Econ 219B
Psychology and Economics: Applications
(Lecture 12 and last)

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Outline

1. Methodology: Markets and Non-Standard Behavior
2. Market Reaction to Biases: Corporate Decisions
3. Market Reaction to Biases: Employers
4. Market Reaction to Biases: Behavioral Finance
5. Market Reaction to Biases: Political Economy
6. Welfare Response to Biases
7. Concluding Remarks

1 Methodology: Markets and Non-Standard Behavior

- Why don't market forces eliminate non-standard behavior?
- Common Chicago-type objection
- **Argument 1.** Experience reduces non-standard behavior.
  - Experience appears to mitigate the endowment effect (List, 2003 and 2004).
  - Experience improves ability to perform backward induction (Palacios-Huerta and Volji, 2007 and 2008)
  - BUT: Maybe experience does not really help (Levitt, List, and Reiley, 2008)

- What does experience imply in general?
  - Feedback is often infrequent (such as in house purchases) or noisy (such as in financial investments) –>not enough room for experience
  - Experience can exacerbate a bias if individuals are not Bayesian learners (Haigh and List 2004)
  - Not all non-standard features should be mitigated by experience. Example: social preferences
  - Debiasing by experienced agents can be a substitute for direct experience. However, as Gabaix and Laibson (2006) show, experienced agents such as firms typically have little or no incentive to debias individuals

- *Curse of Debiasing* (Gabaix-Laibson 2006)
  - Credit Card A teaser fees on $1000 balance:
    - $0 for six months
    - $100 fee for next six months
  - Cost of borrowing to company $100 –> Firm makes 0 profit in Perfectly Competitive market
  - Naive consumer:
    - Believes no borrowing after 6 months
    - Instead keeps borrowing
    - Expects cost of card to be $0, instead pays $100

- Can Credit Card B debias consumers and profit from it?
  - Advertisement to consumers: 'You will borrow after 6 months!'
  - Offer rate of
    - $50 for six months
    - $50 for next six months
- What do consumers (now sophisticated) do?
  - Stay with Card A
    - Borrow for 6 months at $0
    - Then switch to another company
- No debiasing in equilibrium

- System of transfers:
  - Firms take advantage of naive consumers
  - Sophisticated consumers benefit from naive consumers

- Related: Suppose Credit Card B can identify naive consumer
  - What should it do?
  - If debias, then lose consumer
  - Rather, take advantage of consumer

- **Argument 2.** Even if experience or debiasing do not eliminate the biases, the biases will not affect aggregate market outcomes
  - Arbitrage –> Rational investors set prices
  - However, limits to arbitrage (DeLong et al., 1991) –> individuals with non-standard features affect stock prices
  - In addition, in most settings, there is no arbitrage!
    * Example: Procrastination of savings for retirement
    * (Keep in mind SMRT plan though)
  - Behavioral IO: Non-standard features can have a disproportionate impact on market outcomes
    * Firms focus pricing on the biases
    * **Lee and Malmendier (2011)** on overbidding in eBay auctions

eBay Auctions

- Proxy bidding
  - Bidders submit “maximum willingness to pay”
  - Quasi-second price auction: price outstanding increased to prior leading maximum willingness to pay + increment (see Table 1).
- Fixed prices (“Buy-it-now”)
  - Immediate purchase.
  - Listing on same webpage, same list, same formatting.
  - About 1/3 of eBay listings

→ Key ingredient for analysis.

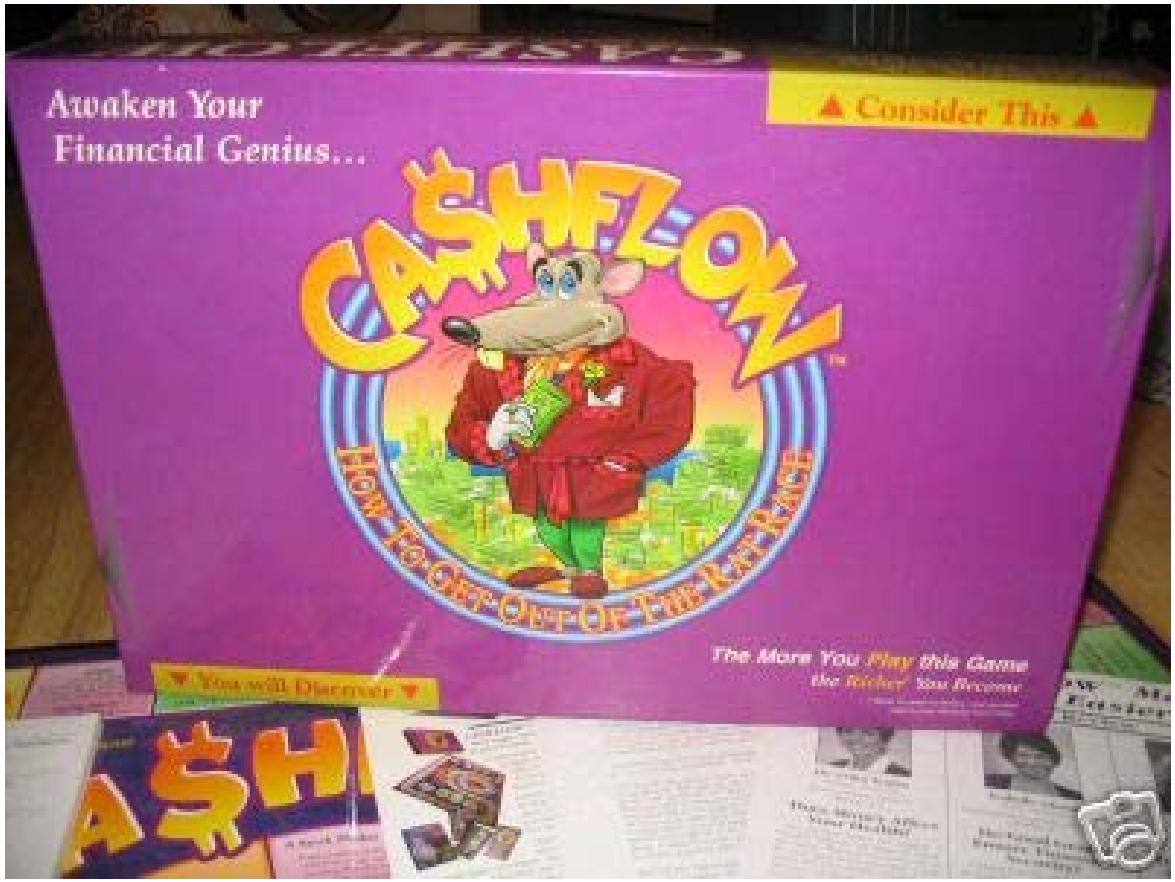
→ Persistent presence of buy-it-now price as a (conservative) upper limit of bids

Identification of Overbidding

Overbidding = bidding more than value of auction object to bidder
or alternative purchase price ← more than alternative price

1. Hard to measure: Where does *over*-bidding exactly start?
2. Hard to evaluate cause.
   - **Incentive misalignment**
   – Private benefits from having the top pick/desired target (prestige)
   – Empire building
   – Career concerns
   - **Winner's curse**
   - **Other non-standard bidding behavior**
   – Utility from bidding
   – Bidding fever (emotions)
   – Sunk cost (having submitted a bid)
   – Limited attention to lower outside prices / too much attention to advertising

The Object


Awaken Your
Financial Genius…
Consider This
CASHFLOW
HOW TO GET OUT OF THE RAT RACE
The More You Play this Game
the Richer You Become
You will Discover

The Data

- Hand-collected data of all auctions and Buy-it-now transactions of Cashflow 101 on eBay from 2/19/2004 to 9/6/2004.
- Cashflow 101: board game with the purpose of finance/accounting education.
- Retail price : $195 plus shipping cost ($10.75) from manufacturer (*www.richdad.com*).
- Two ways to purchase Cashflow 101 on eBay
  - Auction (quasi-second price proxy bidding)
  - Buy-it-now

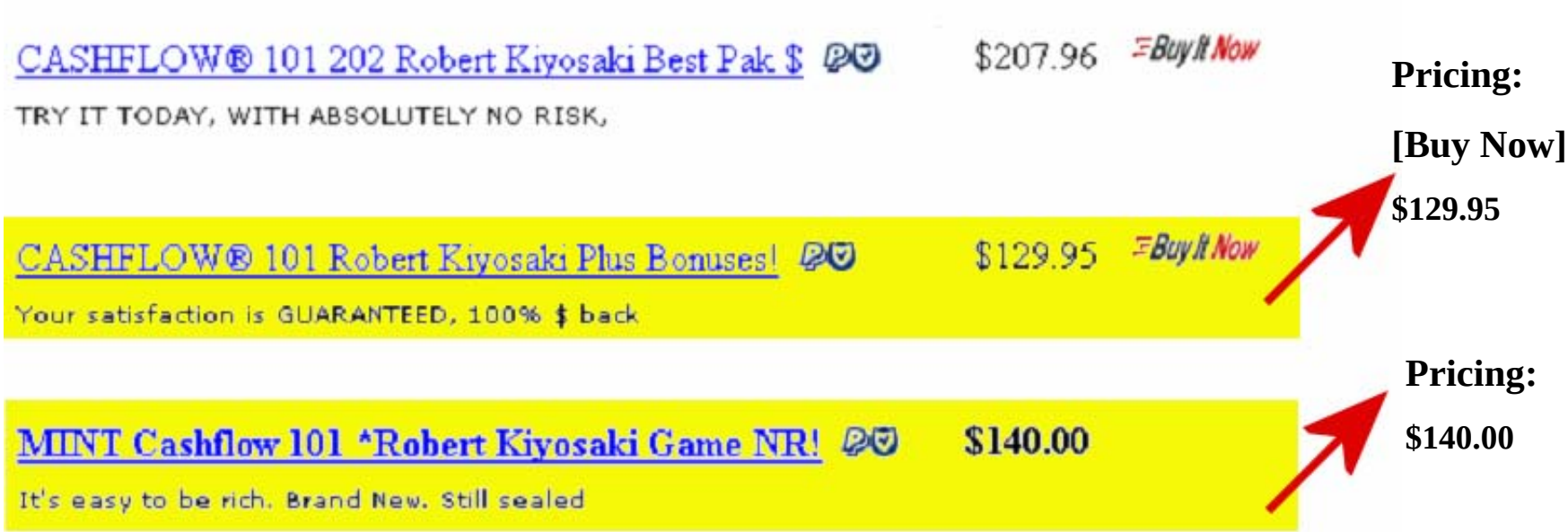
Sample

- Listings (excluding non-US$, bundled offers)
  - 287 by individuals (187 auctions only, 19 auctions with buy-it-now option)
  - 401 by two retailers (only buy-it-now)
- Remove terminated, unsold items, hybrid offers that ended early (buy-it-now) and items without simultaneous *professional* buy-it-now listing. → 2,353 bids, 806 bidders, 166 auctions
- Buy-it-now offers of the two retailers
  - Continuously present for all but six days. (Often individual buy-it-now offers present as well; they are often lower.)
  - 100% and 99.9% positive feedback scores.
  - Same prices **$129.95** until 07/31/2004; **$139.95** since 08/01/2004.
  - Shipping cost **$9.95**; other retailer $10.95.
  - New items (with bonus tapes/video).

Listing Example (02/12/2004)

Rich Dad's Cashflow Quadrant, Rich dad ...	**$12.50**	4	1d 00h 14m
Rich Dad's Cashflow Quadrant by Robert T. ...	**$9.00**	9	1d 00h 43m
Real Estate Investment Cashflow Software $$$!	**$10.49**	2	1d 04h 36m
CASHFLOW® 101 202 Robert Kiyosaki Best Pak $	$207.96	Buy It Now	1d 06h 47m
TRY IT TODAY, WITH ABSOLUTELY NO RISK,			
CASHFLOW® 101 Robert Kiyosaki Plus Bonuses!	$129.95	Buy It Now	1d 08h 02m
Your satisfaction is GUARANTEED, 100% $ back			
MINT Cashflow 101 *Robert Kiyosaki Game NR!	**$140.00**	13	1d 08h 04m
It's easy to be rich. Brand New. Still sealed			
cashflow Hard Money Funding 101 real estate	$14.99	Buy It Now	1d 09h 28m
BRANDNEW RICHDAD CASHFLOW FOR KIDS E-GAME	**$20.00**	1	1d 13h 54m
CASHFLOW® 101 Robert Kiyosaki Plus Bonuses!	$129.95	Buy It Now	1d 14h 17m
Your satisfaction is GUARANTEED, 100% $ back			
CASHFLOW® 101 202 Robert Kiyosaki Best Pak $	$207.96	Buy It Now	1d 15h 47m
TRY IT TODAY, WITH ABSOLUTELY NO RISK,			

Listing Example – Magnified



Pricing:

[Buy Now]

$129.95

Pricing:

$140.00

Overbidding

Given the information on the listing website:

- (H0) An auction should never end at a price above the concurrently available purchase price.

