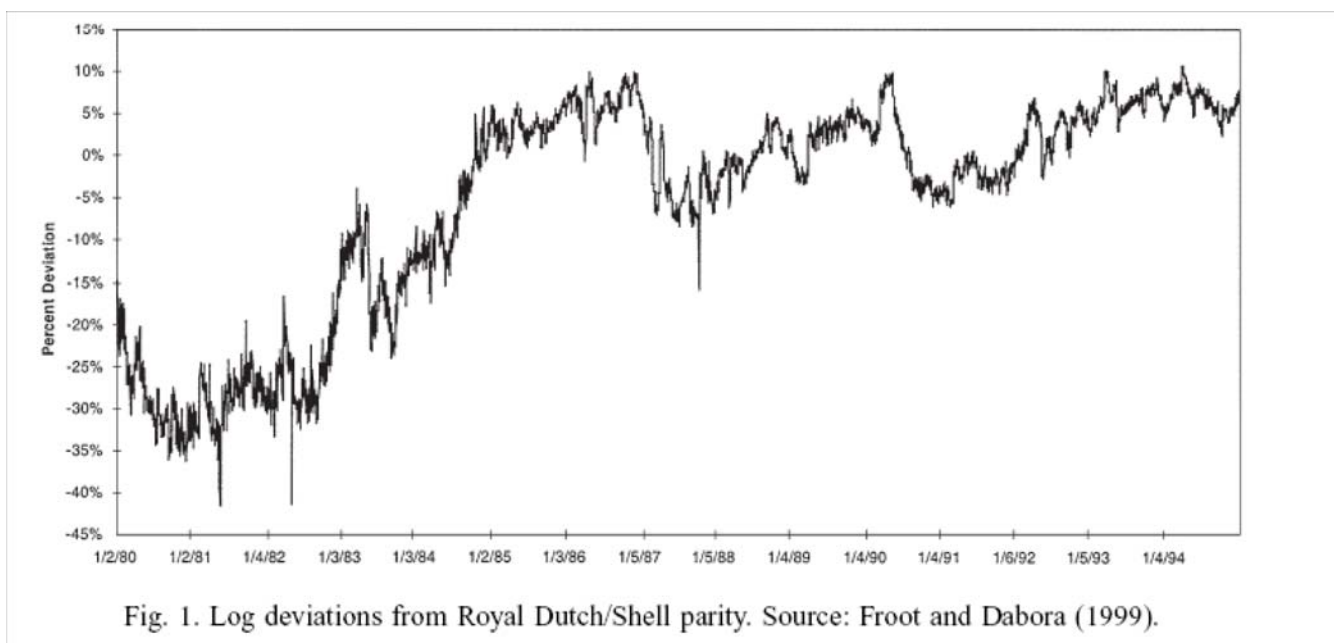
- Fictitious example:
  - Asset A returns \$1 tomorrow with  $p = .5$
  - Asset B returns \$1 tomorrow with  $p = .5$
  
  - Arbitrage  $\rightarrow$  Price of A has to equal price of B
  - If  $p_A > p_B$ ,
    - \* sell  $A$  and buy  $B$
    - \* keep selling and buying until  $p_A = p_B$
  - Viceversa if  $p_A < p_B$

- Problem: Arbitrage is limited (de Long et al., 1991; Shleifer, 2001)
- In Example: can buy/sell A or B and tomorrow get fundamental value
- In Real world: prices can diverge from fundamental value
  
- Real world example. Royal Dutch and Shell
  - Companies merged financially in 1907
  - Royal Dutch shares: claim to 60% of total cash flow
  - Shell shares: claim to 40% of total cash flow
  - Shares are nothing but claims to cash flow



– Price of Royal Dutch should be  $60/40=3/2$  price of Shell

- $p_{RD}/p_S$  differs substantially from 1.5 (Fig. 1)



- Plenty of other example (Palm/3Com)
- What is the problem?
  - Noise trader risk, investors with correlated valuations that diverge from fundamental value
  - (Example: Naive Investors keep persistently bidding down price of Shell)
  - In the long run, convergence to cash-flow value
  - In the short-run, divergence can even increase
  - (Example: Price of Shell may be bid down even more)

- **Noise Traders**

- DeLong, Shleifer, Summers, Waldman (*JPE* 1990)

- Shleifer, *Inefficient Markets*, 2000

- Fundamental question: What happens to prices if:

  - (Limited) arbitrage

  - Some irrational investors with correlated (wrong) beliefs

- First paper on Market Reaction to Biases

- *The* key paper in Behavioral Finance

## The model assumptions

A1: arbitrageurs risk averse and short horizon

—→ Justification?

- \* Short-selling constraints

(per-period fee if borrowing cash/securities)

- \* Evaluation of Fund managers.

- \* Principal-Agent problem for fund managers.

A2: noise traders (Kyle 1985; Black 1986)

misperceive future expected price at  $t$  by

$$\rho_t \stackrel{i.i.d.}{\sim} \mathcal{N}(\rho^*, \sigma_\rho^2)$$

misperception *correlated* across noise traders ( $\rho^* \neq 0$ )

→ Justification?

\* fads and bubbles (Internet stocks, biotechs)

\* pseudo-signals (advice broker, financial guru)

\* behavioral biases / misperception riskiness

## What else?

- $\mu$  noise traders,  $(1 - \mu)$  arbitrageurs
- OLG model
  - Period 1: initial endowment, trade
  - Period 2: consumption
- Two assets with identical dividend  $r$ 
  - safe asset: perfectly elastic supply  
 $\implies$  price=1 (numeraire)
  - unsafe asset: inelastic supply (1 unit)  
 $\implies$  price?
- Demand for unsafe asset:  $\lambda^a$  and  $\lambda^n$ , with  $\lambda^n \mu + \lambda^a (1 - \mu) = 1$ .
- CARA:  $U(w) = -e^{-2\gamma w}$  ( $w$  wealth when old)

$$\begin{aligned}
E[U(w)] &= \int_{-\infty}^{\infty} -e^{-2\gamma w} \cdot \frac{1}{\sqrt{2\pi\sigma_w^2}} \cdot e^{-\frac{1}{2\sigma_w^2}(w-\bar{w})^2} dw \\
&= - \int_{-\infty}^{\infty} \frac{1}{\sqrt{2\pi\sigma_w^2}} \cdot e^{-\frac{4\gamma w\sigma_w^2 + w^2 + \bar{w}^2 - 2w\bar{w}}{2\sigma_w^2}} dw \\
&= - \int_{-\infty}^{\infty} \frac{1}{\sqrt{2\pi\sigma_w^2}} \cdot e^{-\frac{(w - [2\gamma\sigma_w^2 + \bar{w}])^2 + \bar{w}^2 - 4\gamma^2\sigma_w^4 - \bar{w}^2 - 2\gamma\sigma_w^2\bar{w}}{2\sigma_w^2}} dw \\
&= -e^{\frac{4\gamma^2\sigma_w^4 + 2\gamma\sigma_w^2\bar{w}}{2\sigma_w^2}} \int_{-\infty}^{\infty} \frac{1}{\sqrt{2\pi\sigma_w^2}} \cdot e^{-\frac{(w - [2\gamma\sigma_w^2 + \bar{w}])^2}{2\sigma_w^2}} dw \\
&= -e^{4\gamma^2\sigma_w^2 + 2\gamma\bar{w}} = e^{-2\gamma(\bar{w} - \gamma\sigma_w^2)}
\end{aligned}$$

⇓

$$\max E[U(w)]$$

pos. mon. transf.

$$\max \bar{w} - \gamma\sigma_w^2$$

Arbitrageurs:

$$\begin{aligned} & \max(w_t - \lambda_t^a p_t)(1 + r) \\ & \quad + \lambda_t^a (E_t[p_{t+1}] + r) \\ & \quad - \gamma (\lambda_t^a)^2 \text{Var}_t(p_{t+1}) \end{aligned}$$

Noise traders:

$$\begin{aligned} & \max(w_t - \lambda_t^n p_t)(1 + r) \\ & \quad + \lambda_t^n (E_t[p_{t+1}] + \rho_t + r) \\ & \quad - \gamma (\lambda_t^n)^2 \text{Var}_t(p_{t+1}) \end{aligned}$$

(Note: Noise traders know how to factor the effect of future price volatility into their calculations of values.)



f.o.c.

$$\text{Arbitrageurs: } \frac{\partial E[U]}{\partial \lambda_t^a} \stackrel{!}{=} 0$$

$$\lambda_t^a = \frac{r + E_t[p_{t+1}] - (1 + r)p_t}{2\gamma \cdot \text{Var}_t(p_{t+1})}$$

$$\text{Noise traders: } \frac{\partial E[U]}{\partial \lambda_t^n} \stackrel{!}{=} 0$$

$$\lambda_t^n = \frac{r + E_t[p_{t+1}] - (1 + r)p_t}{2\gamma \cdot \text{Var}_t(p_{t+1})} + \frac{\rho_t}{2\gamma \cdot \text{Var}_t(p_{t+1})}$$

## Interpretation

- Demand for unsafe asset function of:
  - (+) expected return ( $r + E_t[p_{t+1}] - (1 + r)p_t$ )
  - (-) risk aversion ( $\gamma$ )
  - (-) variance of return ( $Var_t(p_{t+1})$ )
  - (+) overestimation of return  $\rho_t$  (noise traders)
- Notice: noise traders hold more risky asset than arb. if  $\rho > 0$  (and viceversa)
- Notice: Variance of prices come from noise trader risk. “Price when old” depends on uncertain belief of next periods’ noise traders.

- Impose general equilibrium:  $\lambda^n \mu + \lambda^a (1 - \mu) = 1$  to obtain

$$1 = \frac{r + E_t[p_{t+1}] - (1 + r)p_t}{2\gamma \cdot Var_t(p_{t+1})} + \mu \frac{\rho_t}{2\gamma \cdot Var_t(p_{t+1})} \text{ or}$$

$$p_t = \frac{1}{1 + r} [r + E_t[p_{t+1}] - 2\gamma \cdot Var_t(p_{t+1}) + \mu\rho_t]$$

- To solve for  $p_t$ , we need to solve for  $E_t[p_{t+1}] = E[p]$  and  $Var_t(p_{t+1})$

$$E[p] = \frac{1}{1 + r} [r + E_t[p] - 2\gamma \cdot Var_t(p_{t+1}) + \mu E[\rho_t]]$$

$$E[p] = 1 + \frac{-2\gamma \cdot Var_t(p_{t+1}) + \mu\rho^*}{r}$$

- Rewrite  $p_t$  plugging in

$$p_t = 1 - \frac{2\gamma \cdot \text{Var}_t(p_{t+1})}{r} + \frac{\mu\rho^*}{r(1+r)} + \frac{\mu\rho_t}{1+r}$$

$$\text{Var}[p_t] = \text{Var}\left[\frac{\mu\rho_t}{1+r}\right] = \frac{\mu^2}{(1+r)^2} \text{Var}(\rho_t) = \frac{\mu^2}{(1+r)^2} \sigma_\rho^2$$

- Rewrite  $p_t$

$$p_t = 1 + \frac{\mu\rho^*}{r} + \frac{\mu(\rho_t - \rho^*)}{1+r} - 2\frac{\gamma\mu^2\sigma_\rho^2}{r(1+r)^2}$$

- Noise traders affect prices!
- Term 1: Variation in noise trader (mis-)perception
- Term 2: Average misperception of noise traders
- Term 3: Compensation for noise trader risk

- **Relative returns of noise traders**

- Compare returns to noise traders  $R^n$  to returns for arbitrageurs  $R_a$ :

$$\Delta R = R^n - R^a = (\lambda_t^n - \lambda_t^a) [r + p_{t+1} - p_t (1 + r)]$$

$$E(\Delta R | \rho_t) = \rho_t - \frac{(1 + r)^2 \rho_t^2}{2\gamma\mu\sigma_\rho^2}$$

$$E(\Delta R) = \rho^* - \frac{(1 + r)^2 (\rho^*)^2 + (1 + r)^2 \sigma_\rho^2}{2\gamma\mu\sigma_\rho^2}$$

- Noise traders hold more risky asset if  $\rho^* > 0$
- Return of noise traders can be higher if  $\rho^* > 0$  (and not too positive)
- Noise traders therefore may outperform arbitrageurs if optimistic!
- (Reason is that they are taking more risk)

## Welfare

- Sophisticated investors have higher utility
- Noise traders have lower utility than they expect
- Noise traders may have higher returns (if  $\rho^* > 0$ )
- Noise traders do not necessarily disappear over time

- Three fundamental assumptions
  1. OLG: no last period; short horizon
  2. Fixed supply unsafe asset ( $a$  cannot convert safe into unsafe)
  3. Noise trader risk systematic
  
- Noise trader models imply that biases affect asset prices:
  - Reference Dependence
  - Attention
  - Persuasion

