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

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Outline

1. Market Reaction to Biases: Pricing II

2. Methodology: Markets and Non-Standard Behavior

3. Market Reaction to Biases: Behavioral Finance

4. Market Reaction to Biases: Corporate Decisions

5. Market Reaction to Biases: Employers

6. Market Reaction to Biases: Political Economy II

7. Happiness II

1 Market Reaction to Biases: Pricing II

1.1 Self-Control II

- **Eliaz and Spiegler (RES 2006),** Contracting with Diversely Naive Agents.

- Extend DellaVigna and Malmendier (2004):

  - incorporate heterogeneity in naiveté

  - allow more flexible functional form in time inconsistency

  - different formulation of naiveté

- Setup:

  1. Actions:

     - Action $a \in [0, 1]$ taken at time 2
     - At time 1 utility function is $u(a)$
     - At time 2 utility function is $v(a)$

  2. Beliefs: At time 1 believe:

     - Utility is $u(a)$ with probability θ
     - Utility is $v(a)$ with probability $1 - \theta$
     - Heterogeneity: Distribution of types θ

3. Transfers:

   – Consumer pays firm $t(a)$

   – Restrictive assumption: no cost to firm of providing a

- Therefore:
  - Time inconsistency ($\beta < 1$) –> Difference between u and v
  - Naiveté ($\hat{\beta} > \beta$) –> $\theta > 0$
  - Partial naiveté here modelled as stochastic rather than deterministic
  - Flexibility in capturing time inconsistency (self-control, reference dependence, emotions)

- **Proposition 1.** There are two types of contracts:

  1. Perfect commitment device for sufficiently sophisticated agents ($\theta < \underline{\theta}$)

  2. Exploitative contracts for sufficiently naive agents ($\theta > \underline{\theta}$)

- Commitment device contract: Implement $a_\theta = \max_a u(a)$

  – Transfer:

    * $t(a_\theta) = \max_a u(a)$

    * $t(a) = \infty$ for other actions

  – Result here is like in DM: Implement first best

- Exploitative contract:
  - Agent has negative utility:

$$u\left(a_\theta^v\right) - t\left(a_\theta^v\right) < 0$$

  - Maximize overestimation of agents:

$$a_\theta^u = \arg\max\left(u\left(a\right) - v\left(a\right)\right)$$

1.2 Bounded Rationality

- **Gabaix and Laibson (2003)**, *Competition and Consumer Confusion*

- Non-standard feature of consumers:
  - Limited ability to deal with complex products
  - imperfect knowledge of utility from consuming complex goods

- Firms are aware of bounded rationality of consumers
  $\longrightarrow$ design products & prices to take advantage of bounded rationality of consumers

Example: Checking account. Value depends on

- interest rates
- fees for dozens of financial services (overdrafts, more than x checks per months, low average balance, etc.)
- bank locations
- bank hours
- ATM locations
- web-based banking services
- linked products (e.g. investment services)

Given such complexity, consumers do not know the exact value of products they buy.

Model

- Consumers receive noisy, *unbiased* signals about product value.
  - Agent a chooses from n goods.
  - True utility from good i:

$$Q_i - p_i$$

  - Utility signal

$$U_{ia} = Q_i - p_i + \sigma_i \varepsilon_{ia}$$

    σ_i is complexity of product i.

    ε_{ia} is zero mean, iid across consumers and goods, with density f and cumulative distribution F.

    (Suppress consumer-specific subscript a;
    $U_i \equiv U_{ia}$ and $\varepsilon_i \equiv \varepsilon_{ia}$.)

- Consumer decision rule: Picks the one good with highest signal U_i from $(U_i)_{i=1}^n$.

Market equilibrium with exogenous complexity. Bertrand competition with

- Q_i : quality of a good,

  σ_i : complexity of a good,

  c_i : production cost

  p_i : price

- Simplification: Q_i, σ_i, c_i identical across firms. (*Problem: How should consumers choose if all goods are known to be identical?*)

- Firms maximize profit $\pi_i = (p_i - c_i)\, D_i$

- Symmetry reduces demand to

$$D_i = \int f(\varepsilon_i)\, F\left(\frac{p_j - p_i + \sigma\varepsilon_i}{\sigma}\right)^{n-1} d\varepsilon_i$$

Example of demand curves

Gaussian noise $\varepsilon \sim N\,(0{,}1)$, 2 firms

Demand curve faced by firm 1:

$$\begin{aligned} D_1 &= P\left(Q - p_1 + \sigma\varepsilon_1 > Q - p_2 + \sigma\varepsilon_2\right) \\ &= P\left(p_2 - p_1 > \sigma\sqrt{2}\eta\right) \text{ with } \eta = \left(\varepsilon_2 - \varepsilon_1\right)/\sqrt{2} \text{ N(0,1)} \\ &= \Phi\left(\frac{p_2 - p_1}{\sigma\sqrt{2}}\right) \end{aligned}$$