Figure 1. Starting Price (*startprice*)

➔ 46% below $20; mean=$46.14; SD=43.81

➔ only 3 auctions above buy-it-now

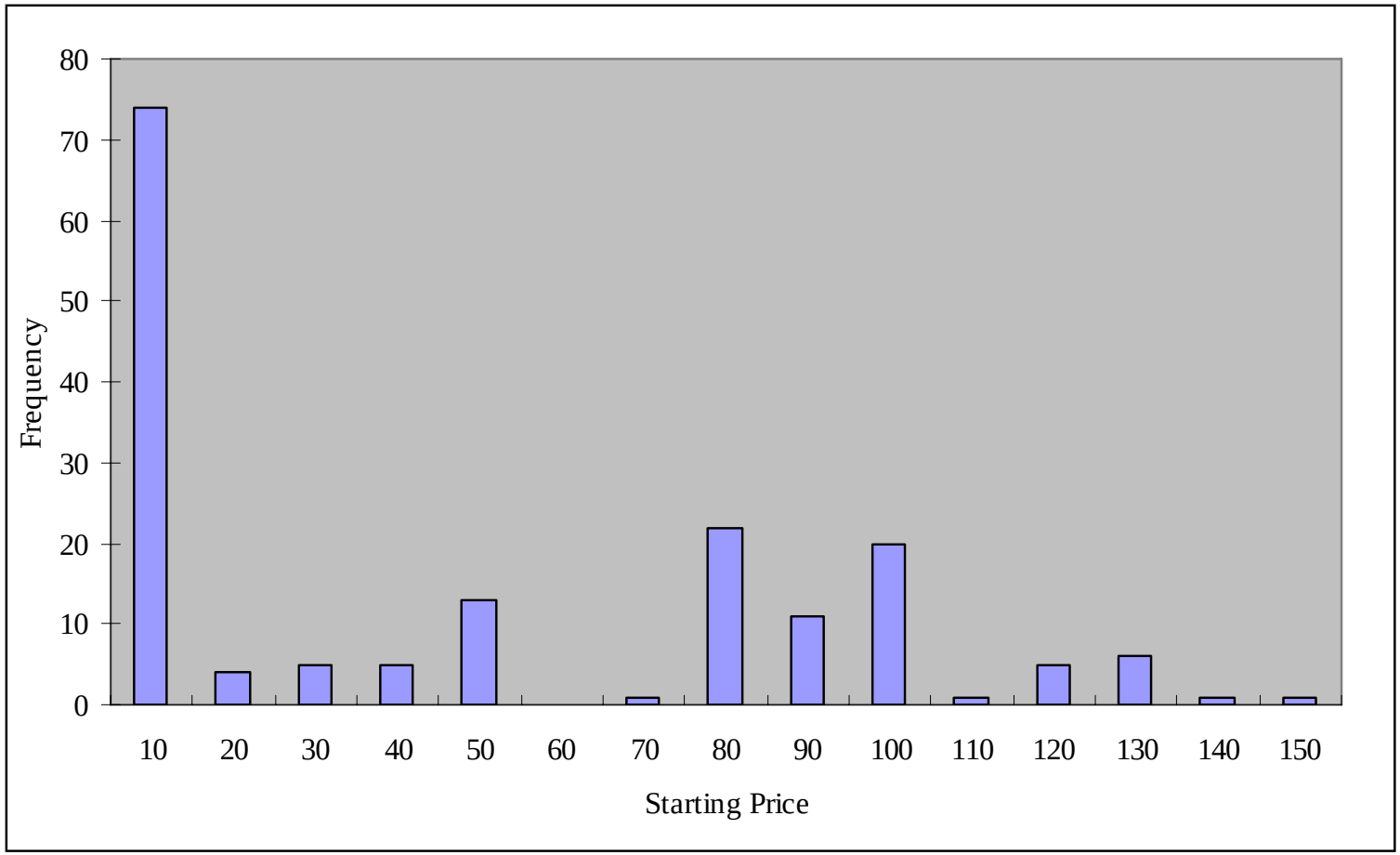


Figure 2. Final Price (*finalprice*)

➔ 43% are above "buy-it-now" (mean $132.55; SD 17.03)

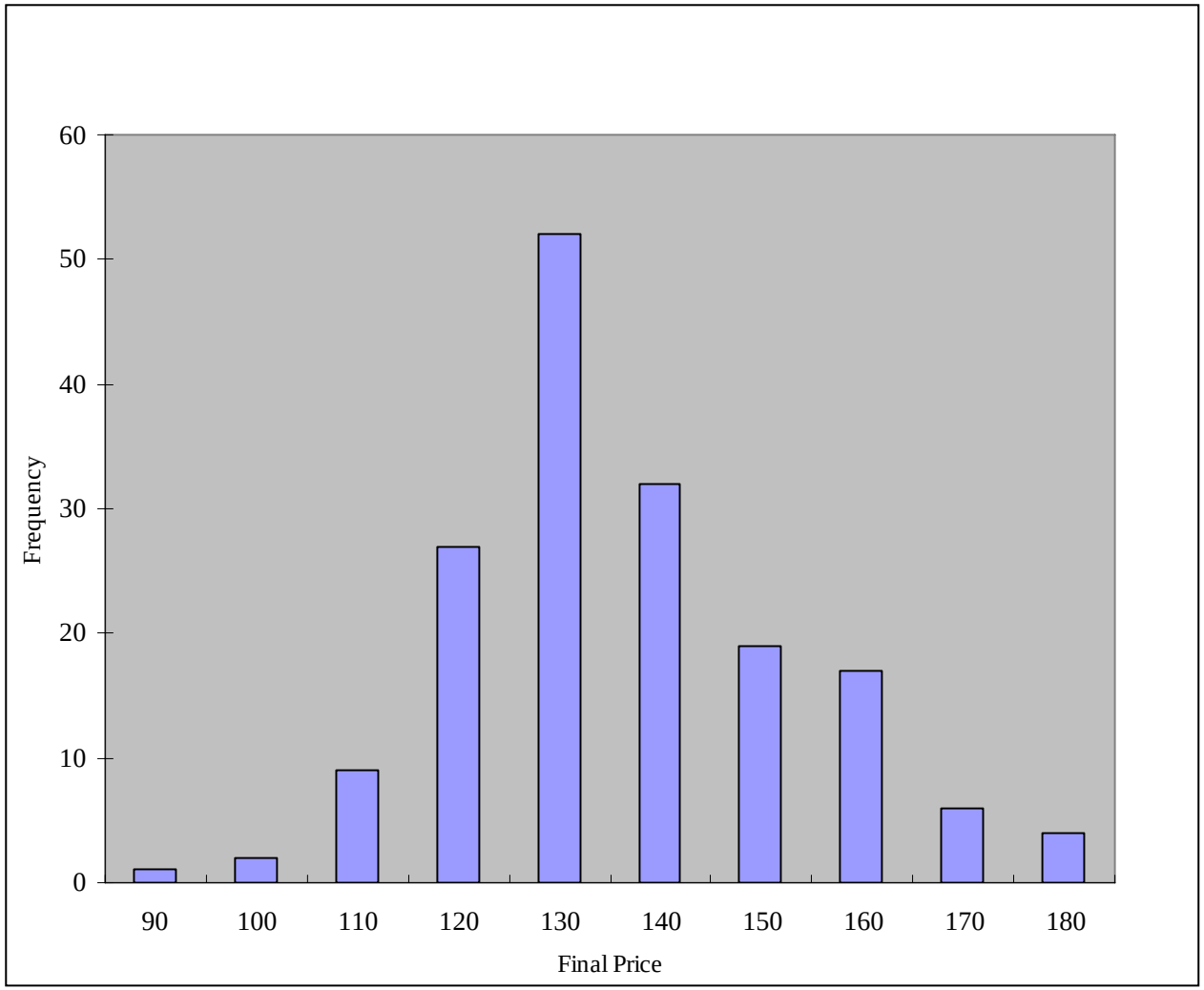
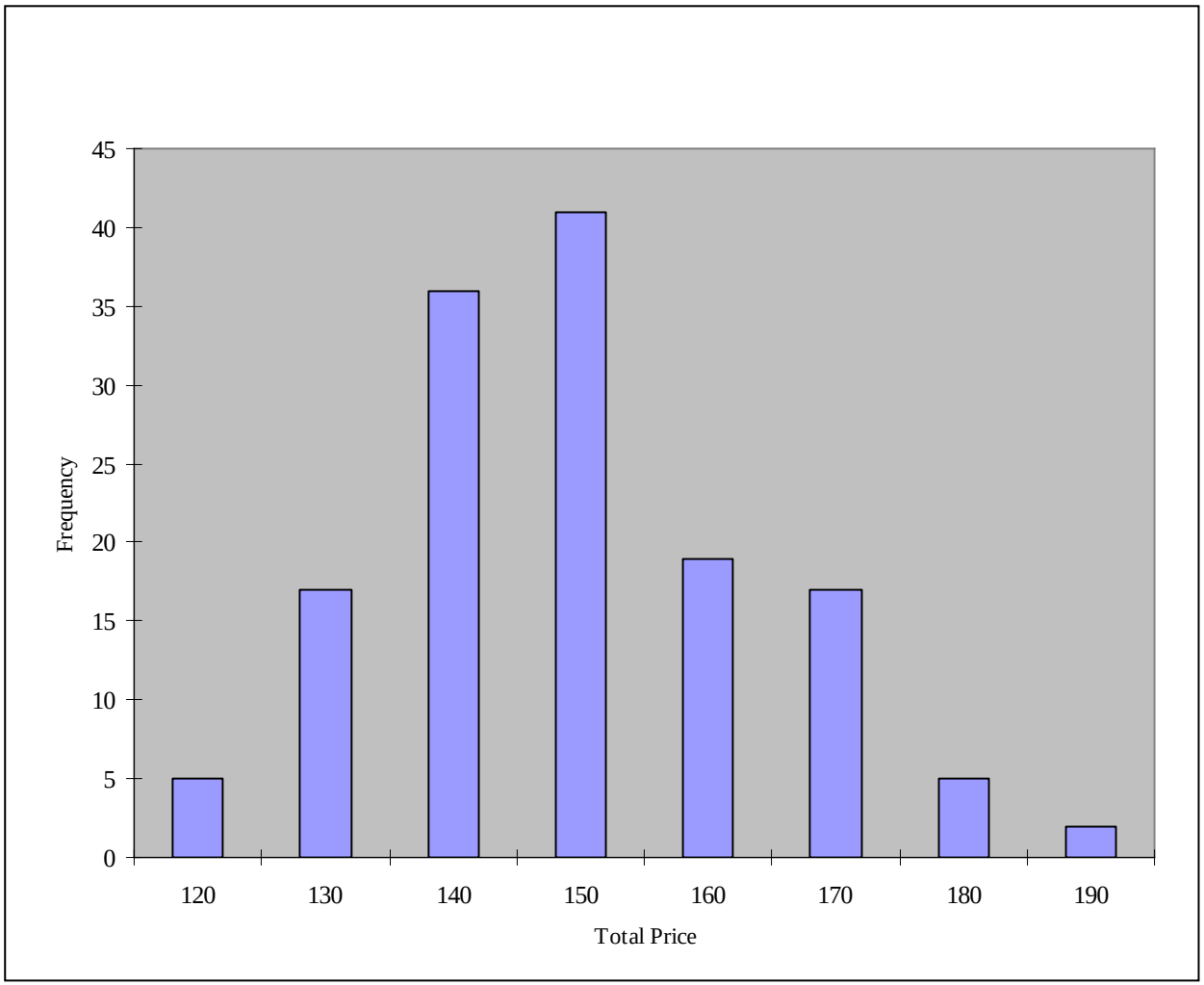


Figure 4. Total Price (incl. shipping cost)

➔ 72% are above “buy-it-now” plus its shipping cost (mean=$144.68; SD=15.29)



Alternative Explanations

1. “Noise”: are these penny-difference
2. Quality differences (I): quality of item
3. Quality differences (II): quality of seller
4. Concerns about unobserved wording differences between auctions and buy-it-now posting.
5. Concerns about consumers’ understanding of buy-it-now posting.

Table V. Disproportionate Influence of Overbidders

		Observations	(Percent)
Auction-level sample			
Does the auction end up overbid?	No	78	56.52%
	Yes	60	**43.48%**
Total		138	100.00%
Bidder-level sample			
Does the bidder ever overbid?	No	670	83.02%
	Yes	137	**16.98%**
Total		807	100.00%
Bid-level sample			
Is the bid an over-bid?	No	2,101	89.29%
	Yes	252	**10.71%**
Total		2,353	100.00%

Overbidding is defined using the final price.