## 2 Market Reaction to Biases: Corporate Decisions

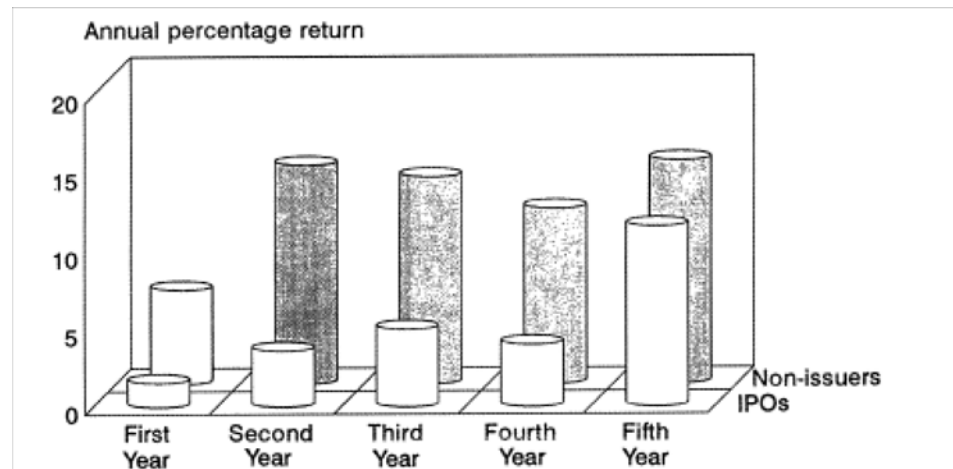
- Baker, Ruback, and Wurgler (2005)
- Behavioral corporate finance:
  - biased investors (overvalue or undervalue company)
  - smart managers
  - (Converse: biased (overconfident) managers and rational investors)
- Firm has to decide how to finance investment project:
  1. internal funds (cash flow/retained earnings)
  2. bonds
  3. stocks



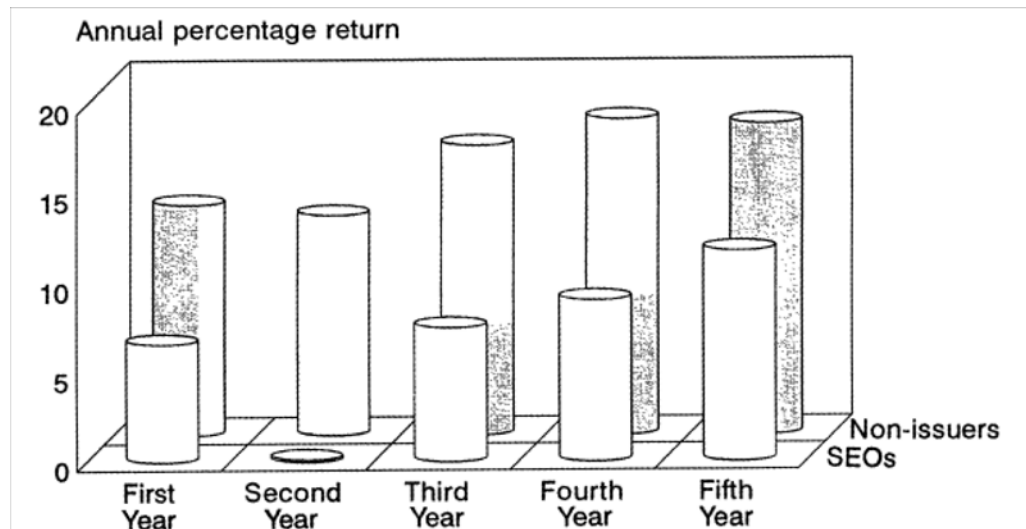
- Fluctuation of equity prices due to noise traders
- Managers believe that the market is inefficient
  - Issue equity when stock price exceeds perceived fundamental value
  - Delay equity issue when stock price below perceived fundamental value
- Consistent with
  - Survey Evidence of 392 CFO's (Graham and Harvey 2001): 67% say under/overvaluation is a factor in issuance decision
  - Insider trading
- Go over quickly two examples

- **Long-run performance of equity issuers**

- Market Timing prediction: Companies issuing equity underperform later
- Loughran-Ritter (1995): Compare matching samples of
  - \* companies doing IPOs
  - \* companies not doing IPOs but have similar market cap.



- Similar finding with SEOs



**Figure 2. The average annual raw returns for 4,753 initial public offerings (IPOs), and their matching nonissuing firms (top), and the average annual raw returns for 3,702 seasoned equity offerings (SEOs), and their matching nonissuing firms (bottom), during the five years after the issue.** The equity issues are from 1970 to 1990. Using the first closing postissue market price, the equally weighted average buy-and-hold return for the year after the issue is calculated for the issuing firms and for their matching firms (firms with the same market capitalization that have not issued equity during the prior five years). On each anniversary of the issue date, the equally weighted average buy-and-hold return during the next year for all of the surviving issuers and their matching firms is calculated. For matching firms that get delisted (or issue equity) while the issuer is still trading, the proceeds from the sale on the delisting date are reinvested in a new matching firm for the remainder of that year (or until the issuer is delisted). The numbers graphed above are reported in Table III.

### 3 Market Reaction to Biases: Political Economy

- Interaction between:
  - (Smart) Politicians:
    - \* Personal beliefs and party affiliation
    - \* May pursue voters/consumers welfare maximization
    - \* BUT also: strong incentives to be reelected
  - Voters (with biases):
    - \* Low (zero) incentives to vote
    - \* Limited information through media
    - \* Likely to display biases
- **Behavioral political economy**

- **Research in Behavioral Political Economy - A Roadmap**

- Social preferences overcome public good problem
  - \* Turnout (Harsanyi; Knack; Blais; Morton; DellaVigna et al.)
  - \* Coordination in protests (Passarelli and Tabellini – below)
  - \* Vote buying (Finan and Schechter – below)
- Reference-dependence of voters
  - \* Status quo in policies (Alesina and Passarelli)
  - \* Lack of support for redistribution (Charite', Fisman and Kuziemko)
- Limited attention and memory
  - \* Order effects at ballot (Ho and Imai)
  - \* Misvoting (Shue and Luttmer)
  - \* Retrospective voting (Wolfers)

- \* Optimal inattention (Matejka and Tabellini)
- Persuasion in voting
  - \* Persuasion and voting (DellaVigna and Kaplan)
- Behavioral Biases
  - \* Overconfidence (Snowberg)
  - \* Correlation neglect (Levy and Razin)
- Rational politicians best-respond to voter biases
  - \* Aid to disasters (Eisensee and Stromberg – below)

- **Eisensee and Stromberg (QJE 2007):** Limited attention of voters
- Setting:
  - Natural Disasters occurring throughout the World
  - US Ambassadors in country can decide to give Aid
  - Decision to give Aid affected by
    - \* Gravity of disaster
    - \* Political returns to Aid decision
- Idea: Returns to aid are lower when American public is distracted by a major news event

- Main Measure of Major News: median amount of Minutes in Evening TV News captured by top-3 news items (Vanderbilt Data Set)

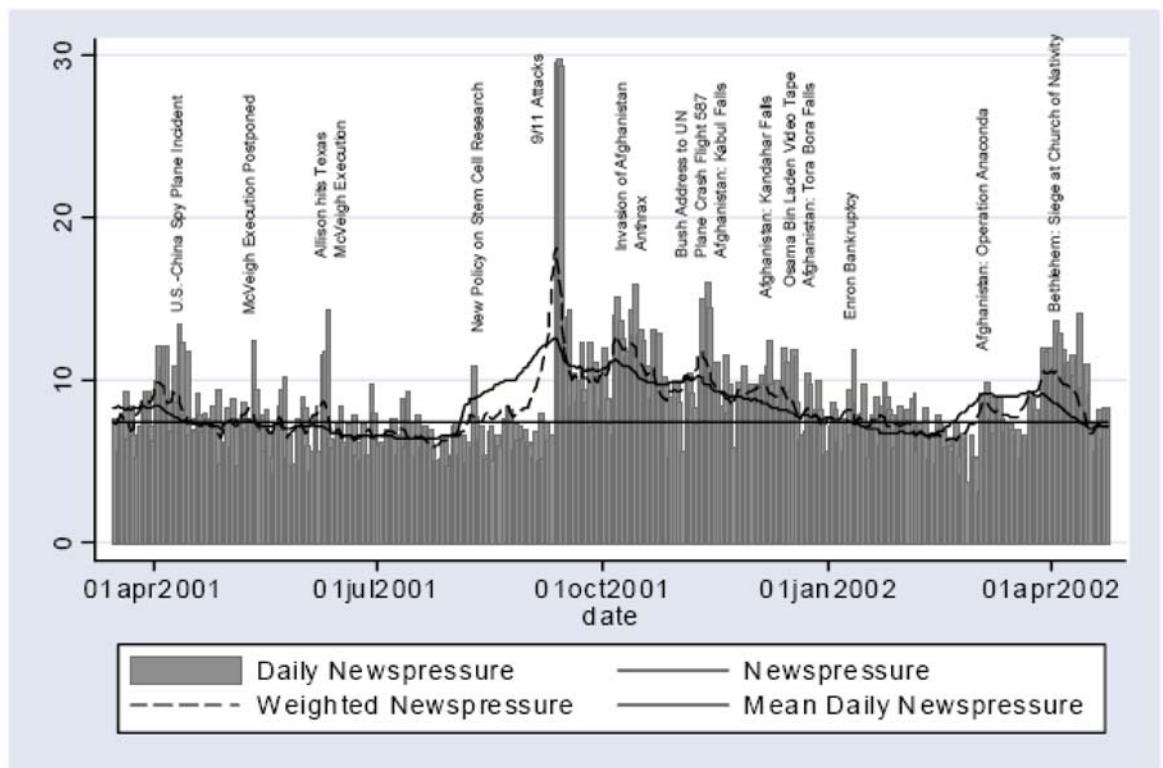


FIGURE IV  
 News Pressure (Minutes) during 405 Days, 15 March 2001 – 23 Apr 2002, by Day



- – Dates with largest news pressure

TABLE III  
DATES OF TWO LARGEST *daily news pressure* AND MAIN STORY, BY YEAR

Year	Date	Main News Story
2003	14 Aug	<i>New York City Blackout</i>
	22 Mar	<i>Invasion of Iraq: Day 3</i>
2002	11 Sep	<i>9/11 Commemoration</i>
	24 Oct	<i>Sniper Shooting in Washington: Arrest of Suspects</i>
2001	13 Sep	<i>9/11 Attack on America: Day 3</i>
	12 Sep	<i>9/11 Attack on America: Day 2</i>
2000	26 Nov	<i>Gore vs. Bush: Florida Recount - Certification by Katherine Harris</i>
	8 Dec	<i>Gore vs. Bush: Florida Recount - Supreme Court Ruling</i>
1999	1 Apr	<i>Kosovo Crisis: U.S. Soldiers Captured</i>
	18 Jul	<i>Crash of Plane Carrying John F. Kennedy, Junior</i>
1998	16 Dec	<i>U.S. Missile Attack on Iraq</i>
	18 Dec	<i>Clinton Impeachment</i>
1997	23 Dec	<i>Oklahoma City Bombing: Trial</i>
	31 Aug	<i>Princess Diana's Death</i>
1996	18 Jul	<i>TWA Flight 800 Explosion</i>
	27 Jul	<i>Olympic Games Bombing in Atlanta</i>
1995	3 Oct	<i>O.J. Simpson Trial: The Verdict</i>
	22 Apr	<i>Oklahoma City Bombing</i>
1994	17 Jan	<i>California Earthquake</i>
	18 Jun	<i>O.J. Simpson Arrested</i>
1993	17 Jan	<i>U.S. Missile Attack on Iraq</i>
	20 Apr	<i>Waco, Texas: Cult Standoff Ends in Fire</i>
1992	16 Jul	<i>Perot Quits 1992 Presidential Campaign</i>
	1 May	<i>Los Angeles Riots</i>

- 5,000 natural Disasters in 143 countries between 1968 and 2002 (CRED)
  - 20 percent receive USAID from Office of Foreign Disaster Assistance (first agency to provide relief)
  - 10 percent covered in major broadcast news
  - OFDA relief given if (and only if) Ambassador (or chief of Mission) in country does Disaster Declaration
  - Ambassador can allocate up to \$50,000 immediately
- Estimate

$$Relief = \alpha News + \beta X + \varepsilon$$

- Below: *News* about the Disaster is instrumented with:
  - Average News Pressure over 40 days after disaster
  - Olympics

TABLE IV  
EFFECT OF THE PRESSURE FOR NEWS TIME ON DISASTER *News* AND *Relief*

	Dependent variable: <i>News</i>				Dependent variable: <i>Relief</i>			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>News Pressure</i>	-0.0162 (0.0041)***	-0.0163 (0.0041)***	-0.0177 (0.0057)***	-0.0142 (0.0037)***	-0.0117 (0.0045)***	-0.0119 (0.0045)***	-0.0094 (0.0058)	-0.0078 (0.0040)**
<i>Olympics</i>	-0.1078 (0.0470)**	-0.1079 (0.0470)**	-0.0871 (-0.0628)	-0.111 (0.0413)***	-0.1231 (0.0521)**	-0.1232 (0.0521)**	-0.1071 (0.0763)	-0.1098 (0.0479)**
<i>World Series</i>	-0.1133 (-0.1065)				-0.1324 (0.1031)			
<i>log Killed</i>			0.0605 (0.0040)***				0.0582 (0.0044)***	
<i>log Affected</i>			0.0123 (0.0024)***				0.0376 (0.0024)***	
<i>imputed log Killed</i>				0.0491 (0.0034)***				0.0442 (0.0037)***
<i>imputed log Affected</i>				0.0151 (0.0020)***				0.0394 (0.0020)***
Observations	5212	5212	2926	5212	5212	5212	2926	5212
R-squared	0.1799	0.1797	0.3624	0.2875	0.1991	0.1989	0.4115	0.3726

Linear probability OLS regressions. All regressions include year, month, country and disaster type fixed effects. Regressions with imputed values ((4) and (8)) also include fixed effects for the interaction of missing values and disaster type. Robust standard errors in parentheses: \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

- – 1st Stage: 2 s.d increase in News Pressure (2.4 extra minutes) decrease
  - \* probability of coverage in news by 4 ptg. points (40 percent)
  - \* probability of relief by 3 ptg. points (15 percent)

- Is there a spurious correlation between instruments and type of disaster?
- No correlation with severity of disaster

TABLE V  
CORRELATIONS BETWEEN INSTRUMENTS AND THE SEVERITY OF DISASTERS

	Dependent variable	
	<i>News Pressure</i>	<i>Olympics</i>
<i>log Killed</i>	-0.0082 (0.0113)	0.0003 (0.0010)
<i>log Affected</i>	0.0005 (0.0068)	-0.0006 (0.0006)
p-value: F-test of joint insignificance	0.75	0.62
Observations	5212	5212
R-squared	0.3110	0.2035

OLS regressions with the instruments *News Pressure* and *Olympics* as dependent variables, and including year, month, country and disaster type fixed effects. Robust standard errors in parentheses: \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. The F-test tests the joint significance of *log Killed* and *log Affected* in the regression.