Usual Bertrand case $(\sigma = 0)$: infinitely elastic demand at $p_1 = p_2$

$$D_1 \in \left\{ \begin{array}{ccc} 1 & \text{if} & p_1 < p_2 \\ [0,1] & \text{if} & p_1 = p_2 \\ 0 & \text{if} & p_1 > p_2 \end{array} \right\}$$

Complexity case ($\sigma > 0$) : Smooth demand curve, no infinite drop at $p_1 = p_2$. At $p_1 = p_2 = p$ demand is $1/2$.

$$\max_{p_1} \Phi\left(\frac{p_2 - p_1}{\sigma\sqrt{2}}\right)[p_1 - c_1]$$

$$f.o.c. : -\frac{1}{\sigma\sqrt{2}}\phi\left(\frac{p_2 - p_1}{\sigma\sqrt{2}}\right)[p_1 - c_1] + \Phi\left(\frac{p_2 - p_1}{\sigma\sqrt{2}}\right) = 0$$

Intuition for non-zero mark-ups: Lower elasticity increases firm mark-ups and profits. Mark-up proportional to complexity σ.

Endogenous complexity

- Consider Normal case –> For $\sigma \to \infty$

$$\max_{p_1} \Phi\left(\frac{p_2 - p_1}{\sigma\sqrt{2}}\right)[p_1 - c_1] \to \max_{p_1} \frac{1}{2}[p_1 - c_1]$$

Set $\sigma \to \infty$ and obtain infinite profits by letting $p_1 \to \infty$

(Choices are random, Charge as much as possible)

- Gabaix and Laibson: Concave returns of complexity $Q_i(\sigma_i)$

  Firms increase complexity, unless "clearly superior" products in model with heterogenous products.

In a nutshell: market does not help to overcome bounded rationality. Competition may not help either

- More work on Behavioral IO:

- **Heidhus-Koszegi (2006, 2007)**

  – Incorporate reference dependence into firm pricing

  – Assume reference point rational exp. equilibrium (**Koszegi-Rabin**)

  – Results on

    * Price compression (consumers hate to pay price higher than reference point)

    * But also: Stochastic sales

- **Gabaix-Laibson (QJE 2006)**

  – Consumers pay attention to certain attributes, but not others (Shrouded attributes)

- Form of limited attention
- Firms charge higher prices on shrouded attributes (add-ons)
- Similar to result in **DellaVigna-Malmendier (2004)**: Charge more on items consumers do not expect to purchase

- **Ellison (2006):** Early, concise literature overview

- Future work: *Empirical Behavioral IO*
  - Document non-standard behavior
  - Estimate structurally
  - Document firm response to non-standard feature

2 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 (AER 2011)** on overbidding in eBay auctions

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

3 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 –> 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)

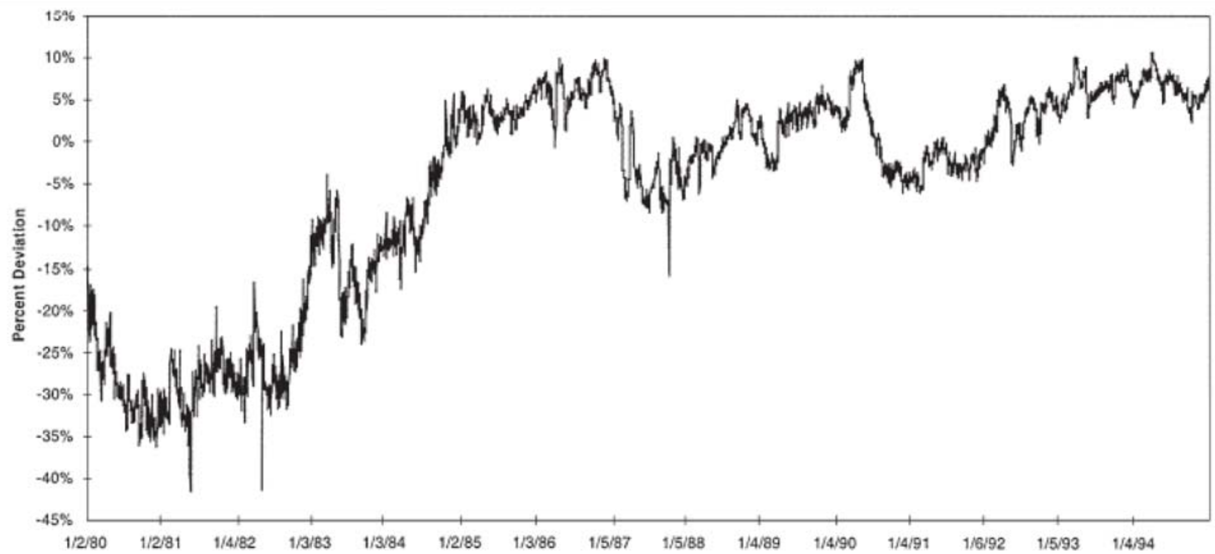


Fig. 1. Log deviations from Royal Dutch/Shell parity. Source: Froot and Dabora (1999).