- Bidders with bias have *disproportionate* impact

- Opposite of Chicago intuition

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

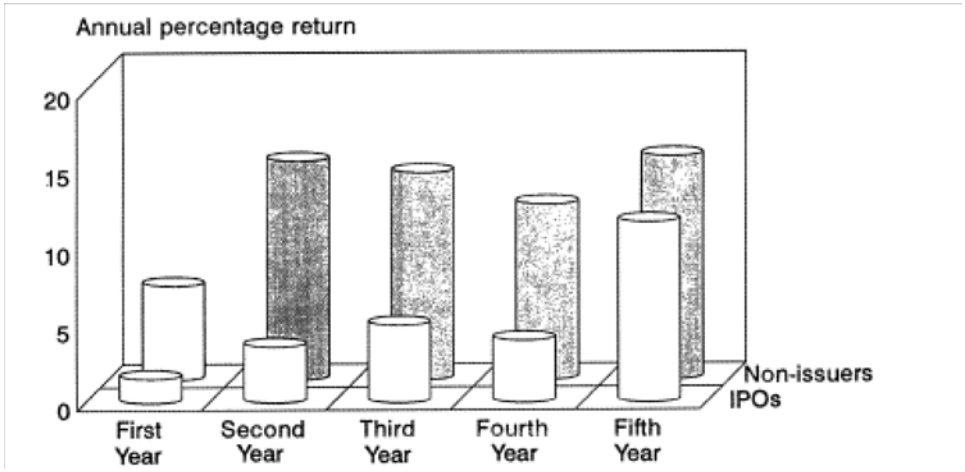
- Fluctuation of equity prices due to noise traders

- 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

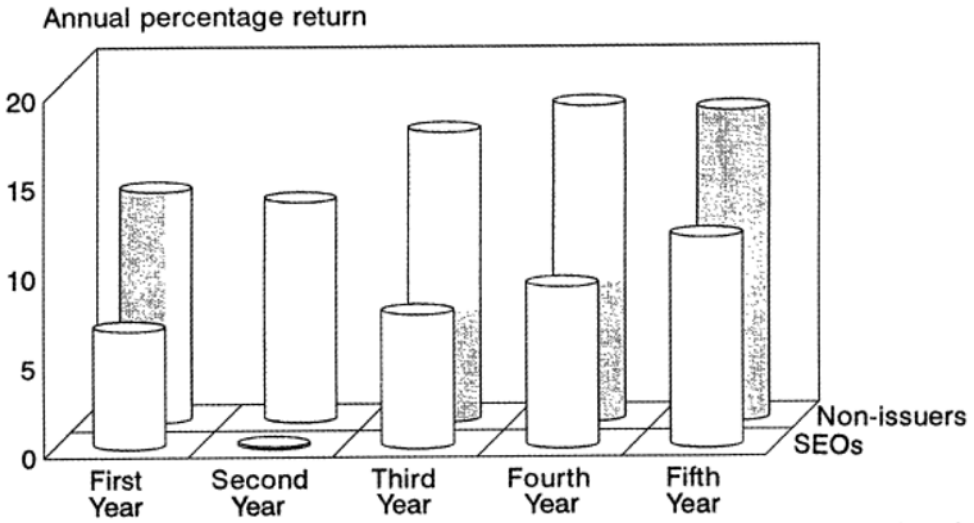


Figure 2. The average annual raw returns for 4,753 initial public offerings (IPOs), and their matching nonissuing firms (top), and the average annual raw returns for 3,702 seasoned equity offerings (SEOs), and their matching nonissuing firms (bottom), during the five years after the issue. The equity 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: Employers

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

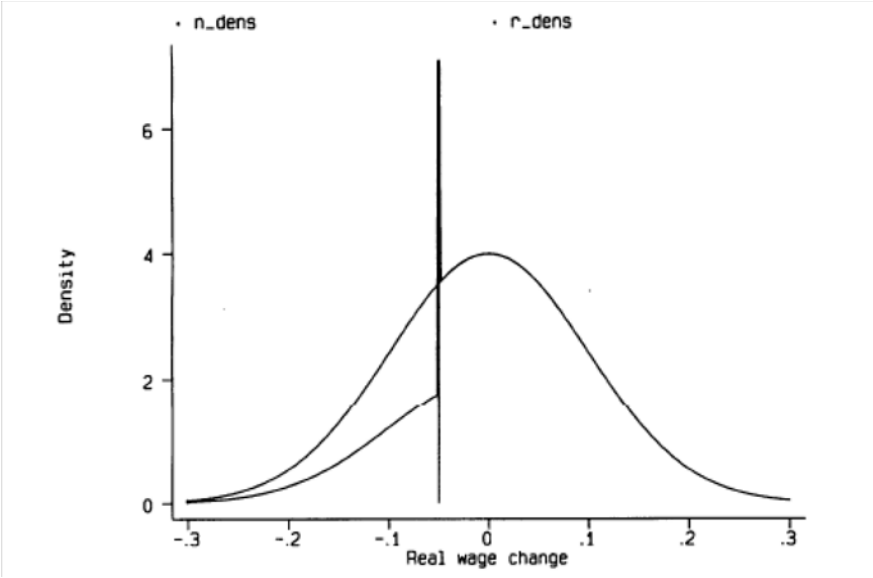
Question 4A. A company is making a small profit. It is located in a community experiencing a recession with substantial unemployment but no inflation. There are many workers anxious to work at the company. The company decides to decrease wages and salaries 7% this year.
($N = 125$) Acceptable 38% Unfair 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?

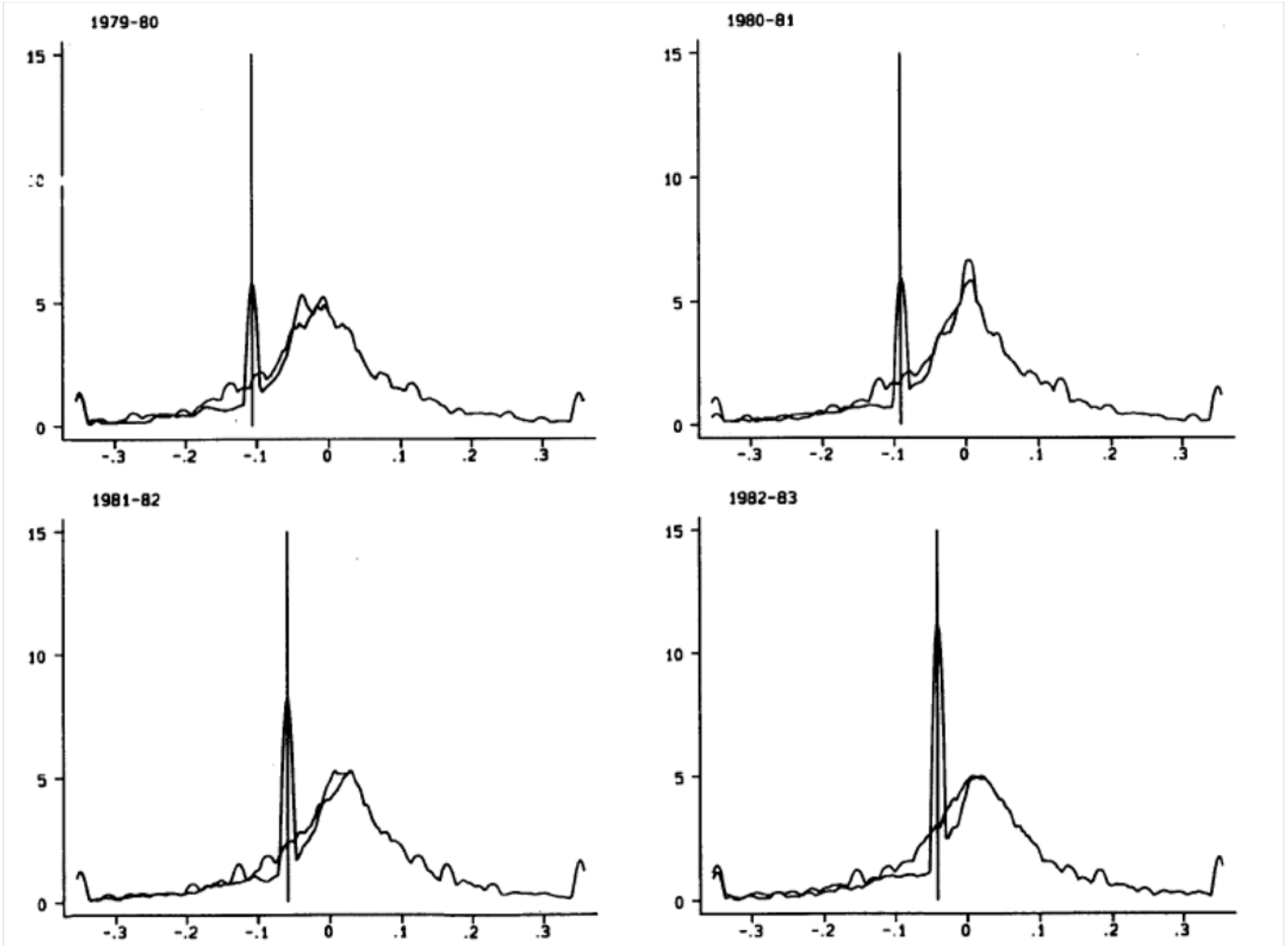


Figure 4: Smoothed (Kernel) Estimates of Actual and Counterfactual Densities of Real Wage Changes, CPS Samples from 1979-80 to 1982-83

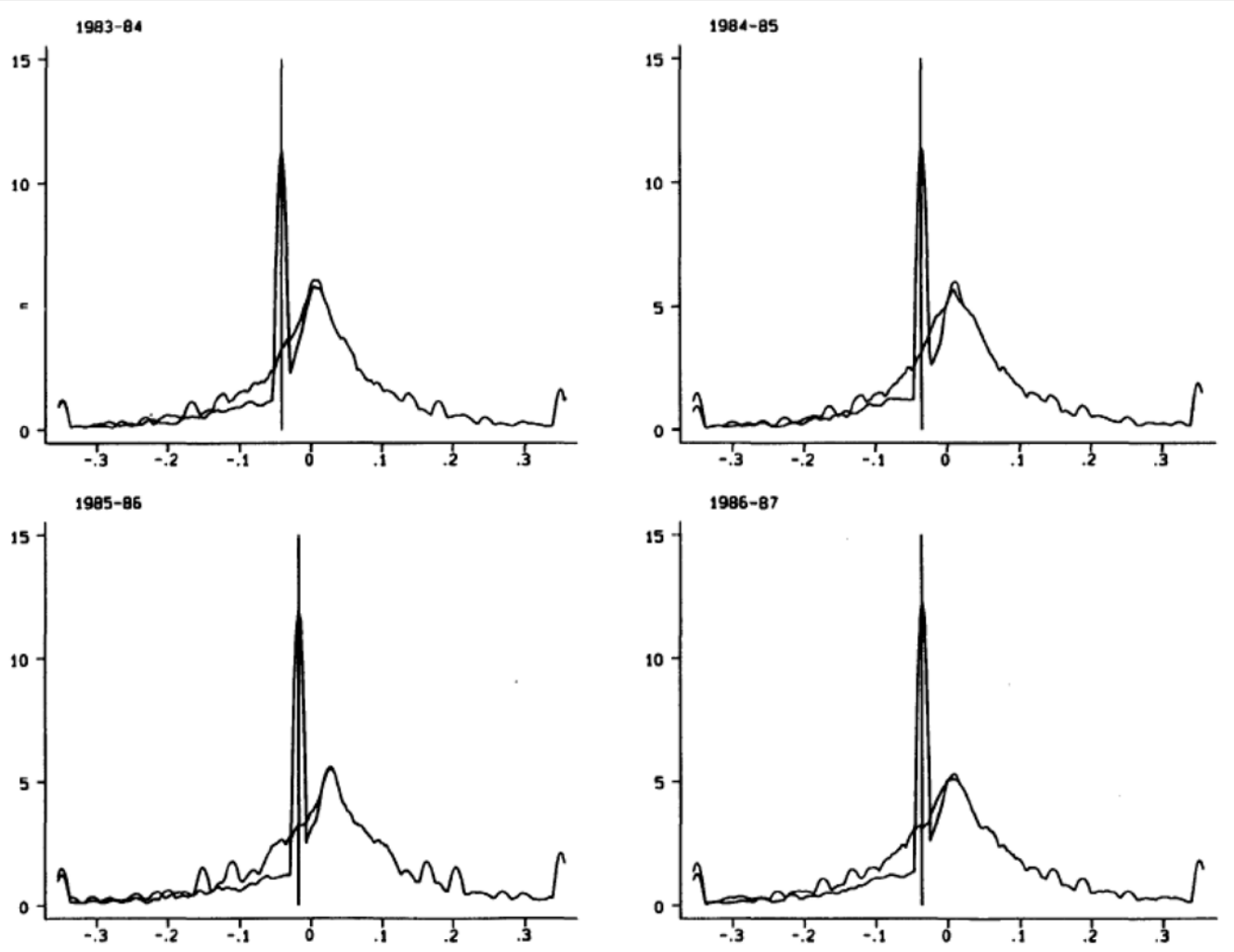


Figure 4 (Continued): Smoothed (Kernel) Estimates of Actual and Counterfactual Densities of Real Wage Changes, CPS Samples from 1983-84 to 1986-87