- OLS and IV Regressions of Reliefs on presence in the News
- (Instrumented) availability in the news at the margin has huge effect: Almost one-on-one effect of being in the news on aid

TABLE VI  
DEPENDENT VARIABLE: *Relief*

	OLS					IV		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
News	0.2886 (0.0200)***	0.158 (0.0232)***	0.1309 (0.0178)***	0.2323 (0.0328)***	0.2611 (0.0569)***	0.8237 (0.2528)***	0.6341 (0.3341)*	0.6769 (0.2554)***
News*abs(Pr(news)-0.5)				-0.4922 (0.1059)***	-0.302 (0.0840)***			
abs(Pr(news)-0.5)				0.5374 (0.0943)***	0.2959 (0.0831)***			
log Killed		0.0486 (0.0046)***					0.0198 -0.0208	
log Affected		0.0358 (0.0024)***					0.0299 (0.0048)***	
imputed log Killed			0.0378 (0.0038)***	0.0546 (0.0049)***	0.0307 (0.0046)***			0.0109 -0.0132
imputed log Affected			0.0375 (0.0020)***	0.0445 (0.0023)***	0.0345 (0.0026)***			0.0292 (0.0045)***
F-stat, instruments, 1 <sup>st</sup> stage						11.0	6.1	11.1
Over-id restrictions, $\chi^2_{df}$ (p-value)						0.51 <sub>1</sub> (0.47)		0.64 <sub>1</sub> (0.42)
Observations	5212	2926	5212	5212	5027	5212	2926	5212
R-squared	0.2443	0.4225	0.3800	0.3860				

All regressions include year, month, country, and disaster type fixed effects. Regressions with imputed values ((3), (4) and (5)) also include fixed effects for the interaction of missing values and disaster type. Robust standard errors in parentheses: \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

- **Finan and Schechter (2012 EMA):** Politicians target voter reciprocity
  - Motivation is vote buying
  - Politicians do favors to individuals in the hope of the return of a vote
  - BUT: Vote is private, no way to enforce a contract
- Solution that makes the contract enforceable: reciprocity of voters
  - Voter that receives a gift takes into account the politician
  - In return, provides vote
- Similar to gift exchange in the workplace
  - Reciprocity helps enforcement of 'contract'

- BUT: Vote-maximizing politician must find reciprocal voters
- Finan and Schechter do survey in Paraguay in 2002, 2007, and 2010
- Survey of voters:
  - In 2002 asked to play trust game
    - \* First mover has allocation of 8k and decide how much to send to recipient: 0, 2k, 4k, 6k, 8k
    - \* Money sent to recipient is tripled
    - \* Recipient decides how much money to send back (strategy method)
    - \* Measure of reciprocity: Share returned by recipient when receiving 12k+ versus when receiving 6k

- In 2007 ask voters whether targeted by vote-buying:
  - \* *'whether, during the run-up to the 2006 elections, any political party offered them money, food, payment of utility bills, medicines, and/or other goods (excluding propaganda hats, shirts, and posters)'*
  - \* 26 percent say yes
  
- Survey of middlemen in 2010
  - Evidence that they know villagers well
  - Ex.: Correlation between actual years of schooling and middleman report: 0.73
  - (Lower correlation in prediction of amount sent in dictator game, 0.08)



- Main evidence: clear correlation of self-reported vote-buying and reciprocity measure
- Social preferences used for evil purposes!

VOTE-BUYING AND RECIPROCITY

	Dependent Variable <sup>a</sup>				
	Individual Offered Something in Exchange for Vote				Individual Offered Something in Exchange for Vote (as Reported by the Middlemen)
	(1)	(2)	(3)	(4)	(5)
Reciprocity	1.259 [0.512]**	1.318 [0.568]**	1.207 [0.640]*	1.294 [0.579]**	0.382 [0.223]*
Observations	139	139	103	139	314
Mean of dependent variable	0.23	0.23	0.23	0.23	0.47
Main controls	N	Y	Y	Y	Y
Controls for other personal traits	N	N	Y	N	N
Controls for social network	N	N	N	Y	N

- – 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  $\varepsilon_i$
  - 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 (REStud 2017)**
  - 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 $c$

cost of voting

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

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

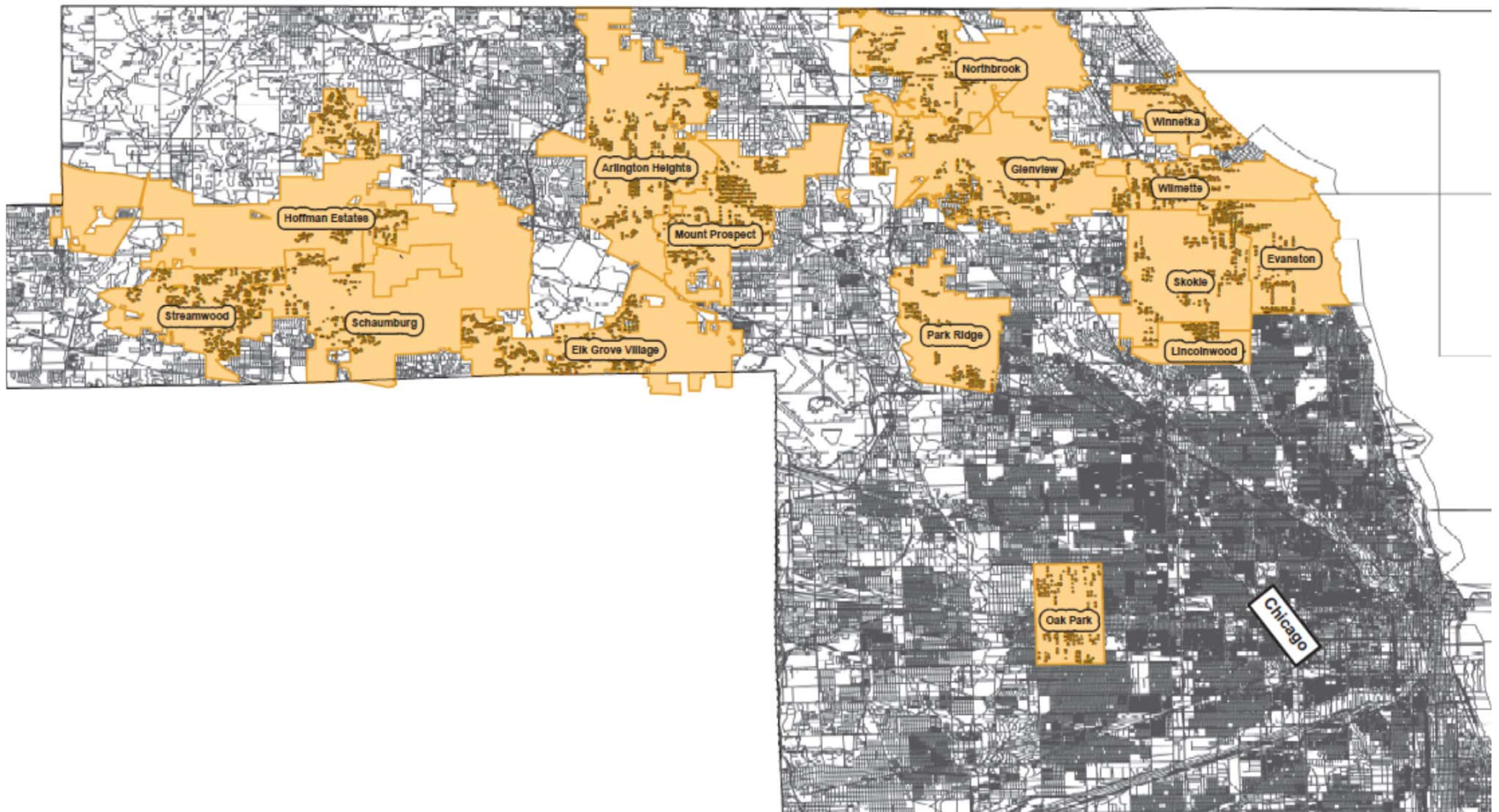


# Experimental Design

- Field experiment: door-to-door survey
  - Match households to voting records
  - Identify all-voter and all-non-voter households
- Cross-randomize
  1. Whether individuals receive advance notice of survey.
    - Individuals can avoid (or seek) surveyor at a cost.
  2. Vary payment and length of survey to estimate elasticity
  3. Incentives to lie / tell truth about voting.
- Get-Out-The-Vote experiment related to model
  - Inform some people that we will visit them after the election to ask whether they voted

# Field Experiment - Implementation

- Single-family homes in towns around Chicago



# Field Experiment - Implementation

- Logistics:
  - Saturdays and Sundays between July 2011 and Nov. 2011
  - Hours between 10am and 5pm
  - Surveyors are trained undergraduate students at the University of Chicago
- Randomization
  - Each 30 minutes within a day (4h shifts per day)
  - At street level within a town
  - Treatments balanced over time
- Most results are after conditioning on solicitor, hour, and location\*day fixed effects

# Exp 1: Announcing Content of Survey

Control:  
Unannounced  
Visit

THE UNIVERSITY OF  
CHICAGO



University of  
Chicago Study

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

THE UNIVERSITY OF  
CHICAGO



University of  
Chicago Study

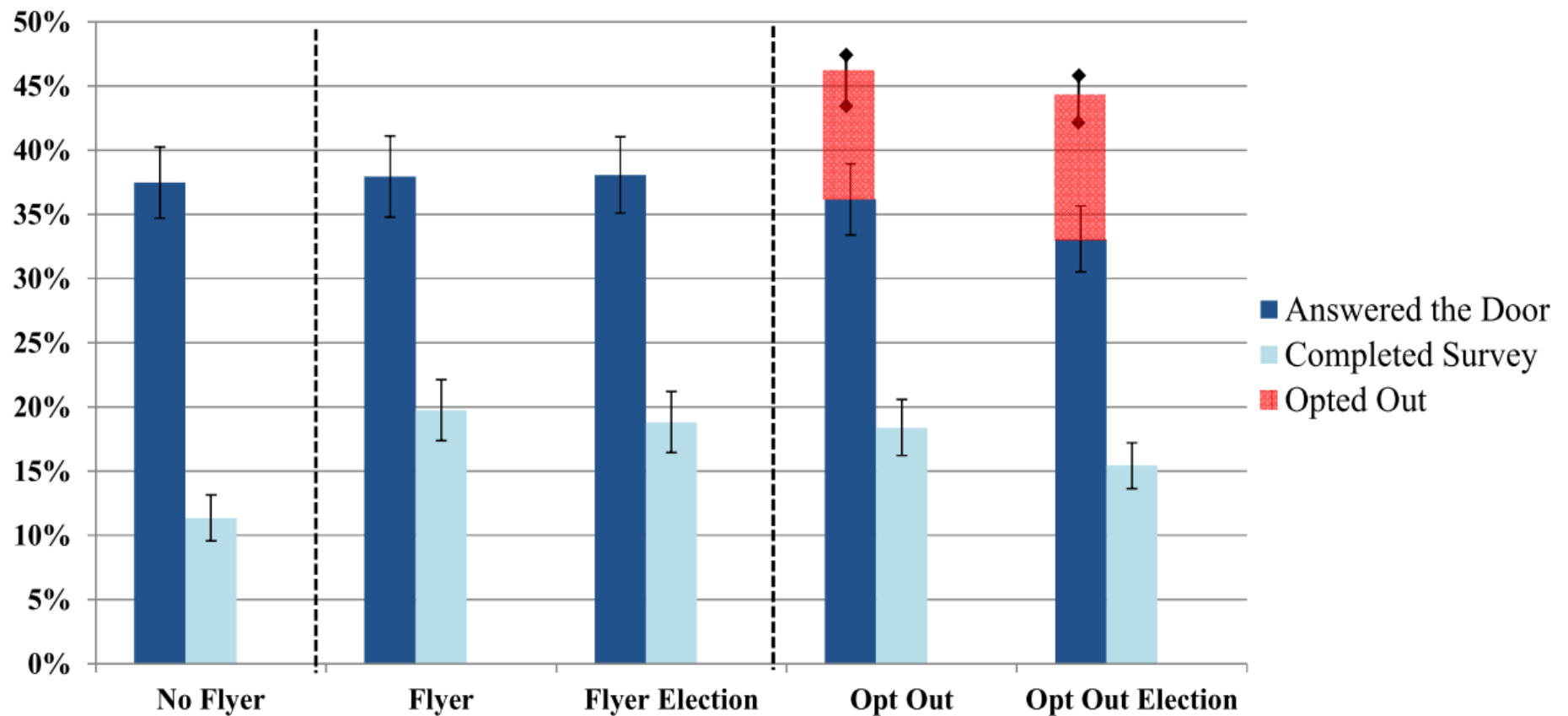
Researchers will visit this  
address tomorrow  
( / )  
between and to  
conduct a  
**5 minute survey on your  
voter participation in the  
2010 congressional  
election.**

## Model Predictions

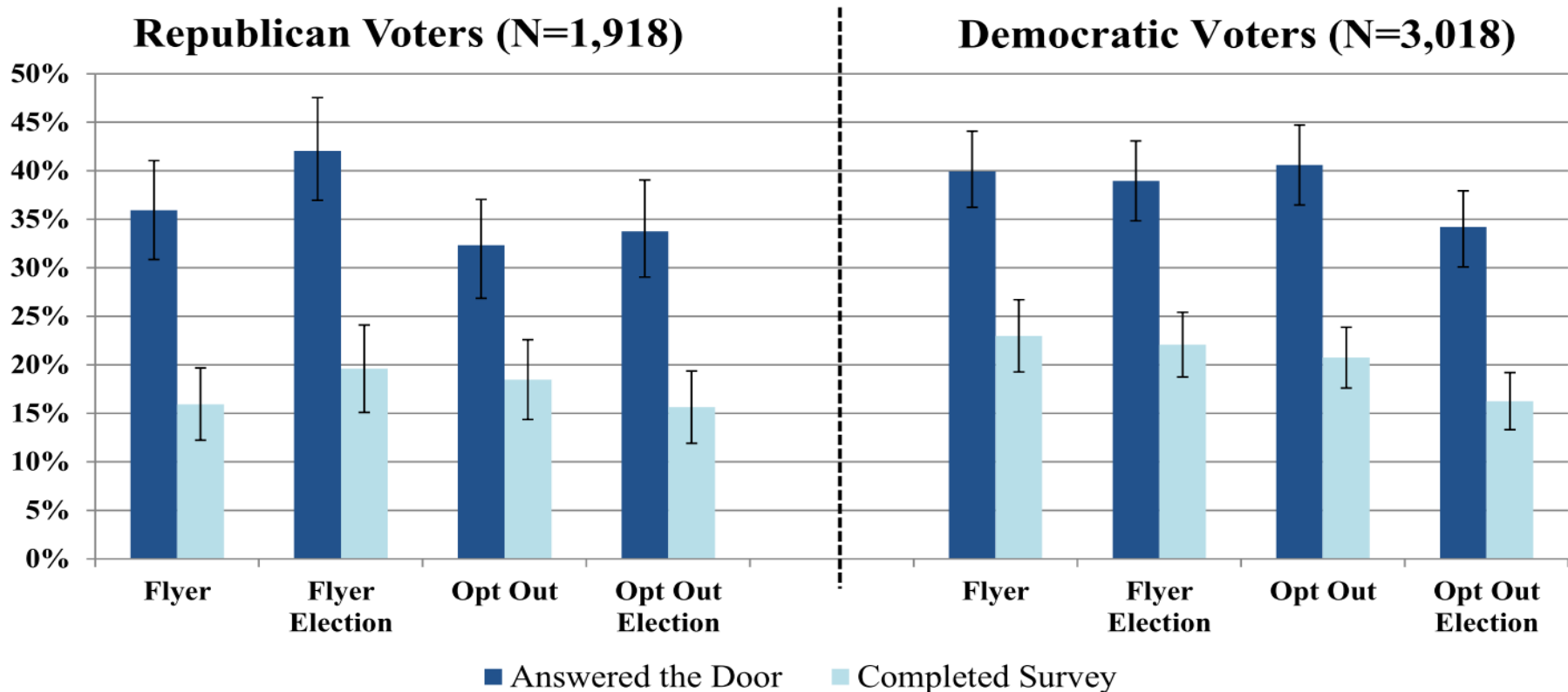
- **Prop. 1.** With pride in voting ( $s_V > 0$ ), voters should be more likely to be at home and answer the door if informed of election survey
- **Prop. 2.** With stigma from not voting ( $s_N < 0$ ), non-voters should be less likely to be at home and answer the door if informed of election survey
- **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  $N$

- **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

Voters (N=6,873)



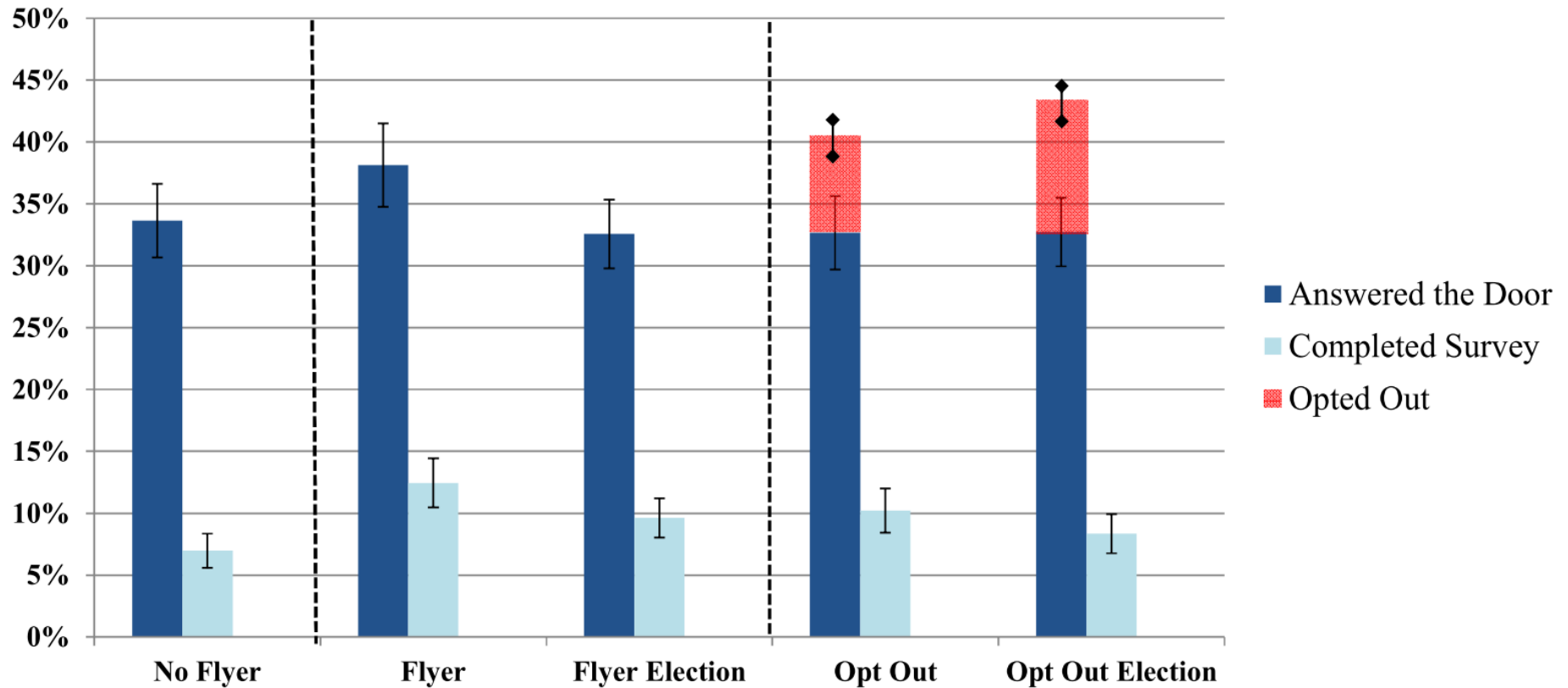
- **Sorting in Response to Election Survey -- Voters**
- However, 2010 election was low point for democratic voters
- 2/3 of registered voters in towns we reached are Democrats
- What if we split by voting record in primaries?
- Evidence of sorting in for Republicans





- **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 (N=6,324)**





# Exp 2: Varying payment and length of svy

THE UNIVERSITY OF  
CHICAGO



University of  
Chicago Study

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

THE UNIVERSITY OF  
CHICAGO



University of  
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.

THE UNIVERSITY OF  
CHICAGO

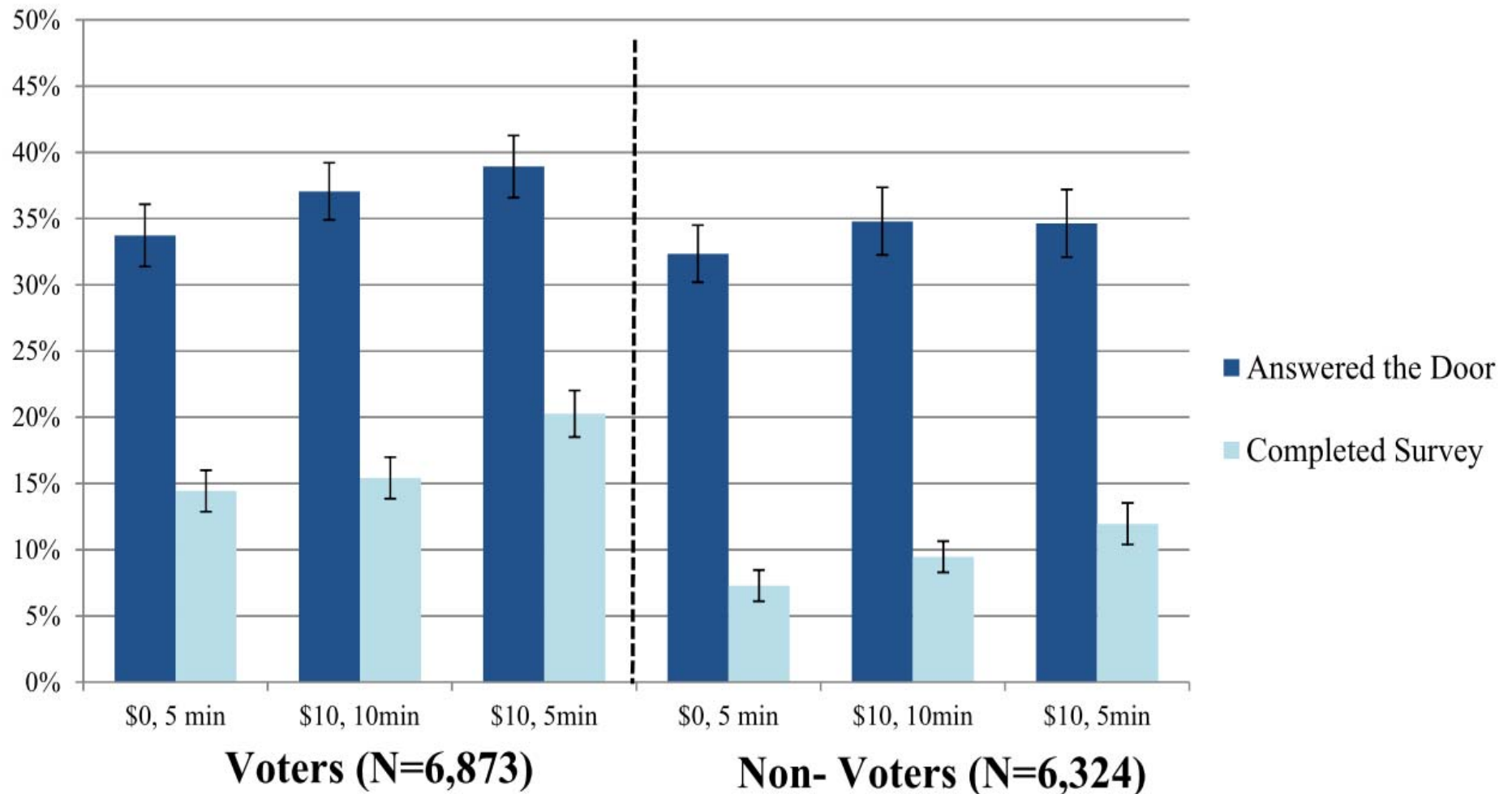


University of  
Chicago Study

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

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

- **Response to Incentives**
- Response to payment and duration
- Election warning effect on non-voters ~ **\$10** decrease in pay



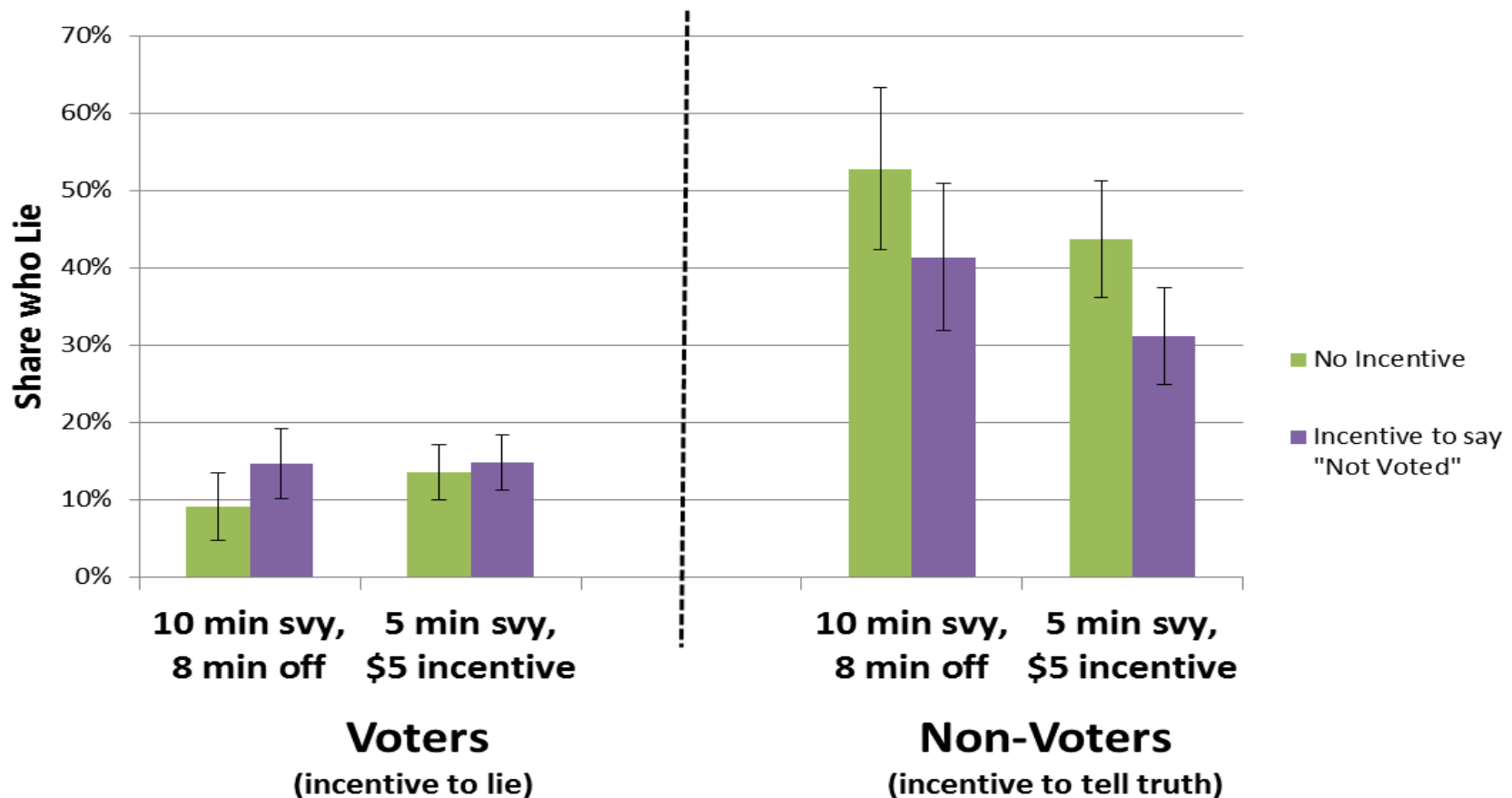
## Exp. 3: Lying Incentives

- Crossed 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 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
  - Novel survey instrument → Use 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 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?”**
- 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