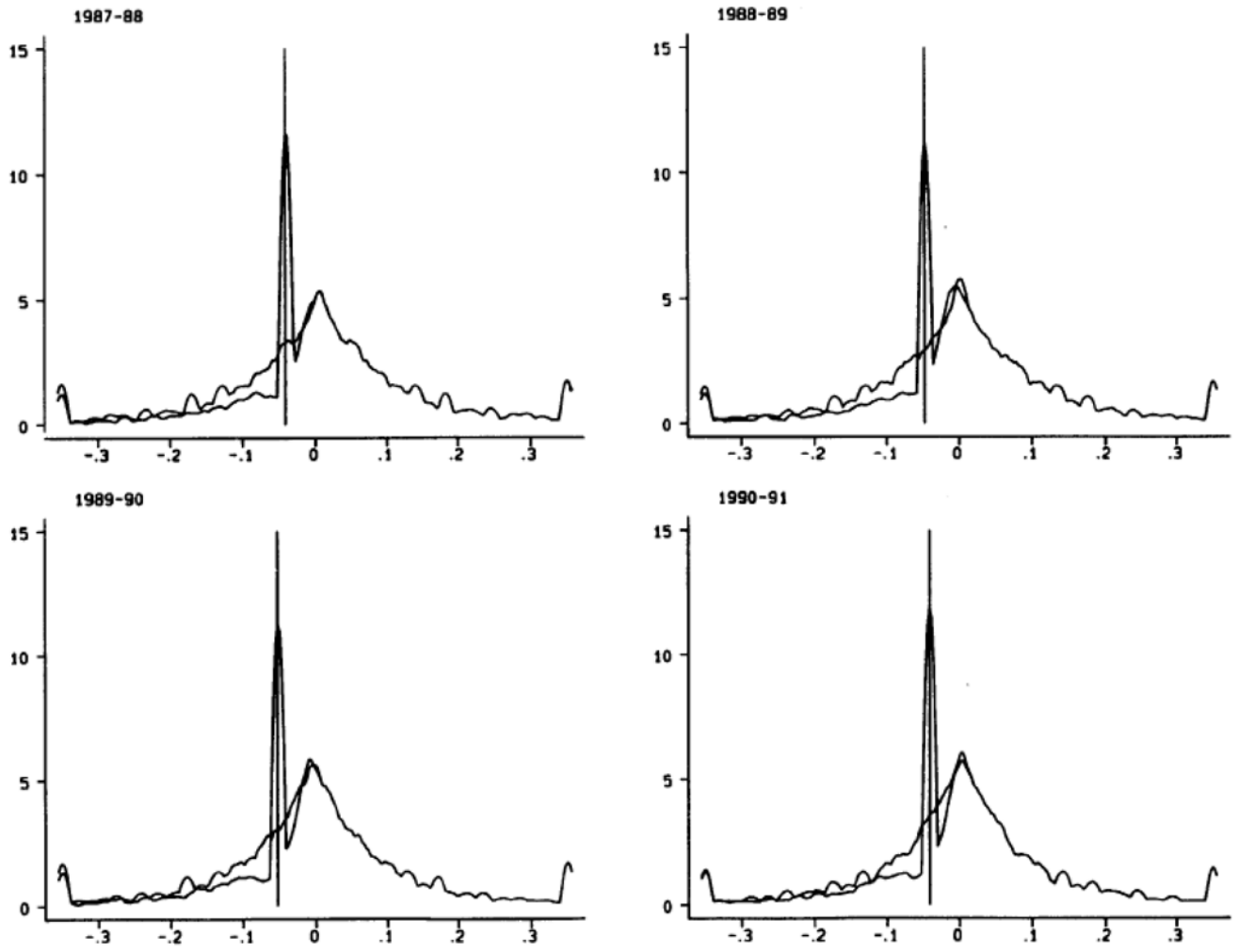


Figure 4 (Continued): Smoothed (Kernel) Estimates of Actual and Counterfactual Densities of Real Wage Changes, CPS Samples from 1987-88 to 1990-91

4 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)

- 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 –> 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)

Fig. 1. Log deviations from Royal Dutch/Shell parity. Source: Froot and Dabora (1999).

- 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

$\longrightarrow$ 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

$\rho_t \overset{i.i.d.}{\sim} \mathcal{N}(\rho^*, \sigma^2_\rho)$

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

$\longrightarrow$ Justification?

* fads and bubbles (Internet stocks, biotechs)

* pseudo-signals (advice broker, financial guru)

* behavioral biases / misperception riskiness

What else?

- μ 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
    $\Longrightarrow$ price=1 (numeraire)
  - unsafe asset: inelastic supply (1 unit)
    $\Longrightarrow$ price?
- Demand for unsafe asset: λ^a and λ^n, with $\lambda^n\mu + \lambda^a(1-\mu) = 1$.
- CARA: $U(w) = -e^{-2\gamma w}$ (w wealth when old)

$$
\begin{aligned}
E\left[U(w)\right] &= \int_{\infty}^{\infty} -e^{-2\gamma w} \cdot \frac{1}{\sqrt{2\pi\sigma_w^2}} \cdot e^{-\frac{1}{2\sigma^2}(w-\overline{w})^2} dw \\
&= -\int_{\infty}^{\infty} \frac{1}{\sqrt{2\pi\sigma_w^2}} \cdot e^{-\frac{4\gamma w\sigma_w^2 + w^2 + \overline{w}^2 - 2w\overline{w}}{2\sigma_w^2}} dw \\
&= -\int_{\infty}^{\infty} \frac{1}{\sqrt{2\pi\sigma_w^2}} \cdot e^{-\frac{(w-[2\gamma\sigma_w^2+\overline{w}])^2 + \overline{w}^2 - 4\gamma^2\sigma_w^4 - \overline{w}^2 - 2\gamma\sigma_w^2\overline{w}}{2\sigma_w^2}} dw \\
&= -e^{\frac{4\gamma^2\sigma_w^4 + 2\gamma\sigma_w^2\overline{w}}{2\sigma_w^2}} \int_{\infty}^{\infty} \frac{1}{\sqrt{2\pi\sigma_w^2}} \cdot e^{-\frac{(w-[2\gamma\sigma_w^2+\overline{w}])^2}{2\sigma_w^2}} dw \\
&= -e^{4\gamma^2\sigma_w^2 + 2\gamma\overline{w}} = e^{-2\gamma\left(\overline{w} - \gamma\sigma_w^2\right)} \\
&\Downarrow \\
&\max E\left[U(w)\right] \qquad \underset{\text{pos. mon. transf.}}{\curvearrowright} \qquad \max \overline{w} - \gamma\sigma_w^2
\end{aligned}
$$

Arbitrageurs:

$$\max(w_t - \lambda_t^a p_t)(1+r)$$

$$+\lambda_t^a(E_t[p_{t+1}] + r)$$

$$-\gamma\,(\lambda_t^a)^2\,Var_t(p_{t+1})$$

Noise traders:

$$\max(w_t - \lambda_t^n p_t)(1+r)$$

$$+\lambda_t^n(E_t[p_{t+1}] + \rho_t + r)$$

$$-\gamma\,(\lambda_t^n)^2\,Var_t(p_{t+1})$$

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

f.o.c.

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

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

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

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

$$+ \quad \frac{\rho_t}{2\gamma \cdot Var_t(p_{t+1})}$$

Interpretation

- Demand for unsafe asset function of:
  - (+) expected return $(r + E_t[p_{t+1}] - (1 + r)p_t)$
  - (-) risk aversion (γ)
  - (-) variance of return $(Var_t(p_{t+1}))$
  - (+) overestimation of return ρ_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

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

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

$$\begin{aligned} E[p] &= \frac{1}{1+r}\left[r + E_t[p] - 2\gamma \cdot Var_t(p_{t+1}) + \mu E[\rho_t]\right] \\ E[p] &= 1 + \frac{-2\gamma \cdot Var_t(p_{t+1}) + \mu\rho^*}{r} \end{aligned}$$

– Rewrite p_t plugging in

$$\begin{aligned} p_t &= 1 - \frac{2\gamma \cdot Var_t(p_{t+1})}{r} + \frac{\mu\rho^*}{r\,(1+r)} + \frac{\mu\rho_t}{1+r} \\ Var\,[p_t] &= Var\left[\frac{\mu\rho_t}{1+r}\right] = \frac{\mu^2}{(1+r)^2} Var\,(\rho_t) = \frac{\mu^2}{(1+r)^2}\sigma_\rho^2 \end{aligned}$$

– 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:

$$\begin{aligned} \Delta R &= R^n - R^a = (\lambda_t^n - \lambda_t^a)\left[r + p_{t+1} - p_t(1+r)\right] \\ E(\Delta R|\rho_t) &= \rho_t - \frac{(1+r)^2 \rho_t^2}{2\gamma\mu\sigma_\rho^2} \\ E(\Delta R) &= \rho^* - \frac{(1+r)^2 (\rho^*)^2 + (1+r)^2 \sigma_\rho^2}{2\gamma\mu\sigma_\rho^2} \end{aligned}$$

  - 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

- Here:
  - Biased investors
  - Non-biased investors
- Behavioral corporate finance:
  - Investors (biased)
  - CEOs (smart)
- Behavioral Industrial Organization:
  - Consumers (biased)
  - Firms (smart)

5 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**

- Examples of voter biases:
  - Effect of candidate order (Ho and Imai)
  - Imperfect signal extraction (Wolfers, 2004) –> Voters more likely to vote an incumbent if the local economy does well even if... it's just due to changes in oil prices
  - Susceptible to persuasion (DellaVigna and Kaplan, 2007)
  - More? Short memory about past performance?

- **Eisensee and Stromberg (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)

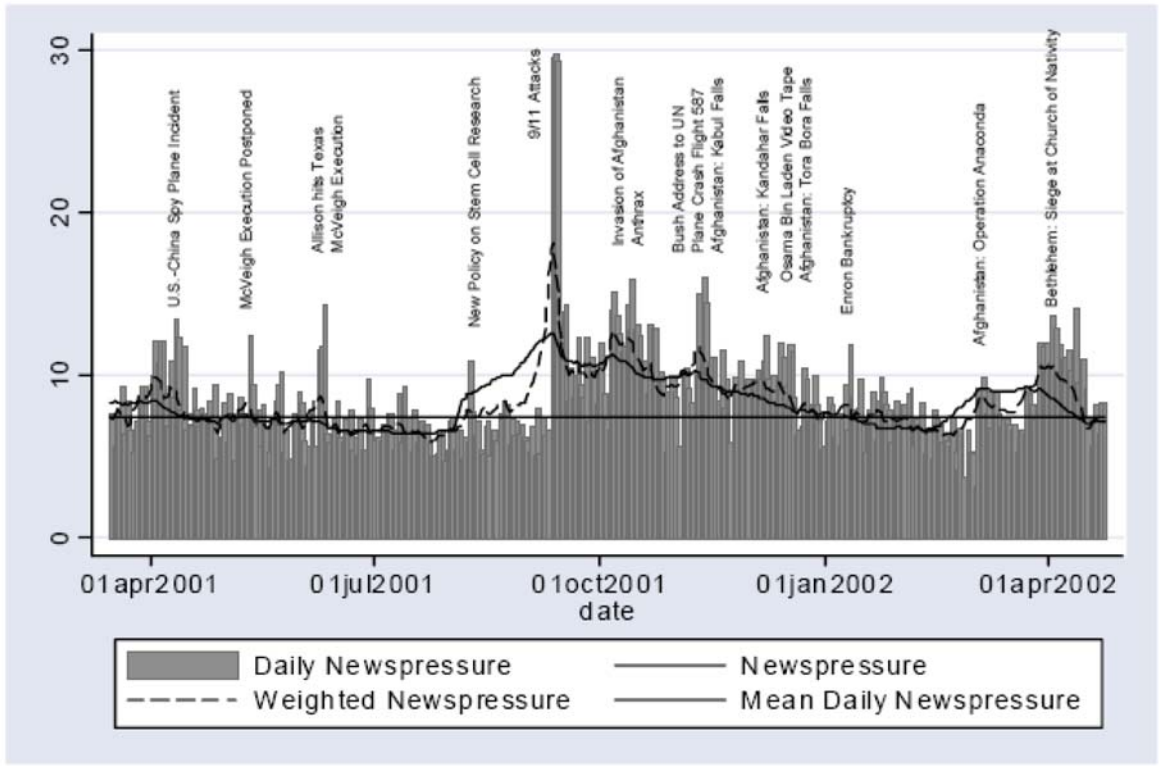


FIGURE IV
News Pressure (Minutes) during 405 Days, 15 March 2001 – 23 Apr 2002, by Day

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

- 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

$$\text{Re}\,lief = \alpha News + \beta X + \varepsilon$$

- 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: *News*				Dependent variable: *Relief*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
News Pressure	-0.0162	-0.0163	-0.0177	-0.0142	-0.0117	-0.0119	-0.0094	-0.0078
	(0.0041)***	(0.0041)***	(0.0057)***	(0.0037)***	(0.0045)***	(0.0045)***	(0.0058)	(0.0040)**
Olympics	-0.1078	-0.1079	-0.0871	-0.111	-0.1231	-0.1232	-0.1071	-0.1098
	(0.0470)**	(0.0470)**	(-0.0628)	(0.0413)***	(0.0521)**	(0.0521)**	(0.0763)	(0.0479)**
World Series	-0.1133				-0.1324			
	(-0.1065)				(0.1031)			
log Killed			0.0605				0.0582	
			(0.0040)***				(0.0044)***	
log Affected			0.0123				0.0376	
			(0.0024)***				(0.0024)***	
imputed log Killed				0.0491				0.0442
				(0.0034)***				(0.0037)***
imputed log Affected				0.0151				0.0394
				(0.0020)***				(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	
	News Pressure	*Olympics*
log Killed	-0.0082	0.0003
	(0.0113)	(0.0010)
log *Affected*	0.0005	-0.0006
	(0.0068)	(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	0.158	0.1309	0.2323	0.2611	0.8237	0.6341	0.6769
	(0.0200)***	(0.0232)***	(0.0178)***	(0.0328)***	(0.0569)***	(0.2528)***	(0.3341)*	(0.2554)***
News*abs(Pr(news)-0.5)				-0.4922	-0.302			
				(0.1059)***	(0.0840)***			
abs(Pr(news)-0.5)				0.5374	0.2959			
				(0.0943)***	(0.0831)***			
log Killed		0.0486					0.0198	
		(0.0046)***					-0.0208	
log Affected		0.0358					0.0299	
		(0.0024)***					(0.0048)***	
imputed log Killed			0.0378	0.0546	0.0307			0.0109
			(0.0038)***	(0.0049)***	(0.0046)***			-0.0132
imputed log Affected			0.0375	0.0445	0.0345			0.0292
			(0.0020)***	(0.0023)***	(0.0026)***			(0.0045)***
F-stat, instruments, 1st stage						11.0	6.1	11.1
Over-id restrictions, χ^2_{df} (p-value)						0.51_1(0.47)		0.64_1 (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%.