- What is  $\vartheta$ ?
- Main parameters
  - mean and s.d. of  $s_i^V$  – signalling utility of saying one voted
  - mean and s.d. of  $s_i^N$  – signalling utility of saying one did not vote
  - $L_i \geq 0$  – lying cost
- Auxiliary parameters:
  - Willingness to do survey
  - Value of time
  - Cost of avoiding surveyor

## Estimation with Selection

- Estimation approach: Incorporate selection into V/NV
- Parameters ( $s_V, s_N$ ) *predict* becoming voter or non-voter
$$pV + g - c + N [\max(s_V, s_N - L) - \max(s_N, s_V - L)] \geq 0$$
$$= \varepsilon$$
  - Assume epsilon Normal
  - Voters and non-voters drawn from same population
  - Draw parameters, determine selection into voters or non-voters
  - Match to moments using simulations
  - Assume number of times asked  $N$  from survey
  - Additional moment: baseline turnout rate (60 percent)
- Total value of voting depends on  $N$
- Survey: *How often have you been asked whether you voted?*
  - *9 times* for 2008 presidential election



# Estimation with Selection

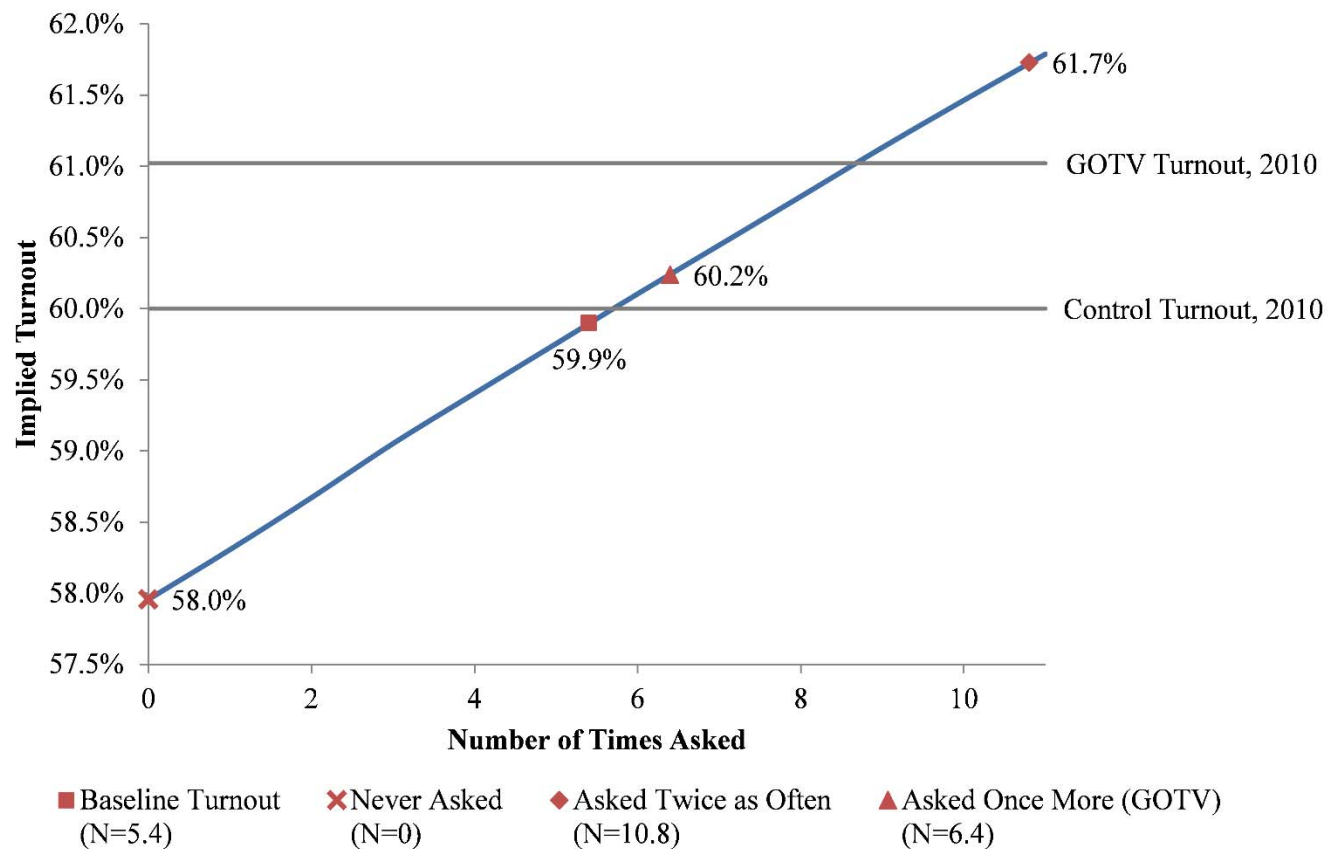
**Table 3. Simulated Minimum-Distance Estimates, Benchmark Results**

	Voters and Non-Voters Have Same Auxiliary Parameters	Voters and Non-Voters Have Different Auxiliary Parameters
<b><i>Voting Parameters</i></b>		
Mean Social Image Value of Saying Voted ( $s_V$ )	-6.3 (2.07)	-3.9 (1.47)
Mean Social Image Value of Saying Did Not Vote ( $s_N$ )	-21.7 (3.19)	-11.3 (1.77)
Std. Dev. of $s_V$ and $s_N$	19.7 (2.83)	9.5 (1.29)
Lying Cost L (in \$)	16.4 (2.82)	7.6 (1.21)
Mean Value of Other Reasons to Vote ( $\epsilon$ )	95.0 (114.33)	64.1 (167.90)
Std. Dev. of Other Reasons to Vote ( $\epsilon$ )	490.6 (454.75)	318.7 (691.37)

- Lying cost L estimated

# Estimation with Selection

- Implications: estimate impact on voting if
  - No one asked
  - Twice as many people asked
  - Also impact of being asked one more time (next)



# Estimation with Selection

- Other implications of estimates

**Table 4. Implied Value of Voting and Welfare Effects of GOTV**

	Voters and Non-Voters Have Same Auxiliary Parameters		Voters and Non-Voters Have Different Auxiliary Parameters	
	Voter	Non-Voter	Voter	Non-Voter
<b>Implications for Value of Voting to Tell Others</b>				
Implied Value of Voting "To Tell Others" (N=5.4)	41.4 (5.6)	26.1 (10.2)	18.3 (4.6)	13.3 (3.3)
Baseline Turnout		0.604 (0.011)		0.599 (0.011)
Implied Change in Turnout if Never Asked About Voting		-0.027 (0.0153)		-0.019 (0.0031)
Implied Change in Turnout if Asked About Voting Twice as Often		+0.025 (0.0081)		+0.018 (0.0079)
<b>Implications for GOTV</b>				
Utility from being Asked about Voting Once	-3.7 (1.6)	-10.6 (2.6)	-2.8 (1.2)	-5.9 (1.5)
Implied GOTV Effect (N+1)		+0.005 (0.0007)		+0.003 (0.0005)
Implied Number of GOTV Subjects to Get One Additional Vote (N+1)		206 (69.5)		295 (84.9)
Disutility Cost of Getting One Additional Vote (N+1)		-1326 (449.6)		-1189 (2684.4)

# Prospective Election Field Experiment

- If estimates are correct, being asked one more time increases the value of voting by \$1.50-\$3.00
- 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 turnout rate in TF group versus CF group provides evidence on impact of social image motive on voting

# Prospective Election Field Experiment



University of Chicago  
Study

**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)
- Estimates consistent with predicted small effect from model

## 4 Market Reaction to Biases: Employers

- **Kahneman, Knetsch and Thaler (1986)**: Telephone surveys in Canada in 1984 and 1985 → Ask questions on fairness

Question 4A. A company is making a small profit. It is located in a community experiencing a recession with substantial unemployment but no inflation. There are many workers anxious to work at the company. The company decides to decrease wages and salaries 7% this year.

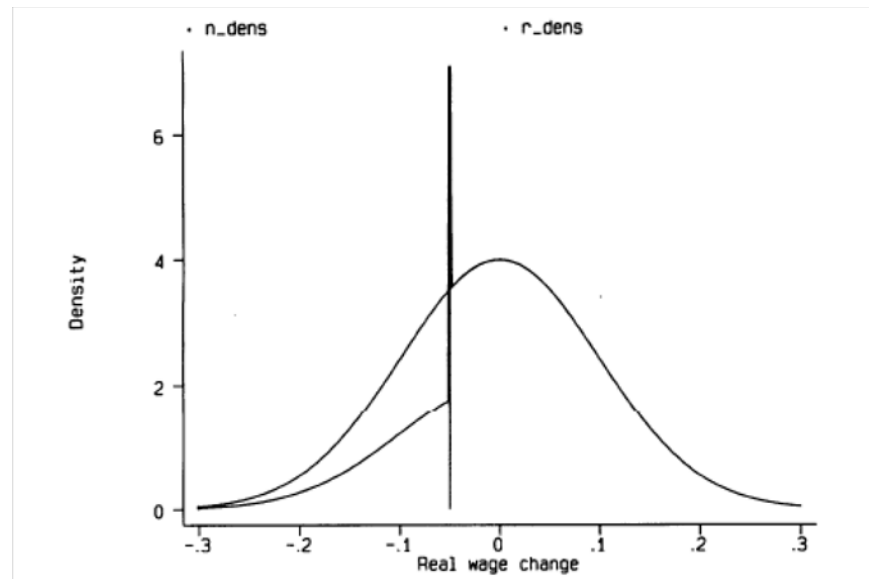
(*N* = 125) Acceptable 38% Unfair 62%

Question 4B. ...with substantial unemployment and inflation of 12%...The company decides to increase salaries only 5% this year.

(*N* = 129) Acceptable 78% Unfair 22%

- – A real and nominal wage cut is not fair (Question 4A)
- A real (but not nominal) wage cut is fair (Question 4B)

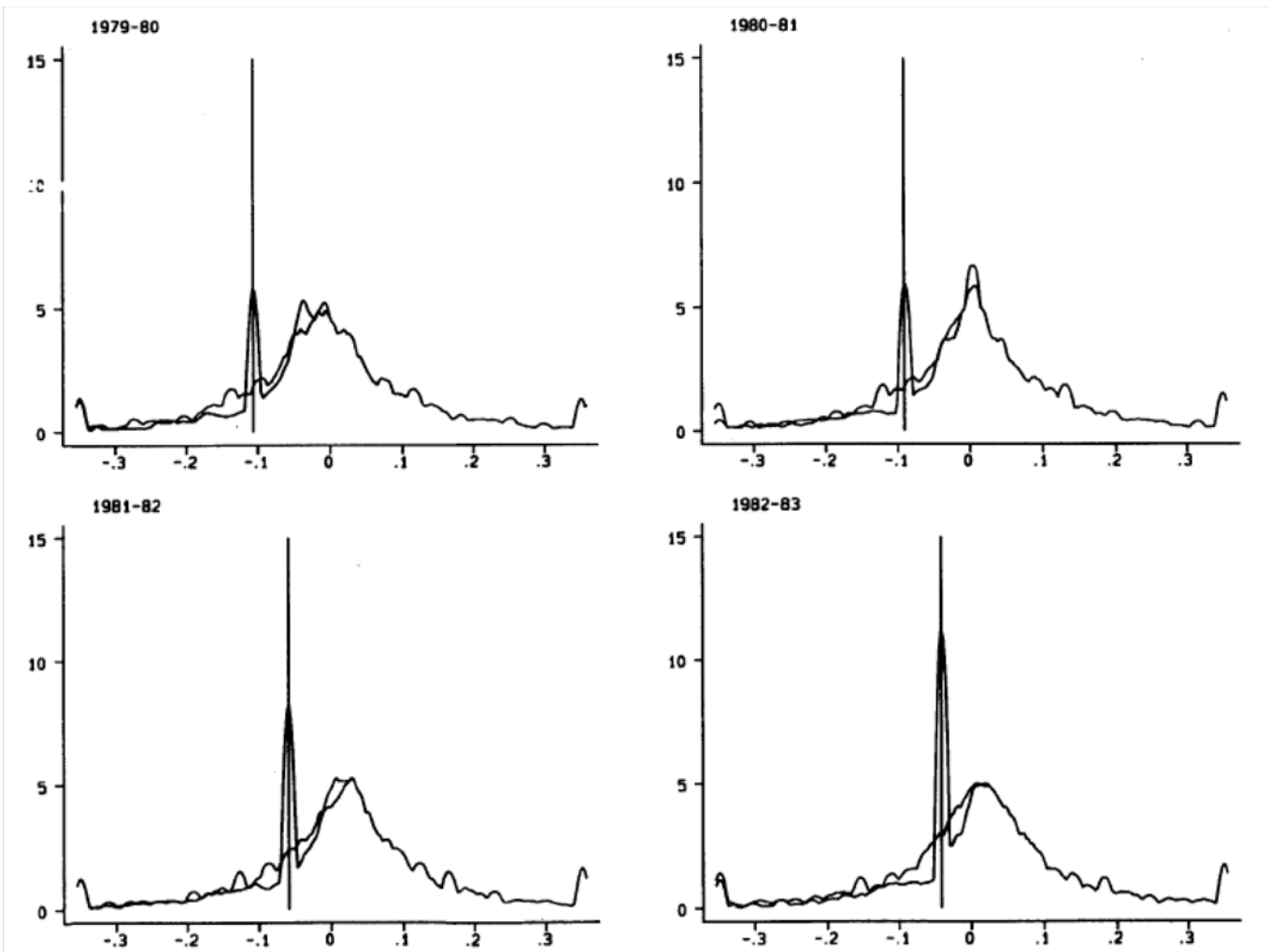
- If this is true, expect employers to minimize cases of  $w_t - w_{t-1} < 0$
- **Card and Hyslop, 1997**: Examine discontinuity around 0 of nominal wage changes
- Prediction of theory:



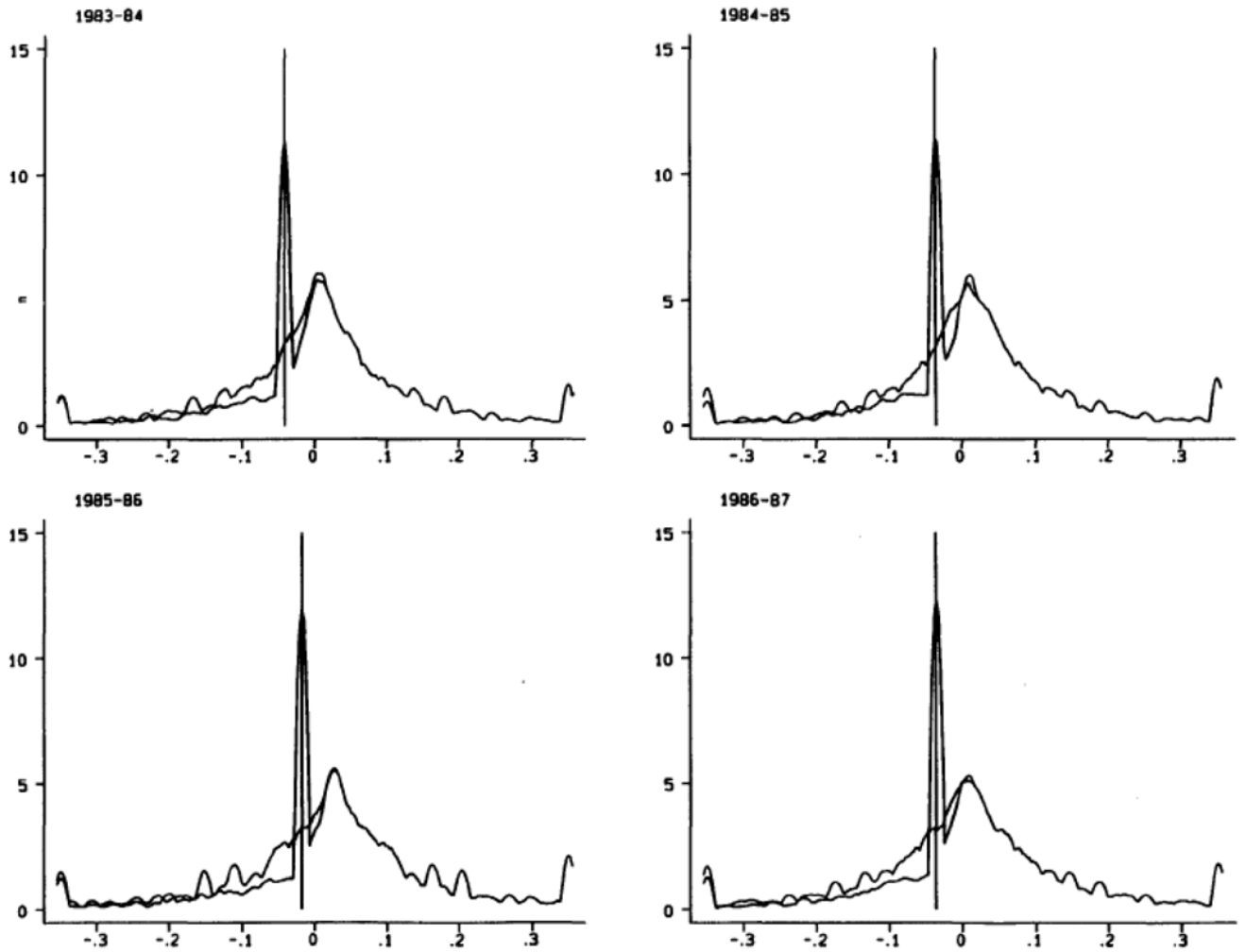


- Data sources:
  - 1979-1993 CPS.
    - \* Rolling 2-year panel
    - \* Restrict to paid by the hour and to same 2-digit industry in the two years
    - \* Restrict to non-minimum wage workers
  - PSID 4-year panels 1976-79 and 1985-88
- Use Log Wage changes:  $\log w_t - \log w_{t-1}$
- Issue with measurement error and heaping at  $\log w_t - \log w_{t-1} = 0$
- Construct counterfactual density of LogWage changes
  - Assume symmetry
  - Positive log wage changes would not be affected

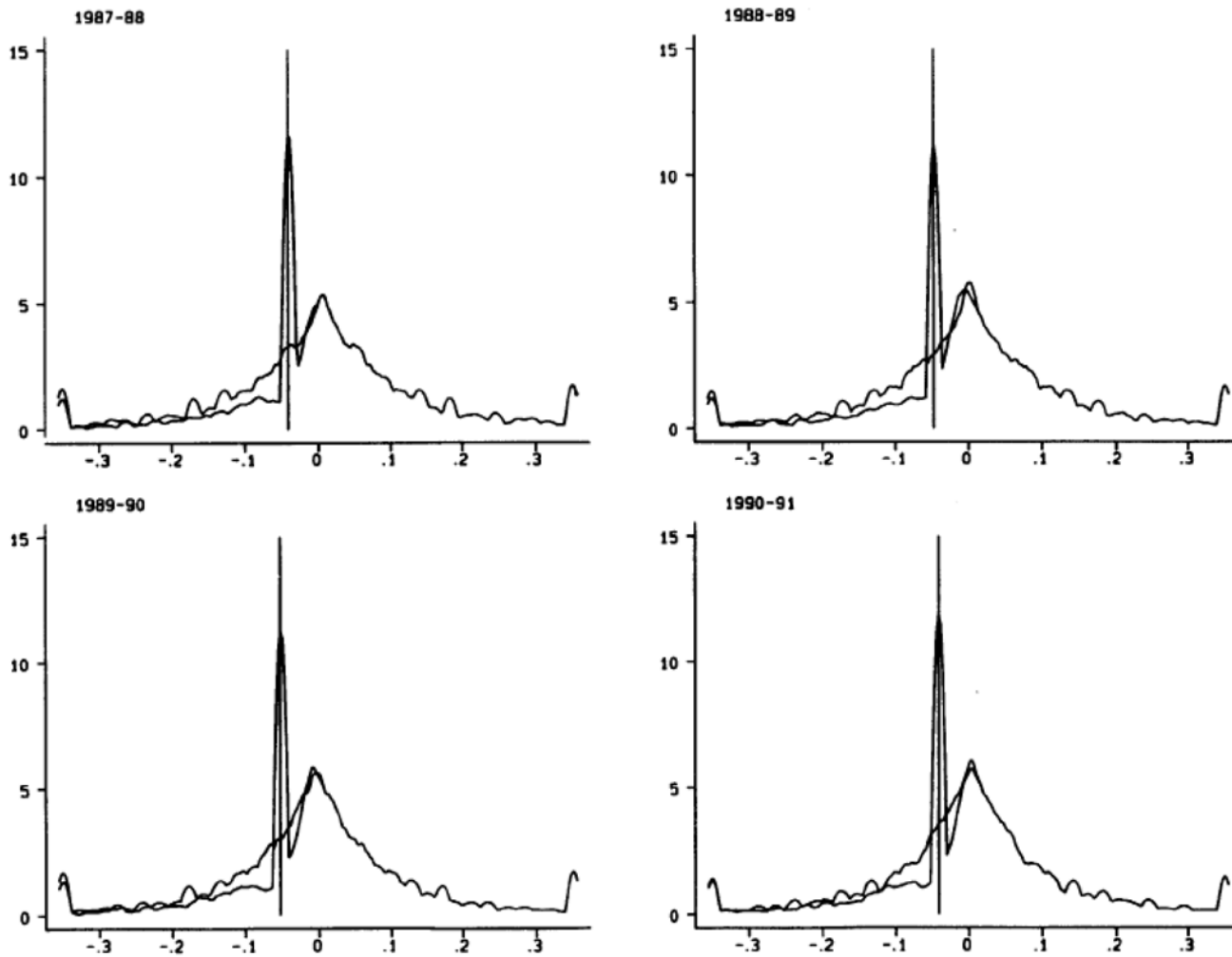
- Plots using kernel estimates of density (local smoother)
- Compare the actual distribution and the predicted one
- Evidence from the CPS year-by-year
- Problem more severe in years with lower inflation
- Large effect of nominal rigidities
- Effect on firings?



**Figure 4: Smoothed (Kernel) Estimates of Actual and Counterfactual Densities of Real Wage Changes, CPS Samples from 1979-80 to 1982-83**

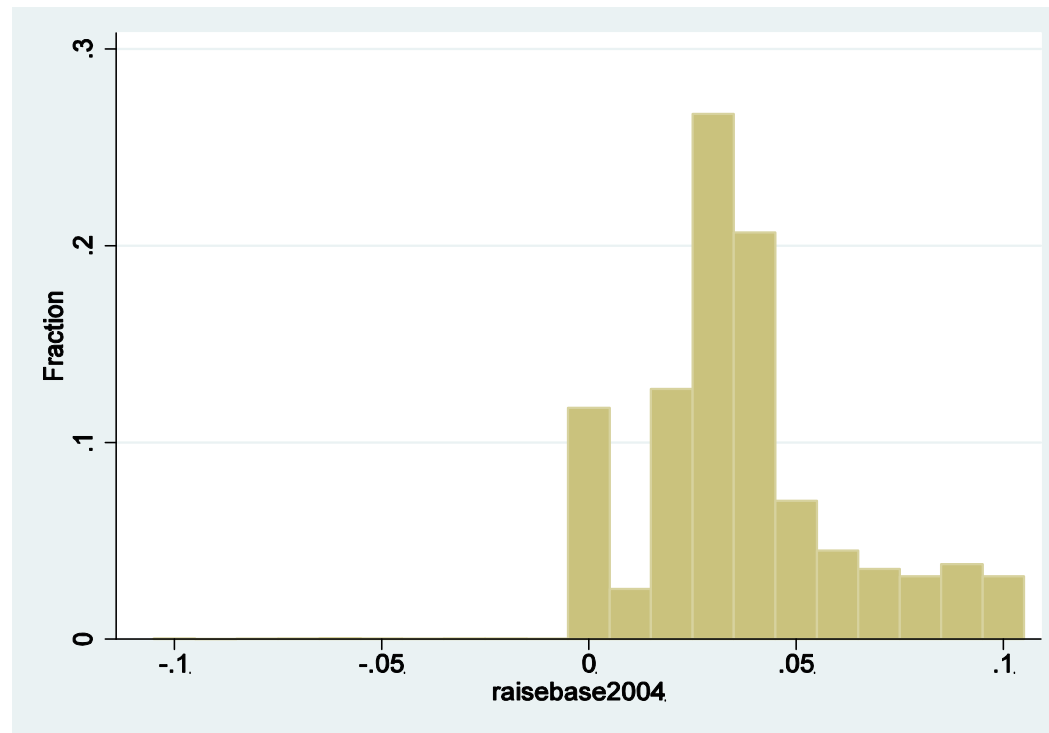


**Figure 4 (Continued): Smoothed (Kernel) Estimates of Actual and Counterfactual Densities of Real Wage Changes, CPS Samples from 1983-84 to 1986-87**