6 Welfare Response to Biases

- Need for government/social planner intervention?
  - No if:
    - Sophistication about biases
    - Markets to correct biases exist
  - Potentially yes 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 real wage cuts
     - Accept nominal 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
	Joined SMarT (N=615)	Did Not Join SMarT (N=3,197)	Joined SMarT (N=165)	Did Not Join SMarT (N=1,840)	(N=5,817)
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: Joined SMarT	EMPLOYEES WHO WERE ALREADY SAVING IN DECEMBER 2001: Did Not Join SMarT	EMPLOYEES WHO WERE NOT SAVING IN DECEMBER 2001: Joined SMarT	EMPLOYEES WHO WERE NOT SAVING IN DECEMBER 2001: Did Not Join SMarT	ALL EMPLOYEES
	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 (%)

	AGE			
INCOME	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 desireable for almost all
    - Nudges 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

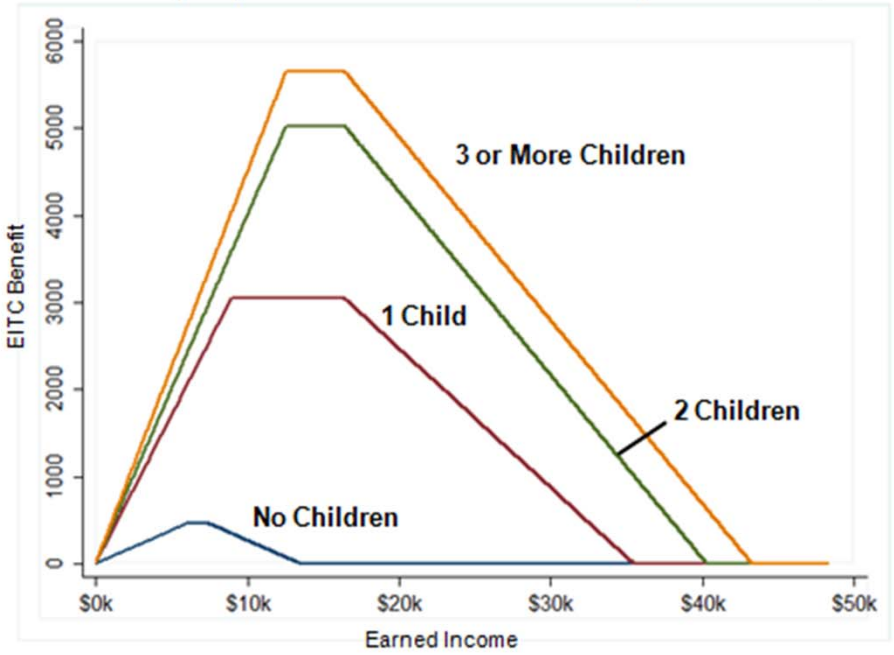
- Despite these difficulties, there are now numerous attempts in this direction
- Two more recent examples:
- **Loewenstein and Volpp**'s work on health outcomes
  - Series of Randomized Trial
  - Leverage incentives with lotteries (probability weighting)
  - Use team incentives...
  - Outcomes: Weight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

MOTIVATION & BACKGROUND

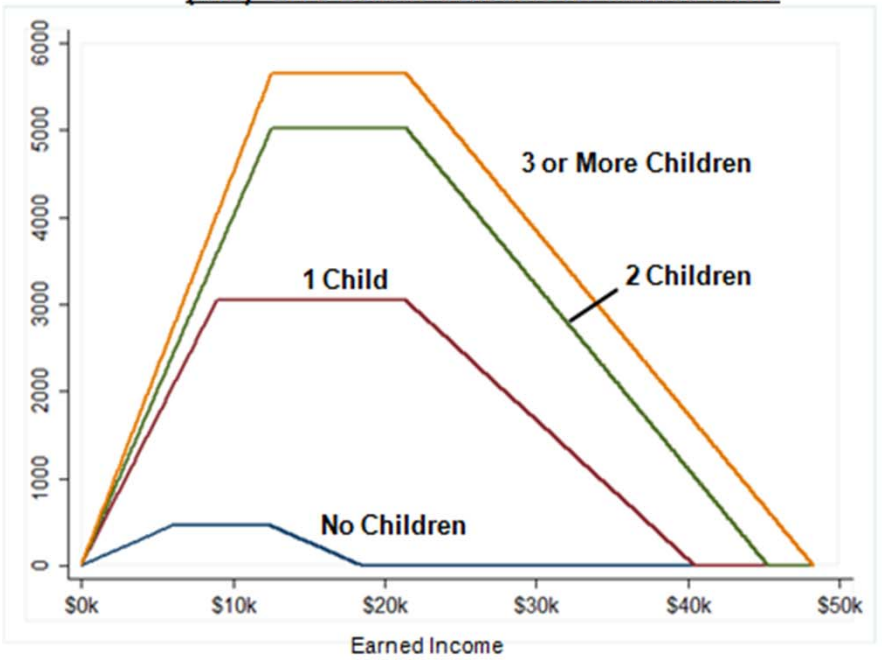
- **EITC is largest means-tested cash transfer program.** It disburses $58 billion per year to 26 million recipients through income supplement that encourages work
- Fully refundable, supplements earned income by average of 17% which amounts to $2,100. Must file your taxes to claim
- **25% of eligible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



RESEARCH STRATEGY

Field experiment to test leading causes of low take-up

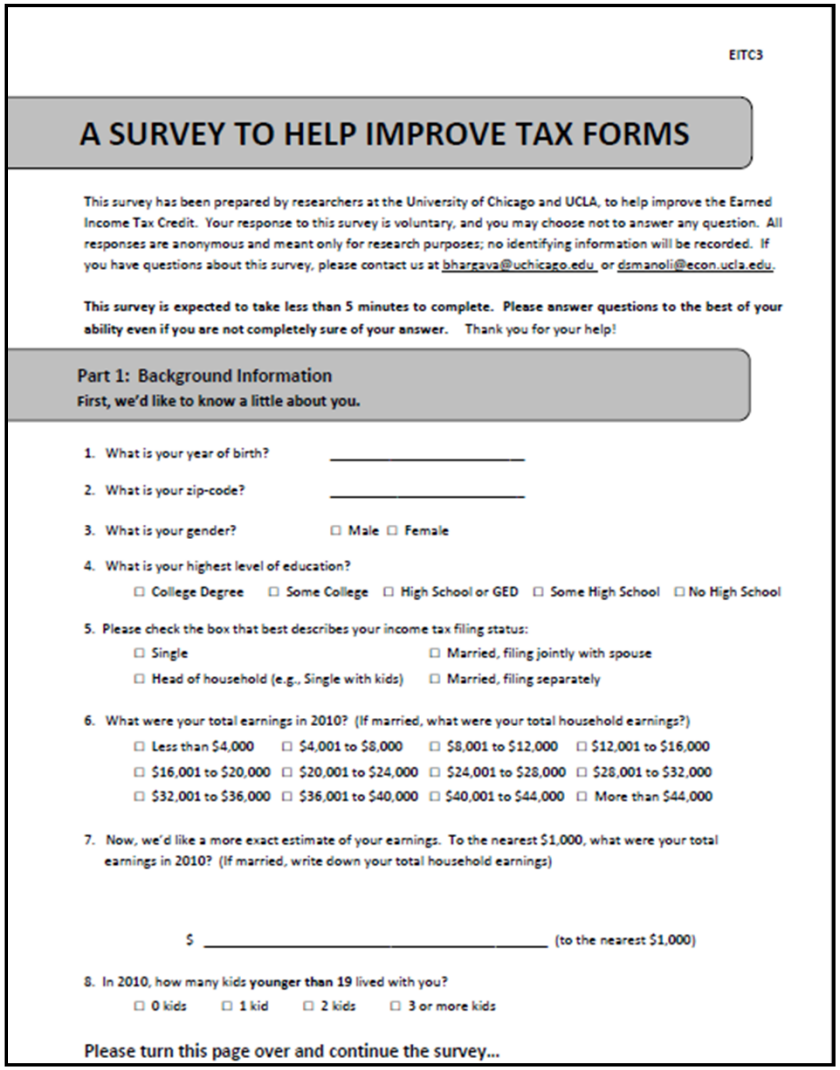
- Modify tax documents (notice + worksheet + envelope) and distribute to eligible filing non-claimants
- Simultaneously test three hypotheses regarding role of **information** (benefits, costs, program rules), **Informational** complexity, and program **stigma** on response
- Randomize three components 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 or dsmanoli@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

EXPERIMENT CONTEXT – ILLUSTRATIVE TIMELINE

2009 **2010**

Jan to Dec | **Feb** | **March** | **May** | **Nov**

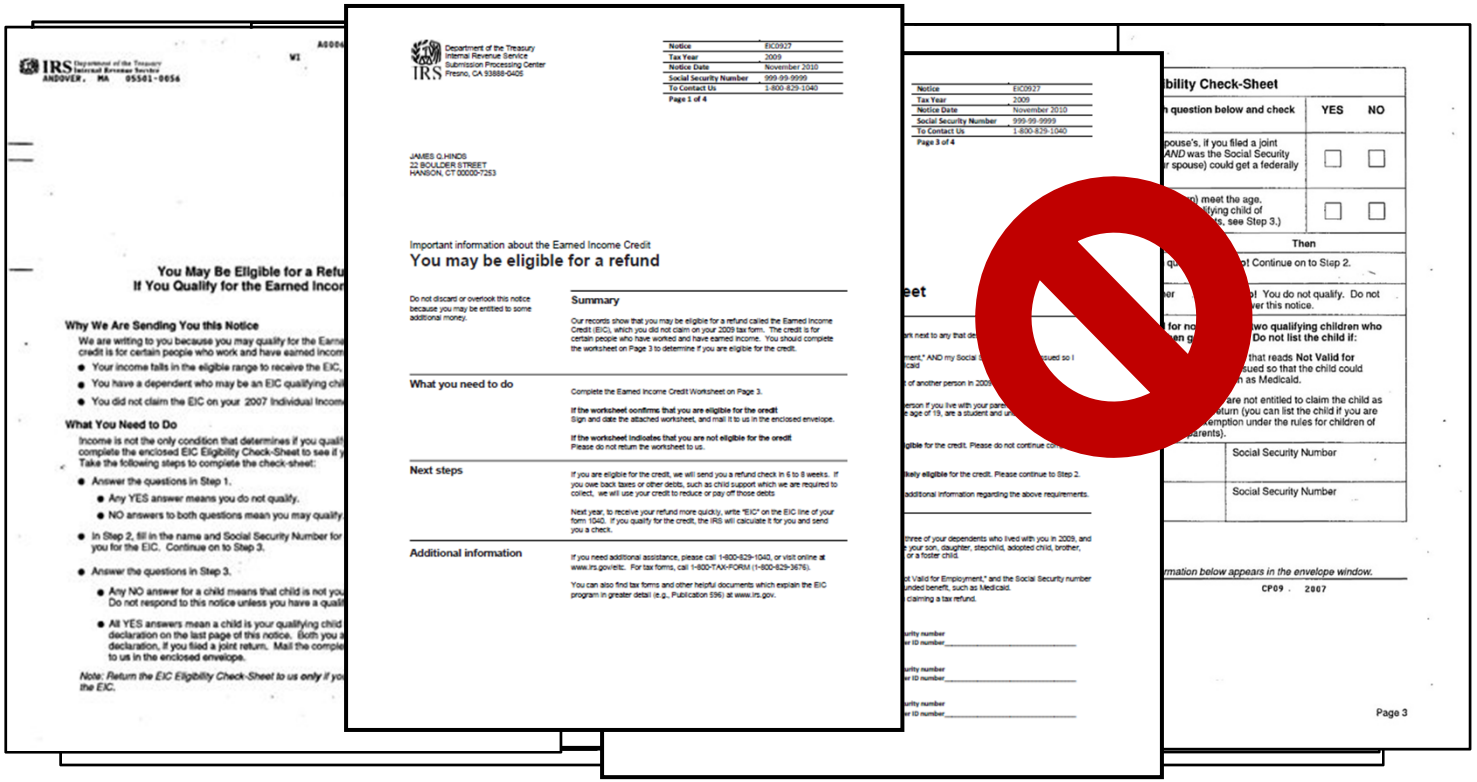
Earn income, qualify for EITC, (CA only)

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)



ORGANIZATION OF TREATMENTS I

Table 3

EXPERIMENTAL INTERVENTIONS BY MECHANISM

MECHANISM	INTERVENTION	DESCRIPTION	SAMPLE
Informational Complexity			
Simplicity / Complexity (Design)	1. Simple Notice	Relative to complex (original CP) notice, "simple" single-sided notice has simplified layout and exlcudes 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
Program Information			
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
Penality/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
Program Stigma			
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)