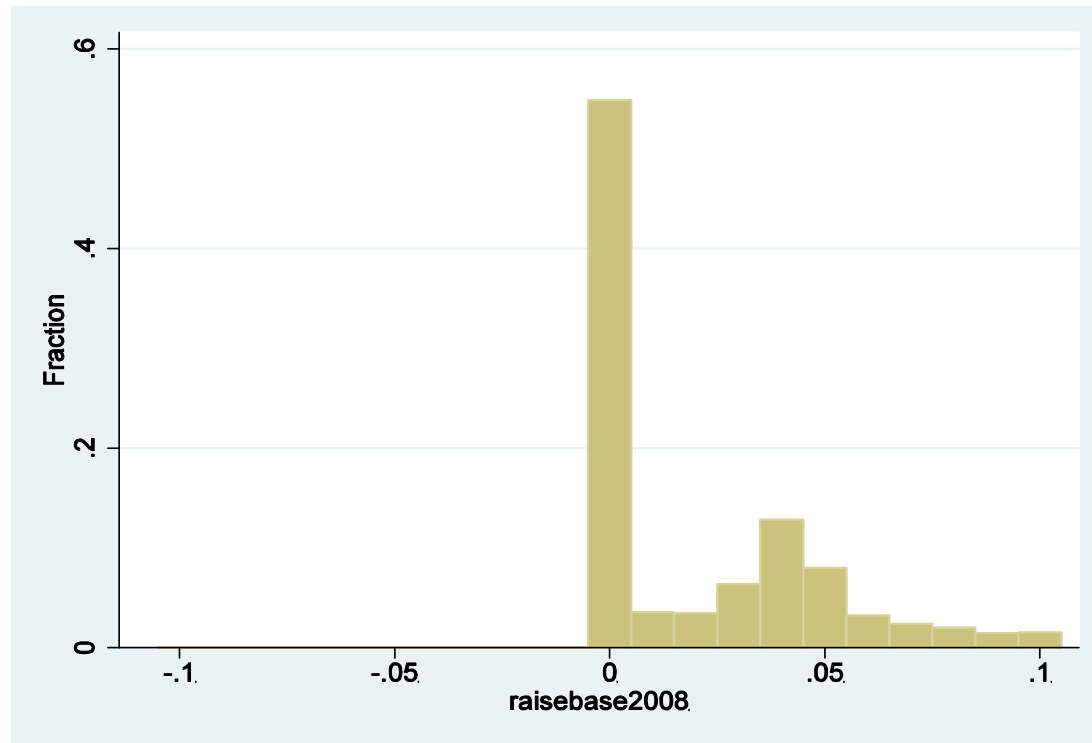


**Figure 4 (Continued): Smoothed (Kernel) Estimates of Actual and Counterfactual Densities of Real Wage Changes, CPS Samples from 1987-88 to 1990-91**

- **Hipsman (2011)**. Administrative data from several firms
  - Base pay % increase among those employed in 2003 and 2004
  - 58 (0.34%) cuts, 1,964 (10.18%) freezes, 15,091 (88.18%) raises



- Base pay % increase among those employed in 2007 and 2008
- 46 (0.36%) pay cuts, 6,913 (54.58%) pay freezes, 5,707 (45.06%) pay raises



- Card and Hyslop had *underestimated* the degree of nominal rigidity
- Important implications for labor markets when low inflation
  - If no pay cut, what margin of adjustment?
  - Firing?
  - Less hiring?
- Key under-researched topic in behavioral macro



## 5 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 (JPE 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 SMarT

	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-SMarT				
\$25,000	57	57	56	55
\$50,000	51	51	51	54
\$75,000	48	49	46	43
B. Post-SMarT				
\$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 SMarT 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 (AER 2016)**

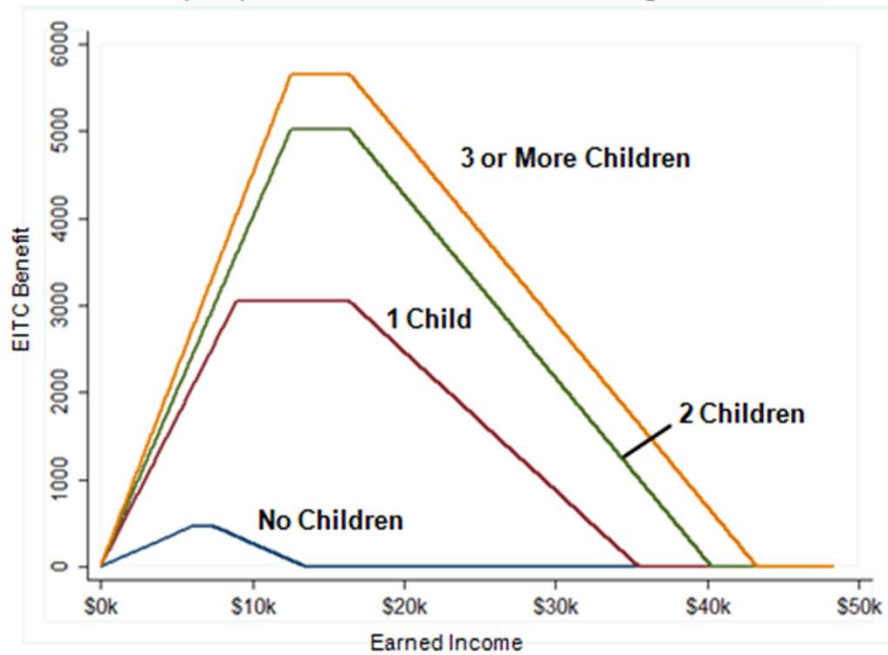


# MOTIVATION & BACKGROUND

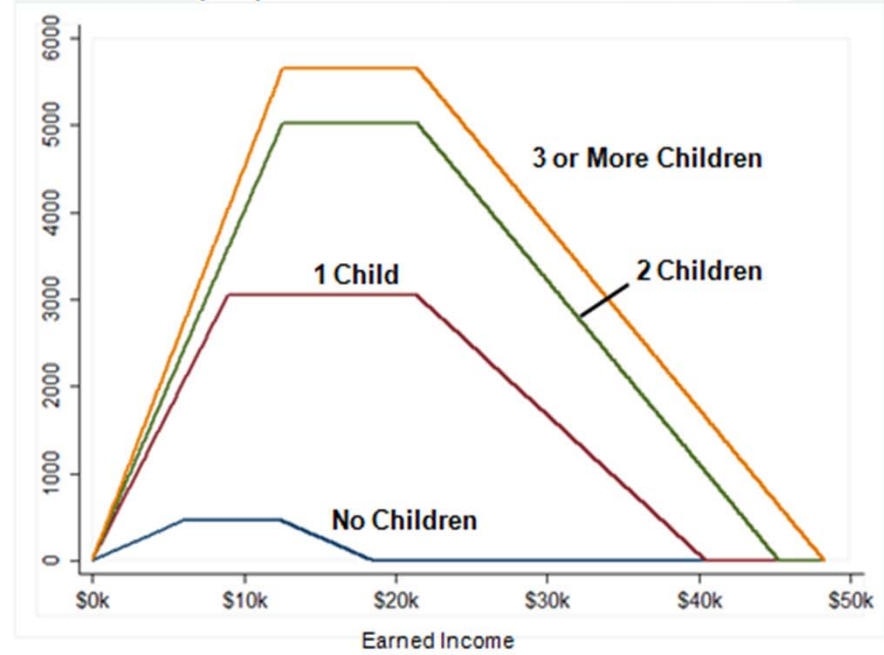
- **EITC is largest means-tested cash transfer program.** It disburses \$58 billion per year to 26 million recipients through income supplement that encourages work
- Fully refundable, supplements earned income by average of 17% which amounts to \$2,100. Must file your taxes to claim
- **25% of eligible 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**



# RESEARCH STRATEGY

## Field experiment to test leading causes of low take-up

- Modify tax documents (notice + worksheet + envelope) and distribute to eligible filing non-claimants
- Simultaneously test three hypotheses regarding role of **information** (benefits, costs, program rules), **Informational** complexity, and program **stigma** on response
- Randomize three components independently and distribute in blocks defined by zip code and dependent status

Tax-return data plus micro-data on demographics, EIC claiming history

**Survey of perceived incentives.** Surveys of ~1200 low to moderate income taxpayers to assess perception of EITC cost/benefit parameters

**Psychometric scoring of interventions.** Second survey with ~2800 subjects illuminates psychological mechanisms underlying experimental response

# 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](mailto:bhargava@uchicago.edu), or [dmanoli@econ.ucla.edu](mailto: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 features a horizontal timeline with markers for 2009 (Jan to Dec) and 2010 (Feb, March, May, Nov). Below the timeline, four documents are shown in a staggered, overlapping manner:

- Document 1 (Left):** A notice titled "You May Be Eligible for a Refund If You Qualify for the Earned Income Credit." It includes sections for "Why We Are Sending You this Notice," "What You Need to Do," and "Additional information." A red prohibition sign is overlaid on this document.
- Document 2 (Middle-Left):** A notice from the Department of the Treasury, Internal Revenue Service, dated November 2009. It is addressed to James G. Hinds and provides "Important information about the Earned Income Credit." It includes a "Summary" and "Next steps" sections.
- Document 3 (Middle-Right):** An "EITC Eligibility Check-Sheet" with a table for "Answer the question below and check YES or NO." The table includes questions about filing status, age, and other criteria. It also contains fields for "Social Security Number" and "Tax Year." A red prohibition sign is overlaid on this document.
- Document 4 (Right):** A page from a form, likely CP09-27, which is a notice regarding the EITC. It includes a "Summary" and "Next steps" section, similar to Document 2.

# ORGANIZATION OF TREATMENTS I

Table 3

## EXPERIMENTAL INTERVENTIONS BY MECHANISM

MECHANISM	INTERVENTION	DESCRIPTION	SAMPLE
<b><u>Informational Complexity</u></b>			
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
<b><u>Program Information</u></b>			
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
<b><u>Program Stigma</u></b>			
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 00000-7253

### 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 and another 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 lived 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](http://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](http://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.

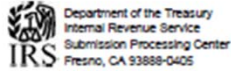
**Additional information**

If you need additional assistance, please call 1-800-829-1040, or visit online at [www.irs.gov/eic](http://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](http://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](http://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**

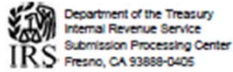
Name \_\_\_\_\_ Social Security number  
or Taxpayer ID number \_\_\_\_\_

**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](http://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**

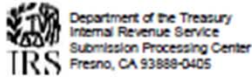
## **THEORY**

- 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 06000-7253

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.

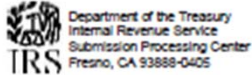
#### Additional information

If you need additional assistance, please call 1-800-829-1040, or visit online at [www.irs.gov/etc](http://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](http://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 00000-7253

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](http://www.irs.gov/efic). For tax forms, call 1-800-TAX-FORM (1-800-829-3676).

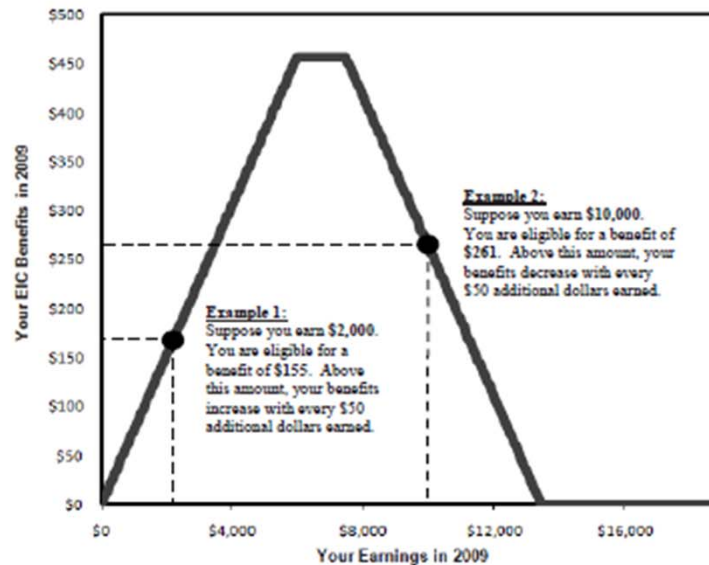
You can also find tax forms and other helpful documents which explain the EIC program in greater detail (e.g., Publication 596) at [www.irs.gov](http://www.irs.gov).