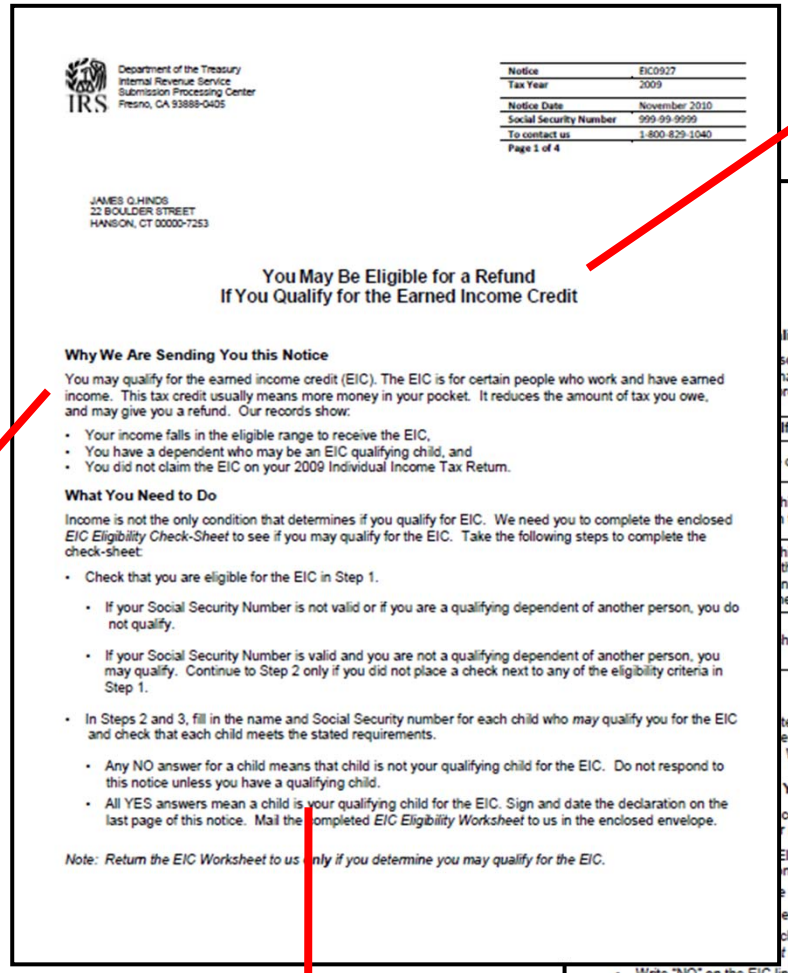
- Simplification appears to “improve” choice in many contexts (e.g., Bettinger et al. 2009)

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 93888-0405

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

Page 1 of 4

JAMES Q HINDS
22 BOULDER STREET
HANSON, CT 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:

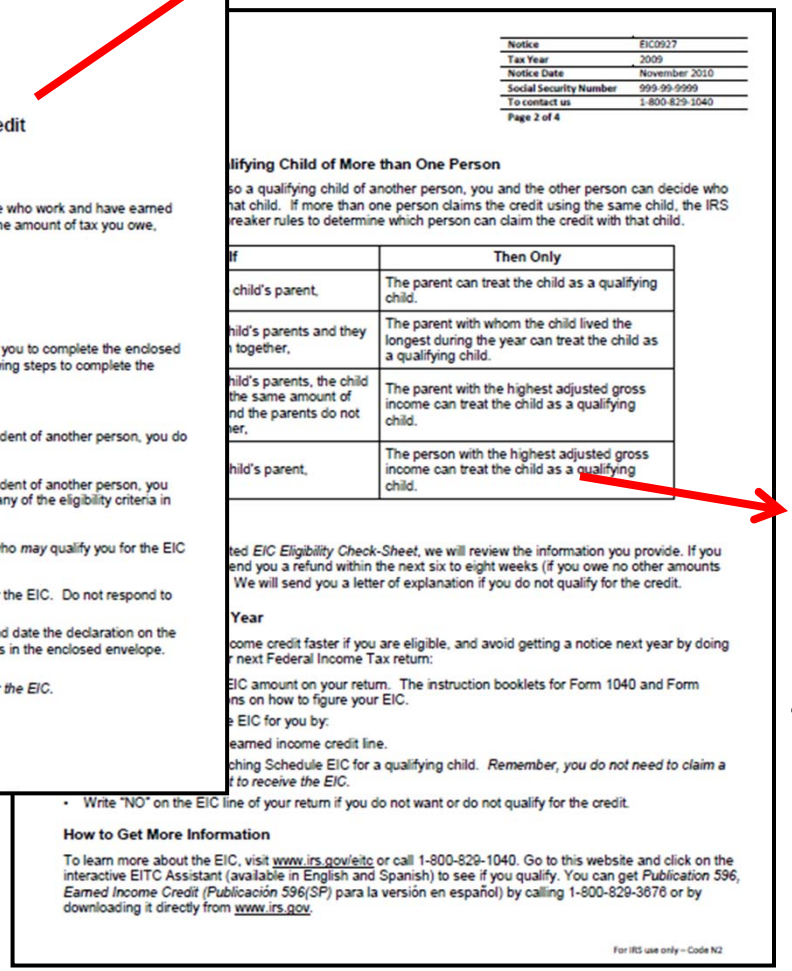
- Your income falls in the eligible range to receive the EIC,
- You have a dependent who may be an EIC qualifying child, and
- You did not claim the EIC on your 2009 Individual Income Tax Return.

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.



Notice	EIC0927
Tax Year	2009
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To contact us	1-800-829-1040

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lifying Child of More than One Person

so a qualifying child of another person, you and the other person can decide who hat child. If more than one person claims the credit using the same child, the IRS reaker 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.
hild's parents and they together,	The parent with whom the child lived the longest during the year can treat the child as a qualifying child.
hild's parents, the child the same amount of nd the parents do not er,	The parent with the highest adjusted gross income can treat the child as a qualifying child.
hild's parent,	The person with the highest adjusted gross income can treat the child as a qualifying child.

ted *EIC Eligibility Check-Sheet*, we will review the information you provide. If you end you 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

come credit faster if you are eligible, and avoid getting a notice next year by doing next Federal Income Tax return:

EIC amount on your return. The instruction booklets for Form 1040 and Form ns on how to figure your EIC.

e EIC for you by:

earned income credit line.

ching Schedule EIC for a qualifying child. *Remember, you do not need to claim a t 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.

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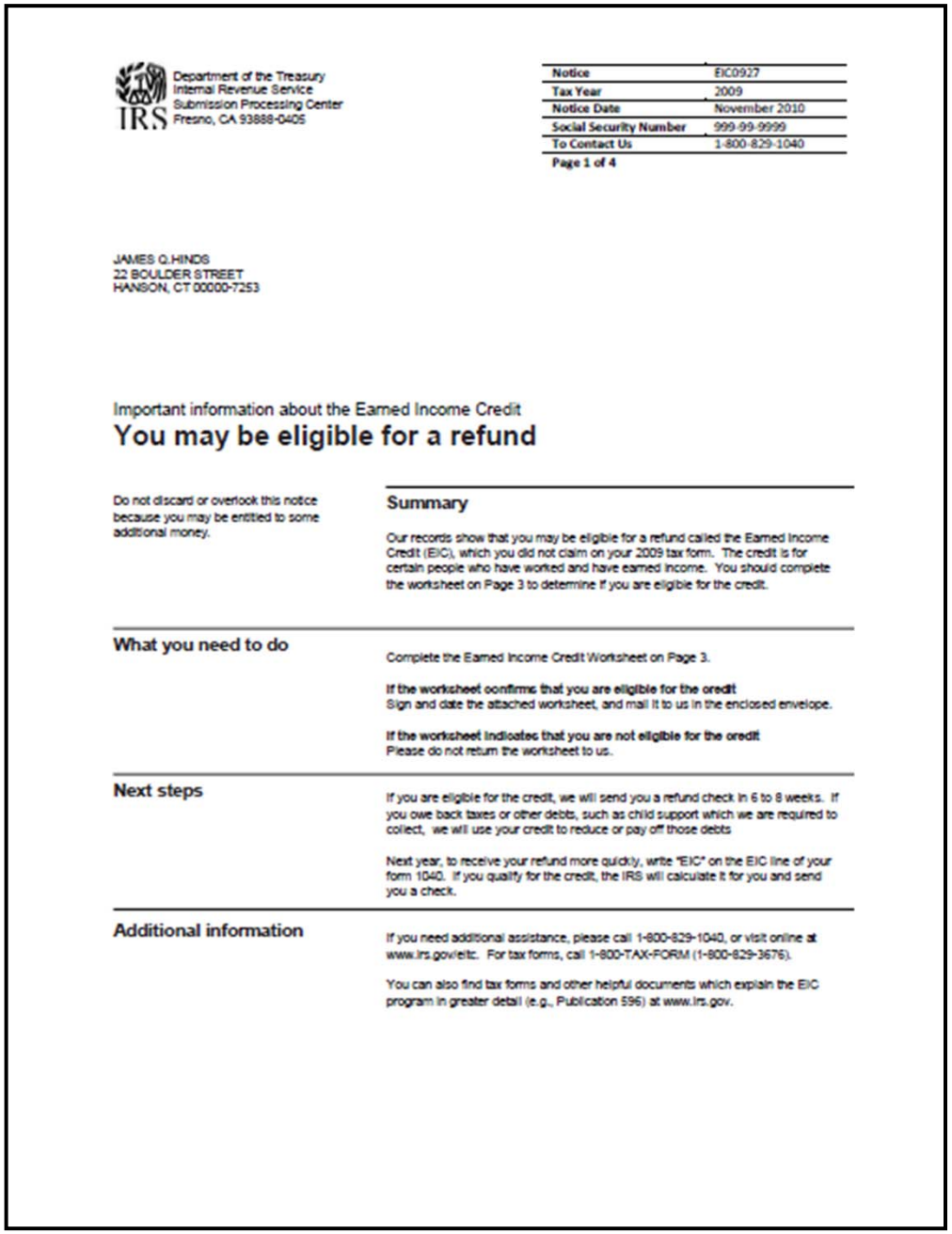
Headline describing purpose of notice

Summary of the notice and program

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

Instructions for eligibility worksheet; very exclusionary language



Department of the Treasury
Internal Revenue Service
Submission Processing Center
Fresno, CA 93888-0405

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JAMES Q.HINDS
22 BOULDER STREET
HANSON, CT 00000-7253

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.

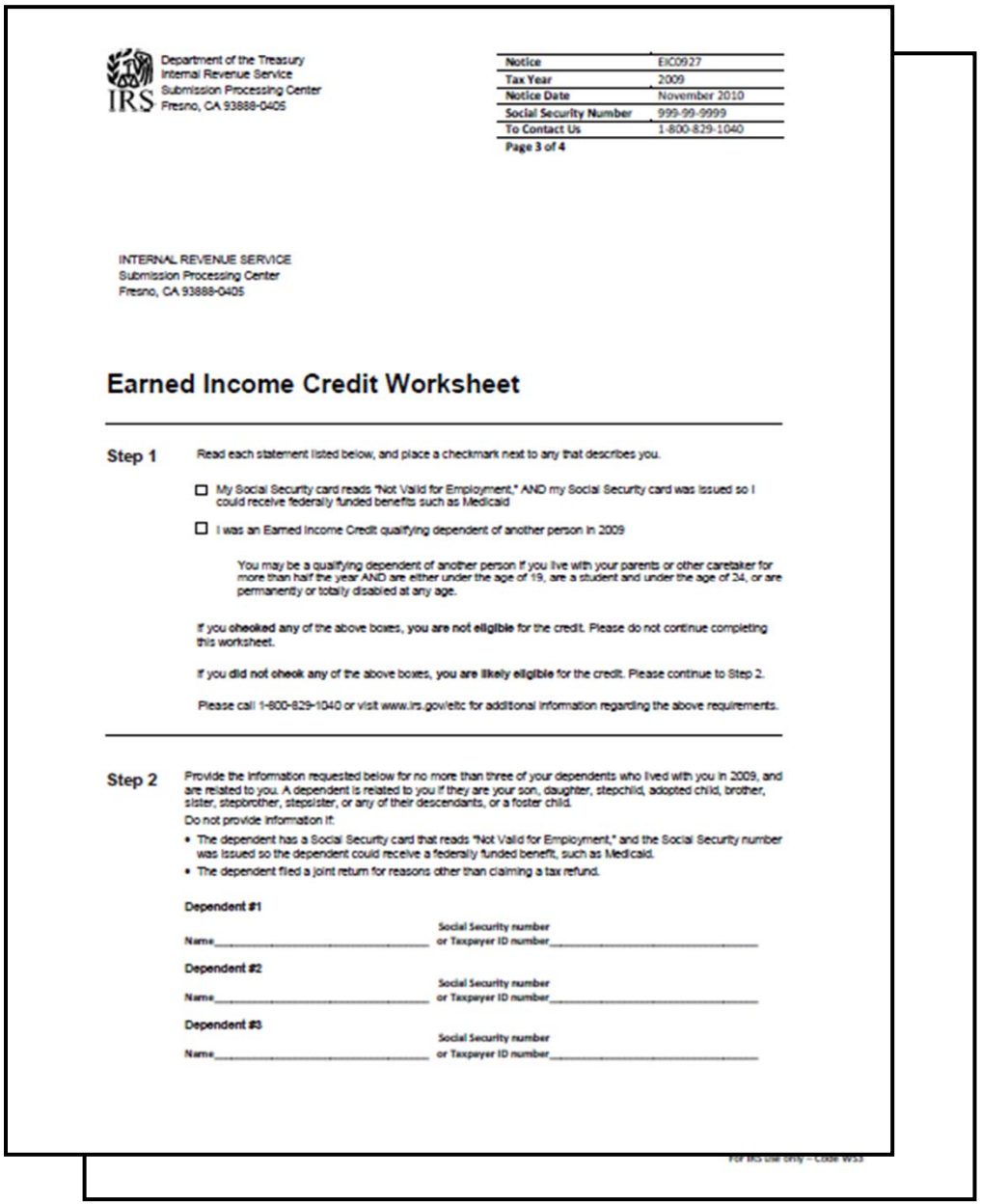
Additional information

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



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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/eitc 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_____

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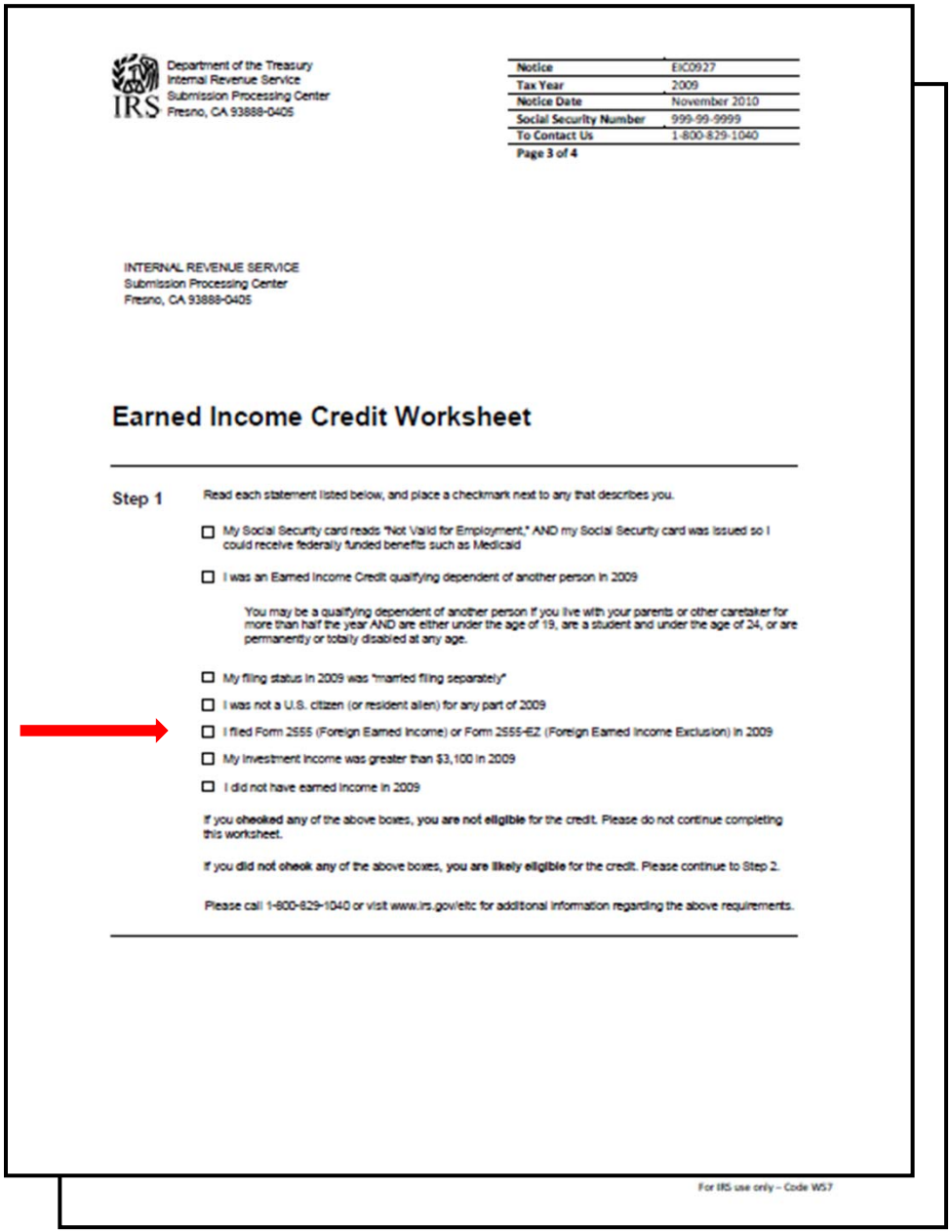
SIMPLE WORKSHEET

- 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



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- ☐ 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/eitc for additional information regarding the above requirements.

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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

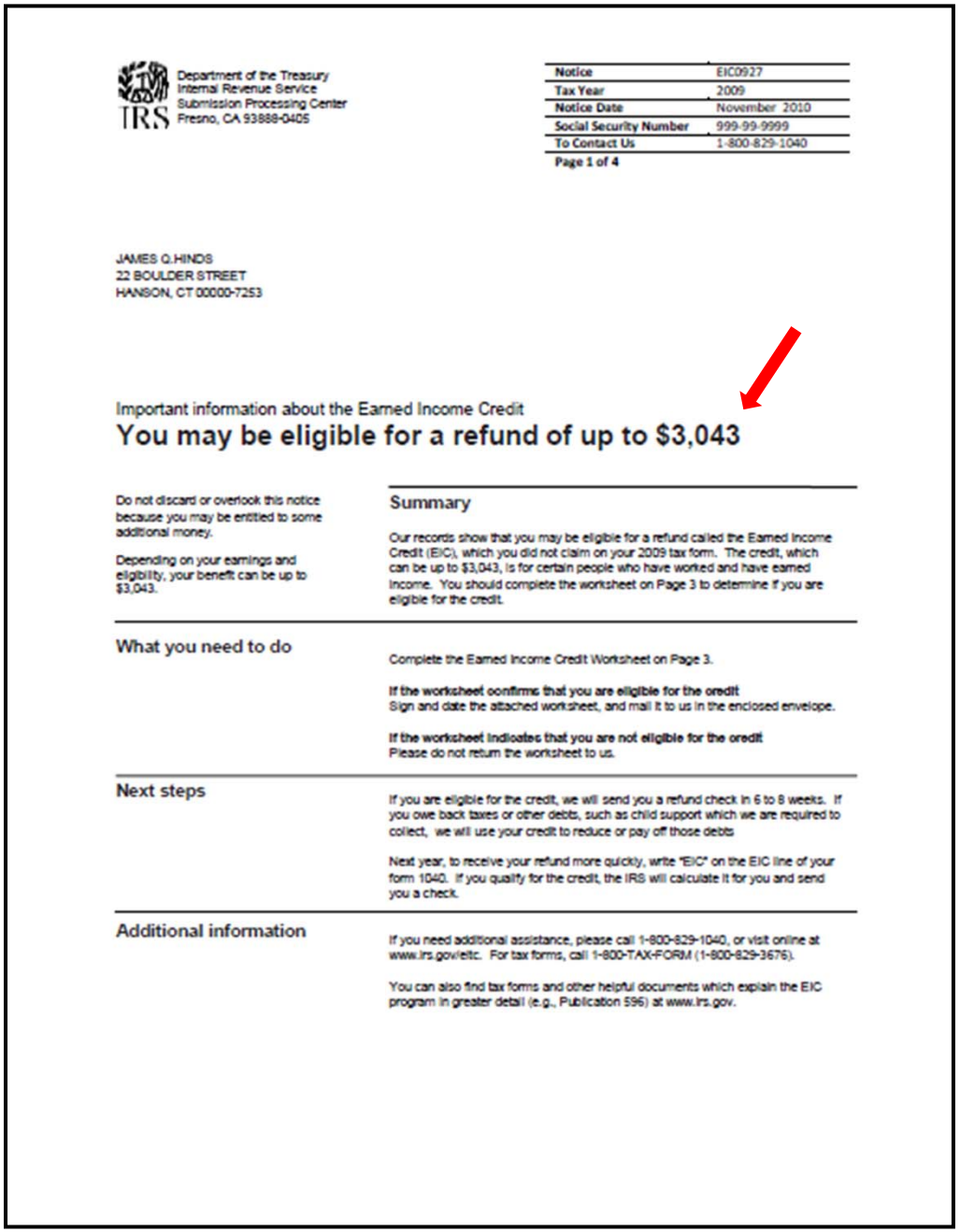
(B) INFORMATION ON BENEFITS, COSTS, RULES

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



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JAMES Q.HINDS
22 BOULDER STREET
HANSON, CT 00000-7253

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.

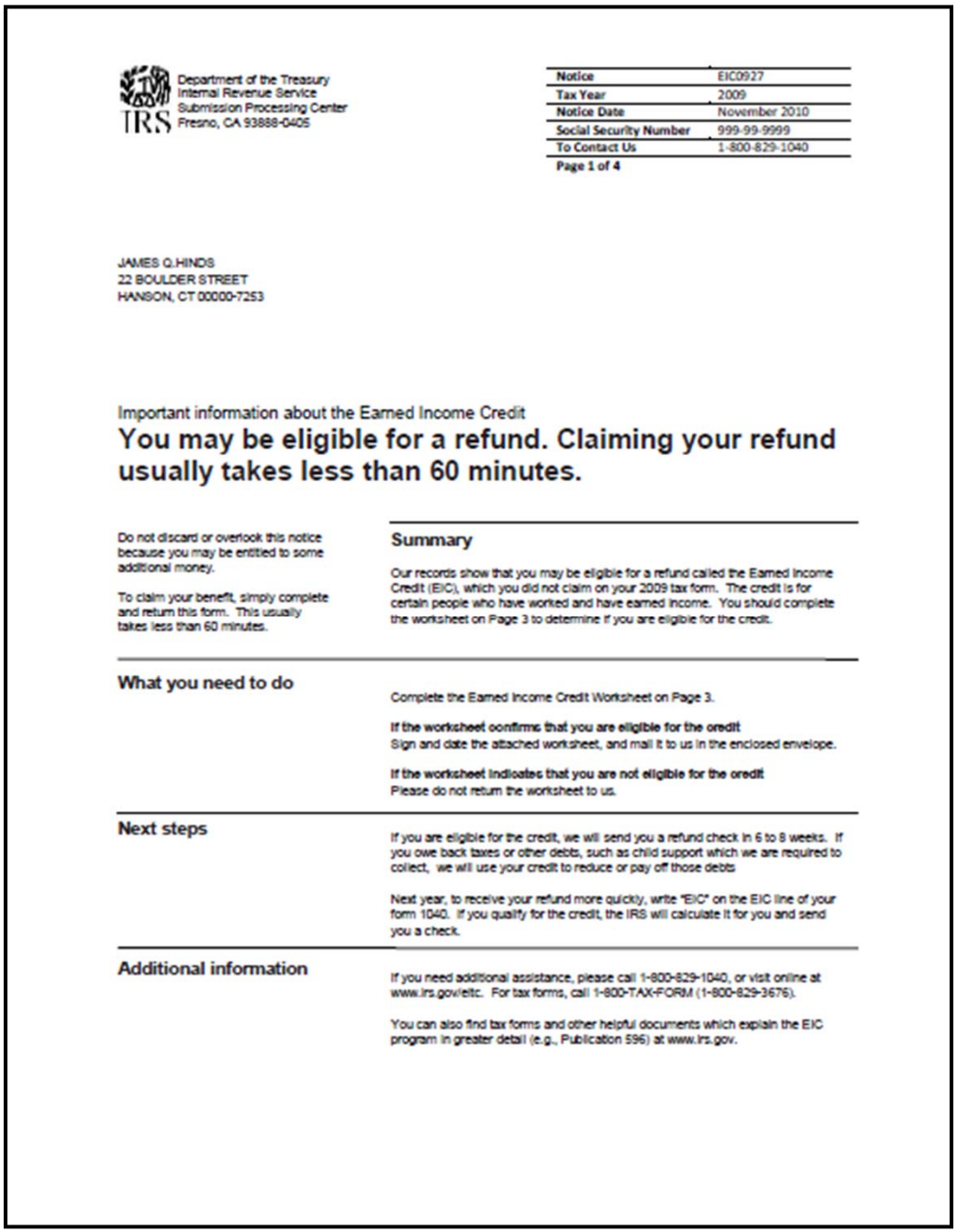
Additional information

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



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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.

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Additional information

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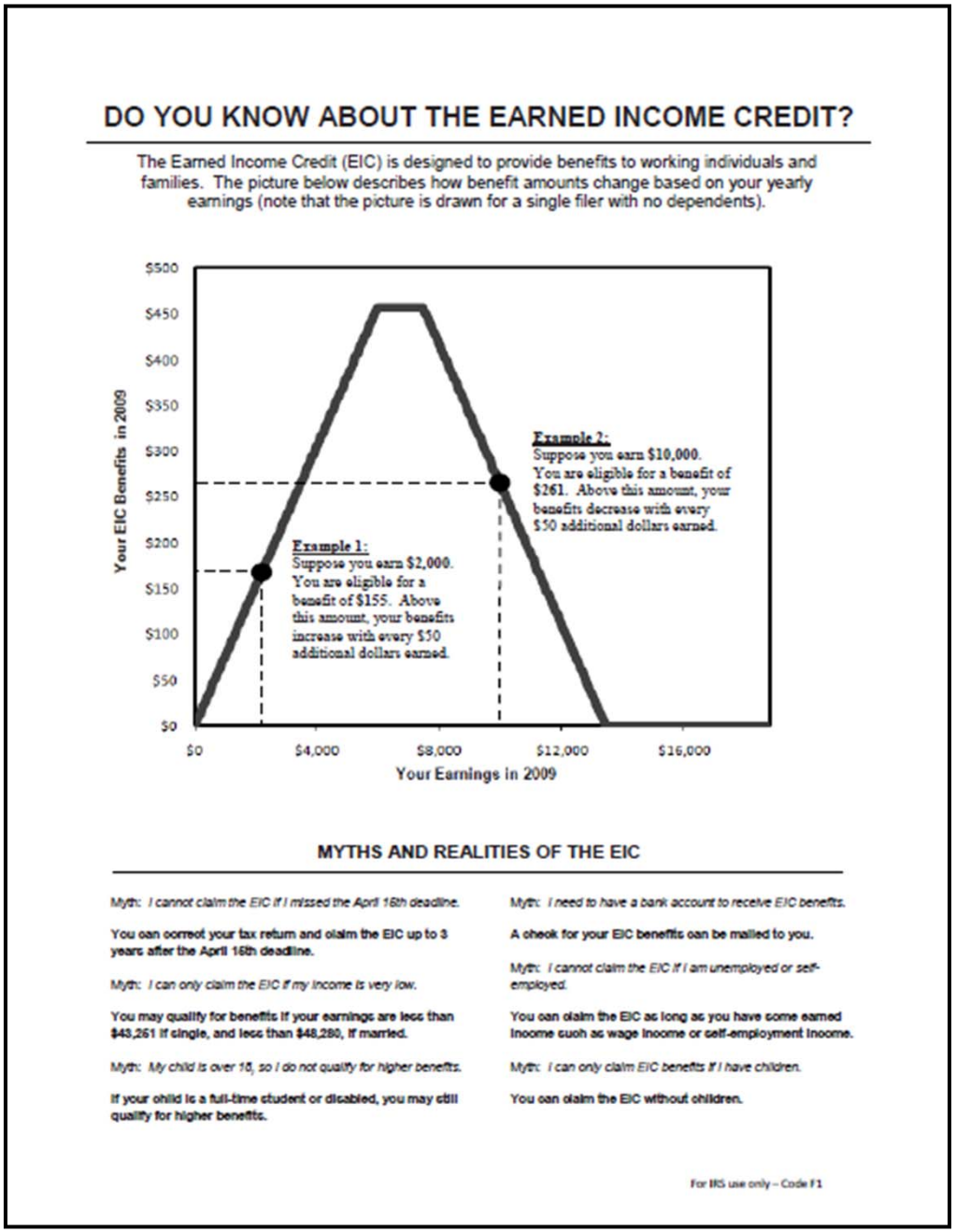
You can also find tax forms and other helpful documents which explain the EIC program in greater detail (e.g., Publication 596) at www.irs.gov.