## 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.

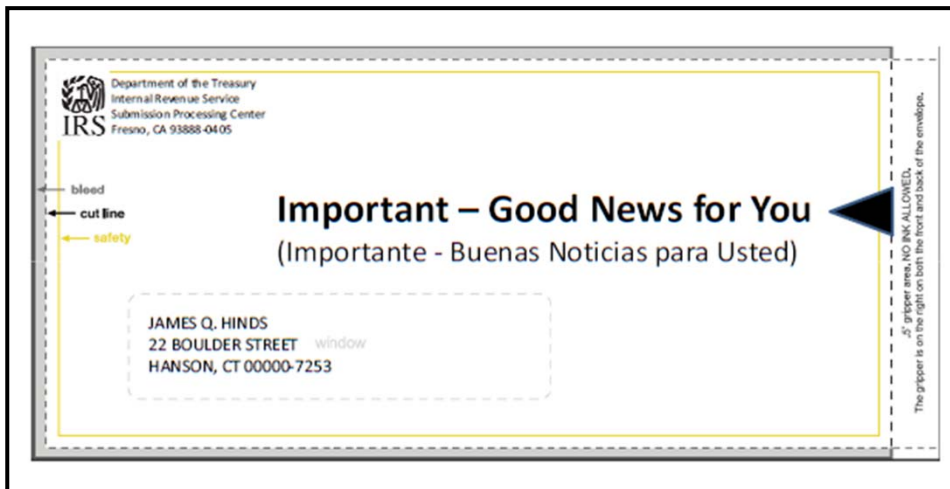
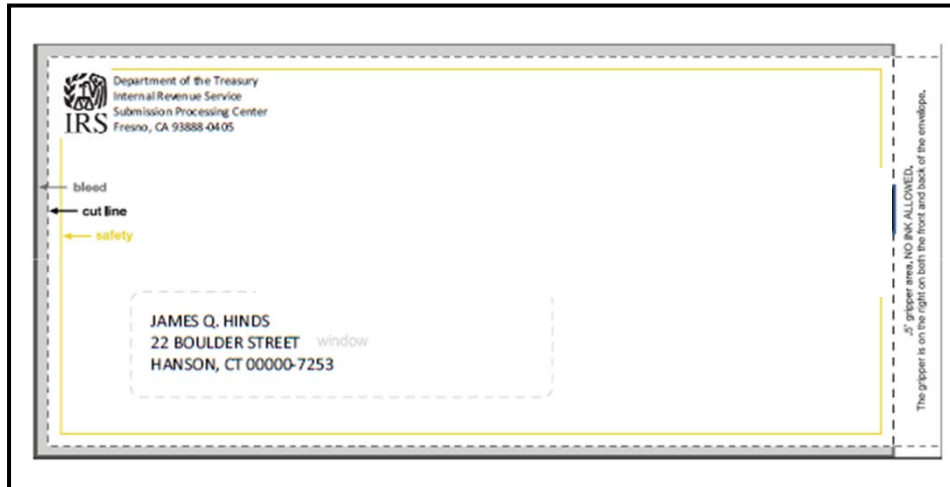
## INFORMATIONAL FLYER

- 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.”**

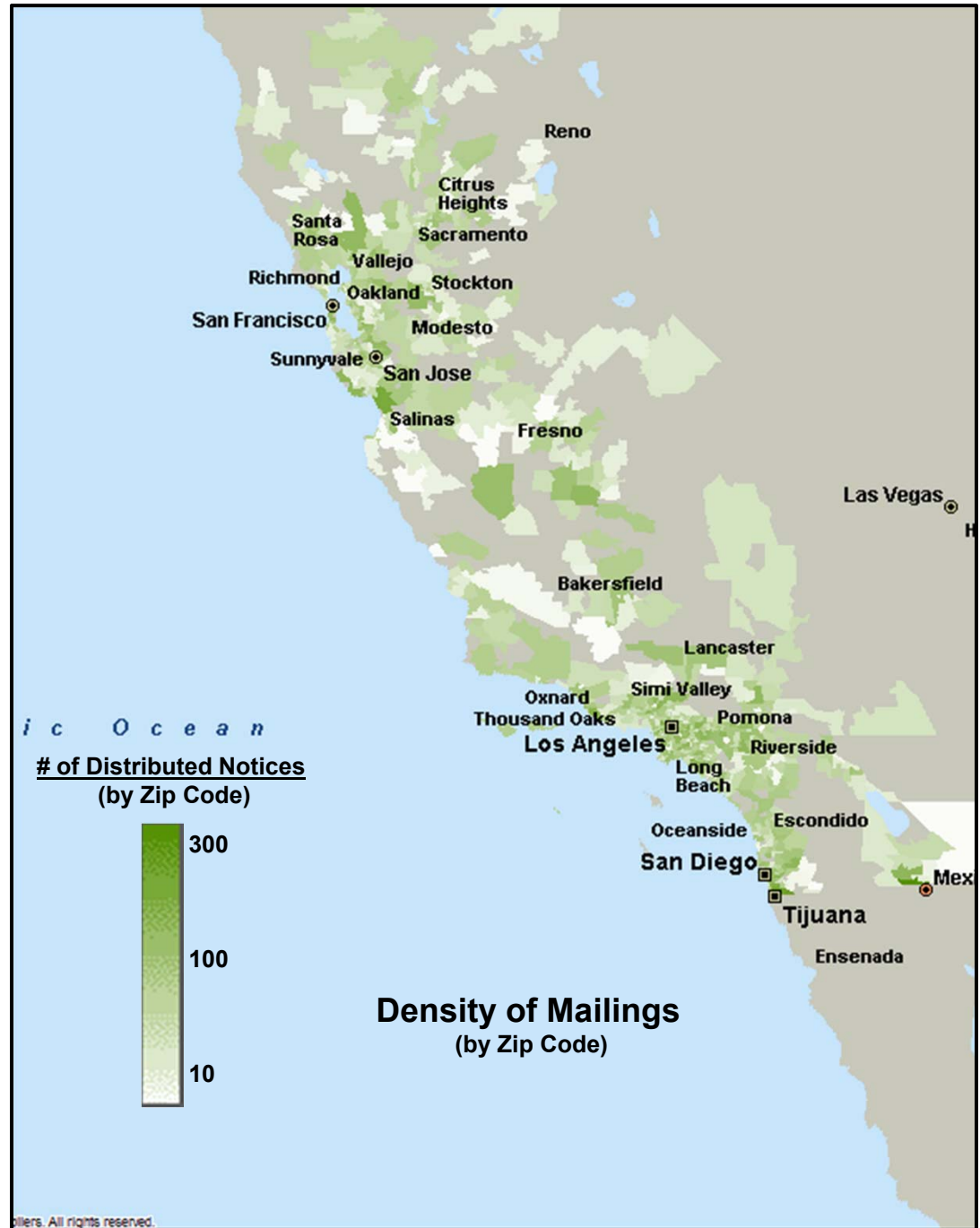
Notice Headline for Intervention 1

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

Notice Headline for Intervention 2

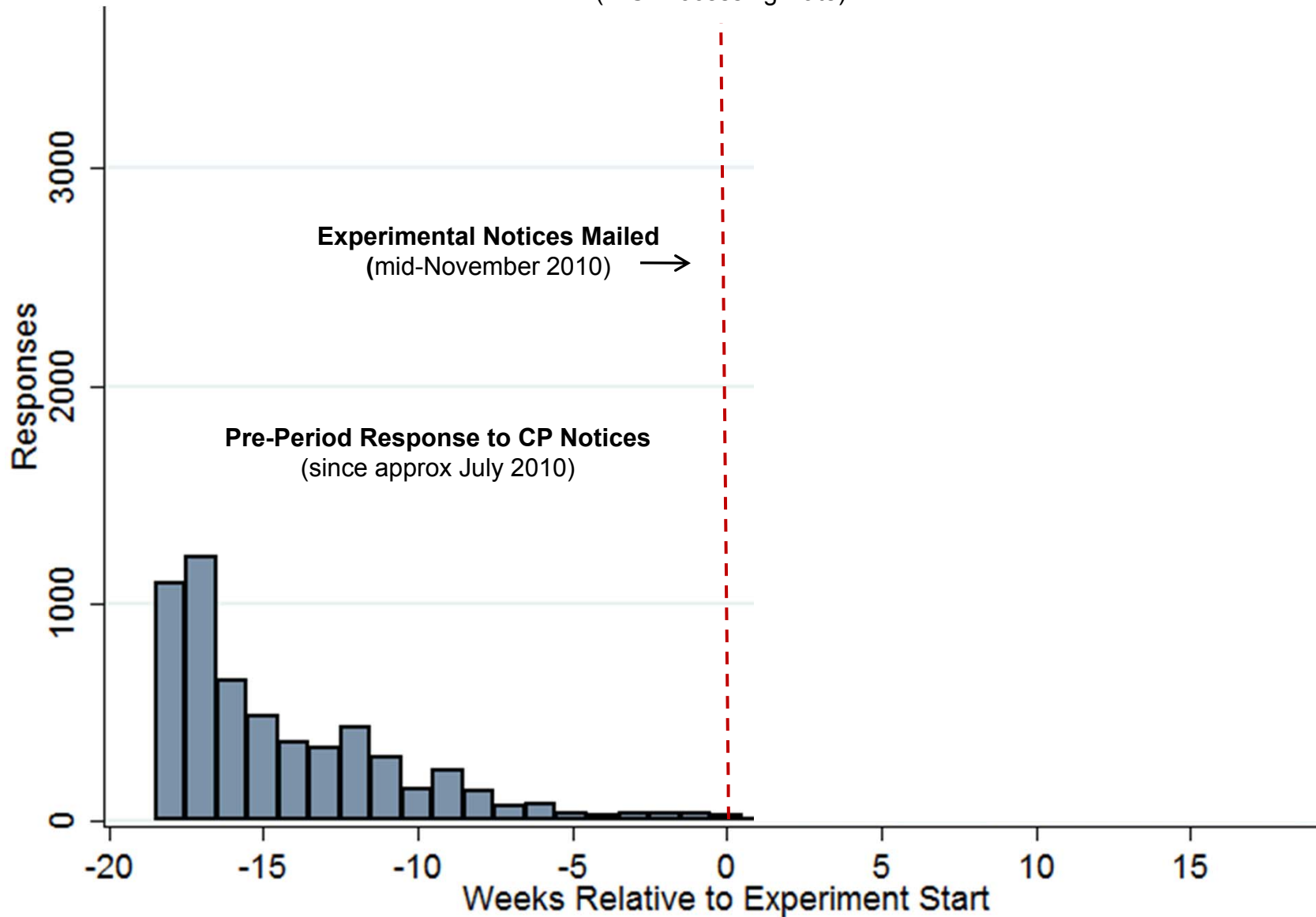
# RANDOMIZATION

- 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.

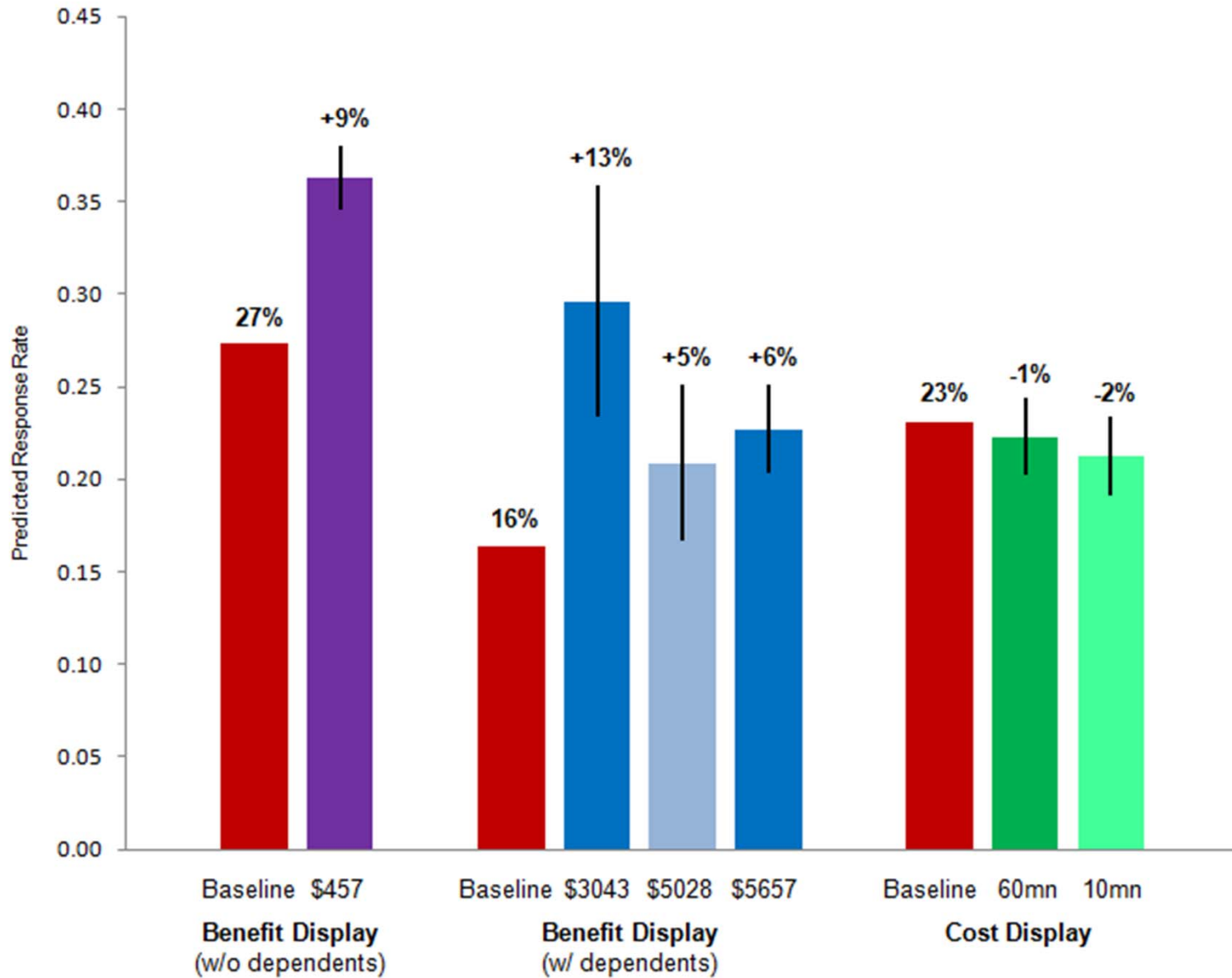
- Mere receipt of second notice yields 0.22 response (0.14 control condition)
- Language may be a barrier to response
- **Simplification raises response from .14 to .23; Information from .23 to .28; No beneficial effect of lower stigma**
- Effects not driven by denial of claims rate

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]						
<b>Complexity Interventions</b>						
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) ✓
<b>Informational Interventions</b>						
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

<b>Stigma Interventions</b>						
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



## 6 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. It is OK to go on the job market as a behavioral student
  - Yes, demand for behavioral students is still relatively limited
  - BUT supply is even more limited: mainly Berkeley, Harvard + some Cornell, CalTech, CMU
  - Many students with (quasi-)behavioral paper on the market show lack of behavioral training (eg, development papers with experiments in tow)
  - Show off your training!

6. 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!