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 $43,281 if single, and less than $48,280, if married.

Myth: My child is over 16, 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.

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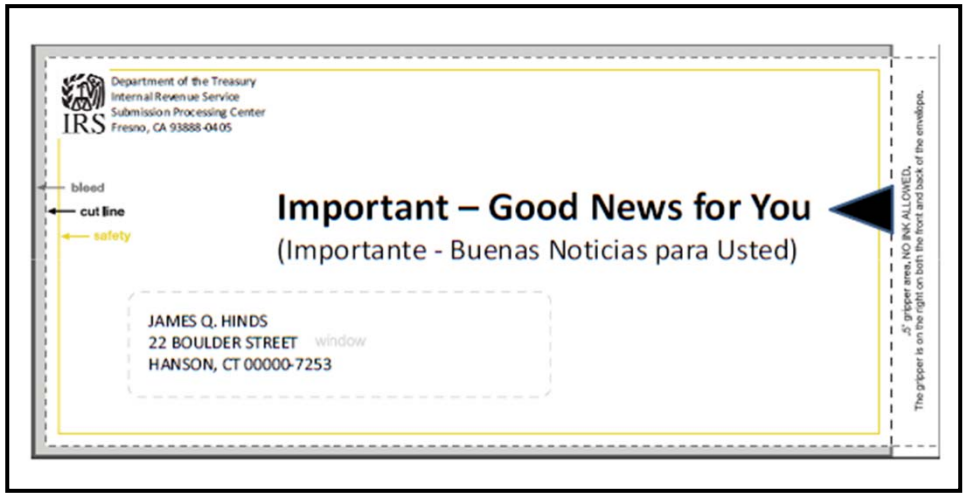
INFORMATIONAL FLYER

- 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



Messaged 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."

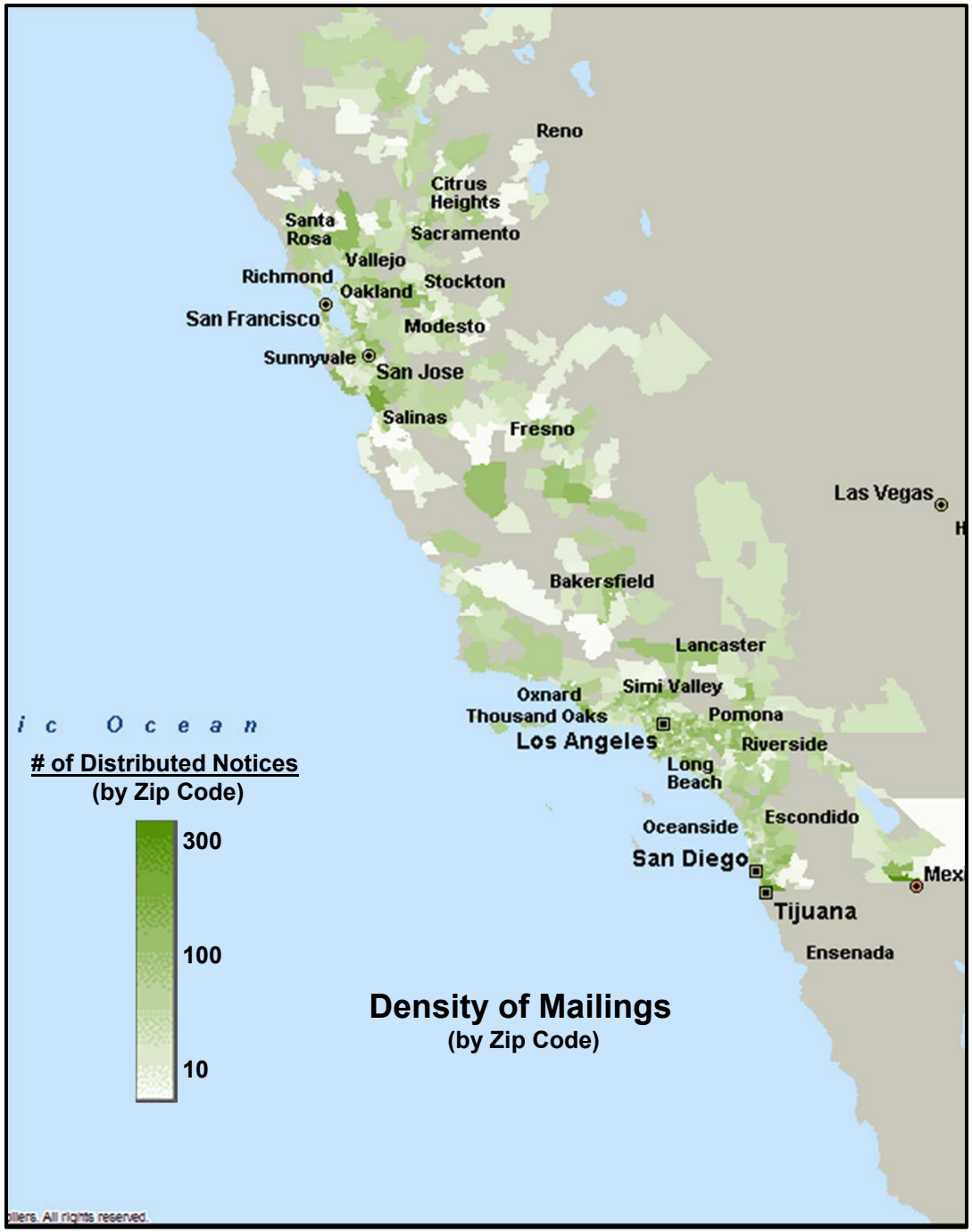
Notice Headline for Intervention 1

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

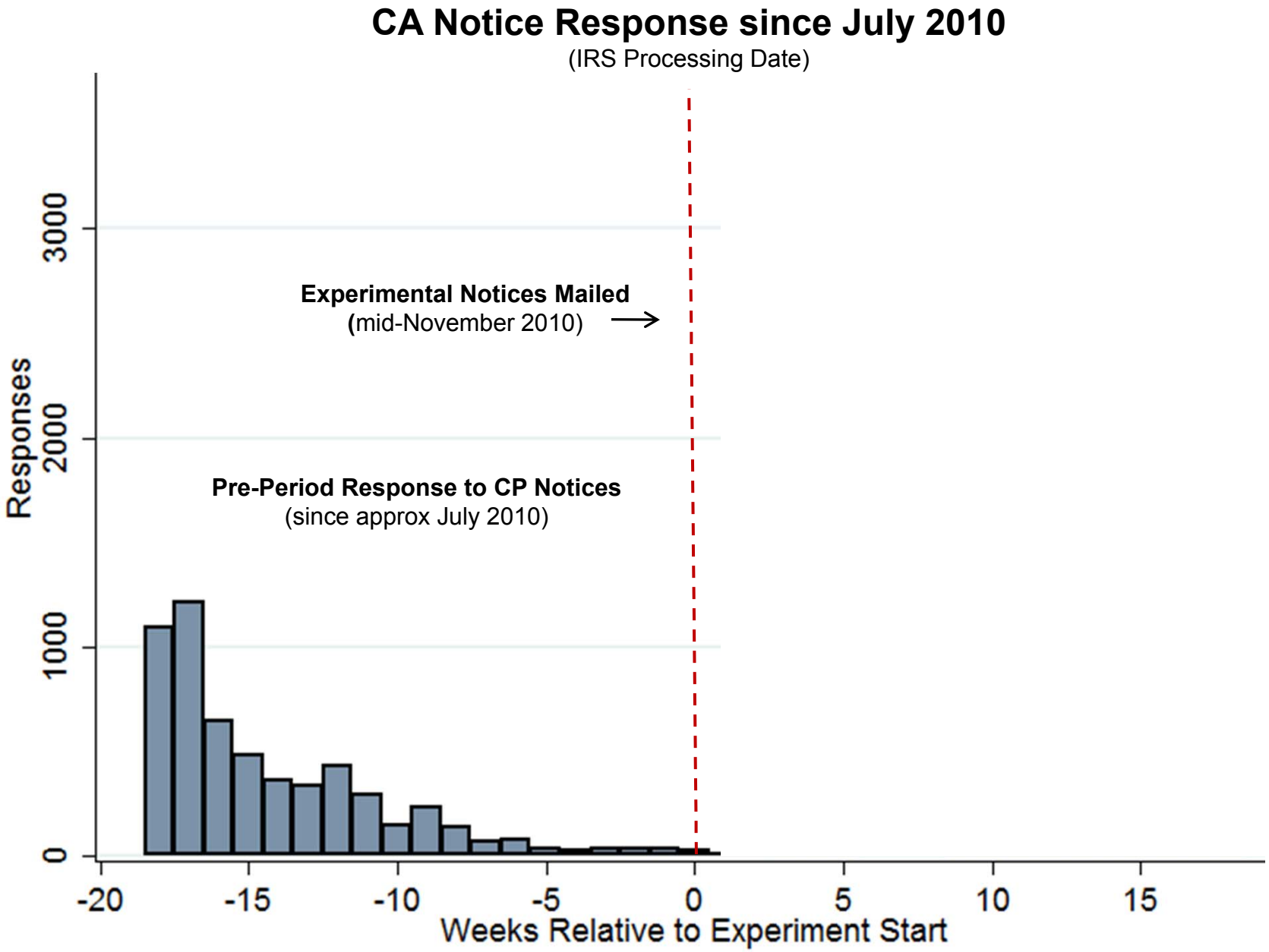
Notice Headline for Intervention 2

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?



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

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***	-0.065***	-0.065***	-0.060***	-0.0001	-0.0001
	(0.008)	(0.008)	(0.010)	(0.010)	(0.0000)	(0.0000)
	[-49%]	[-46%]	[-38%]	[-60%]		
Complex Worksheet	-0.043***	-0.041***	-0.054***	-0.012	-0.0001	-0.0001
	(0.005)	(0.005)	(0.006)	(0.007)	(0.0000)	(0.0000)
	[-31%]	[-29%]	[-32%]	[-12%]		
Informational Interventions						
Benefit Display	0.084***	0.083***	0.085***	0.066***	0.0003*	0.0003*
	(0.007)	(0.007)	(0.009)	(0.011)	(0.0000)	(0.0000)
	[+37%]	[+36%]	[+31%]	[+41%]		
Claiming Cost Display	-0.014	-0.016*	-0.015	-0.008	0.0002	0.0003
	(0.009)	(0.008)	(0.010)	(0.012)	(0.0000)	(0.0000)
	[-6%]	[-7%]	[-6%]	[-5%]		
Indemnity from Penalty Worksheet	0.005	0.006	0.003	0.007	0.0001	0.0001
	(0.005)	(0.005)	(0.006)	(0.007)	(0.0000)	(0.0000)
	[+2%]	[+3%]	[+1%]	[+4%]		
Informational Flyer	-0.040***	-0.039***	-0.047***	-0.019*	0.000	0.000
	(0.008)	(0.008)	(0.009)	(0.011)	(0.0000)	(0.0000)
	[-17%]	[-17%]	[-17%]	[-12%]		
Envelope Message	-0.007	-0.007	-0.01	-0.001	0.000	0.000
	(0.005)	(0.005)	(0.006)	(0.007)	(0.0000)	(0.0000)
	[-3%]	[-3%]	[-4%]	[-1%]		
Stigma Interventions						
Personal Stigma Reduction	-0.007	-0.009	-0.012	0.001	0.0003	0.0004
	(0.011)	(0.011)	(0.014)	(0.016)	(0.0000)	(0.0000)
	[-3%]	[-4%]	[-4%]	[+1%]		
Social Stigma Reduction	-0.048***	-0.046***	-0.047***	-0.037**	-0.0002	-0.0002
	(0.011)	(0.010)	(0.013)	(0.015)	(0.0000)	(0.0000)
	[-21%]	[-20%]	[-17%]	[-23%]		
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

7 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 team 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)
     * 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 (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!