- 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

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

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)

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

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

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

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

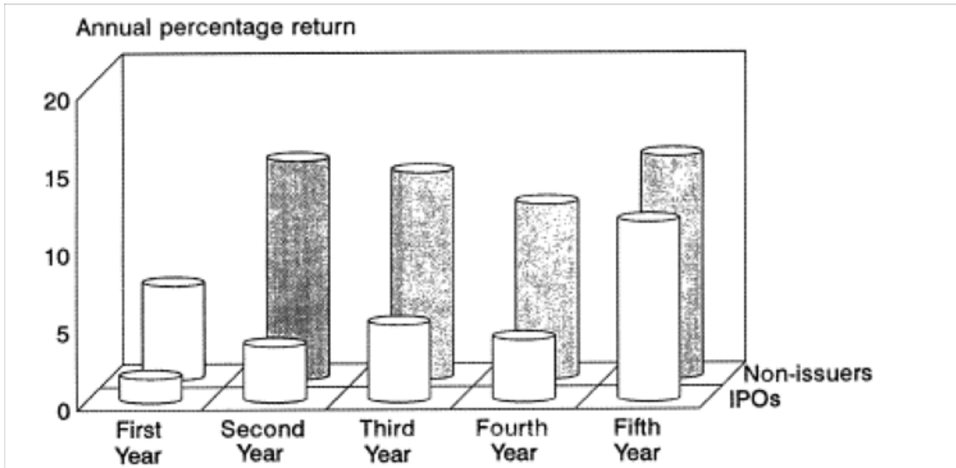
    – Persuasion

4 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

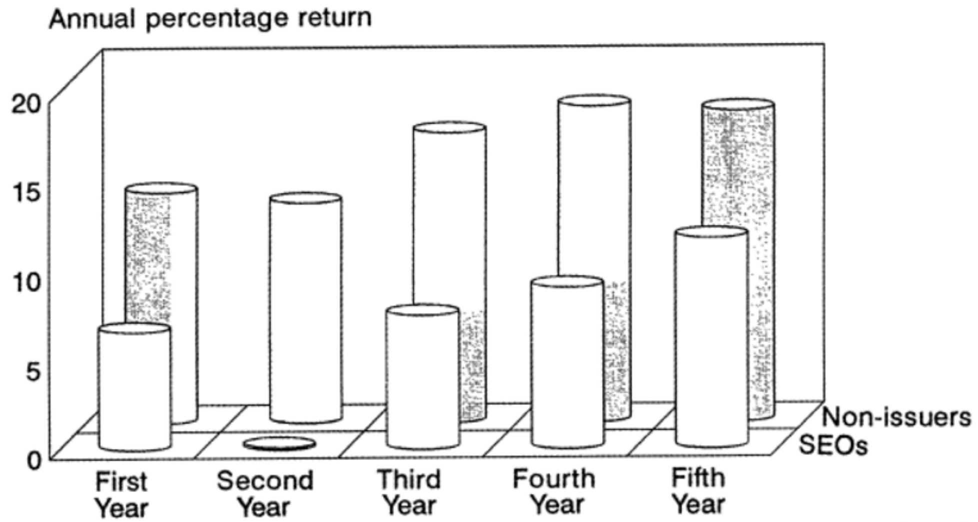


Figure 2. The average annual raw returns for 4,753 initial public offerings (IPOs), and their matching nonissuing firms (top), and the average annual raw returns for 3,702 seasoned equity offerings (SEOs), and their matching nonissuing firms (bottom), during the five years after the issue. The equity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

5 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.

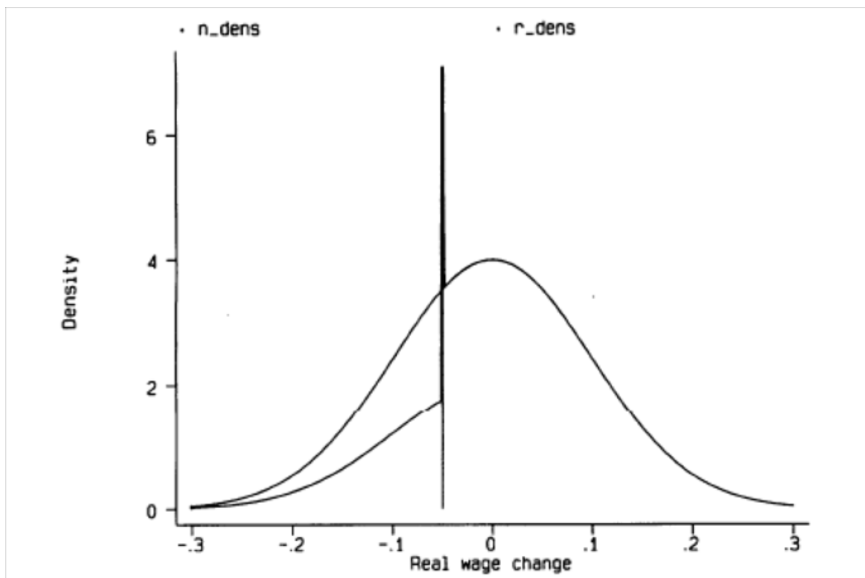
($N = 125$) Acceptable 38% Unfair 62%

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?

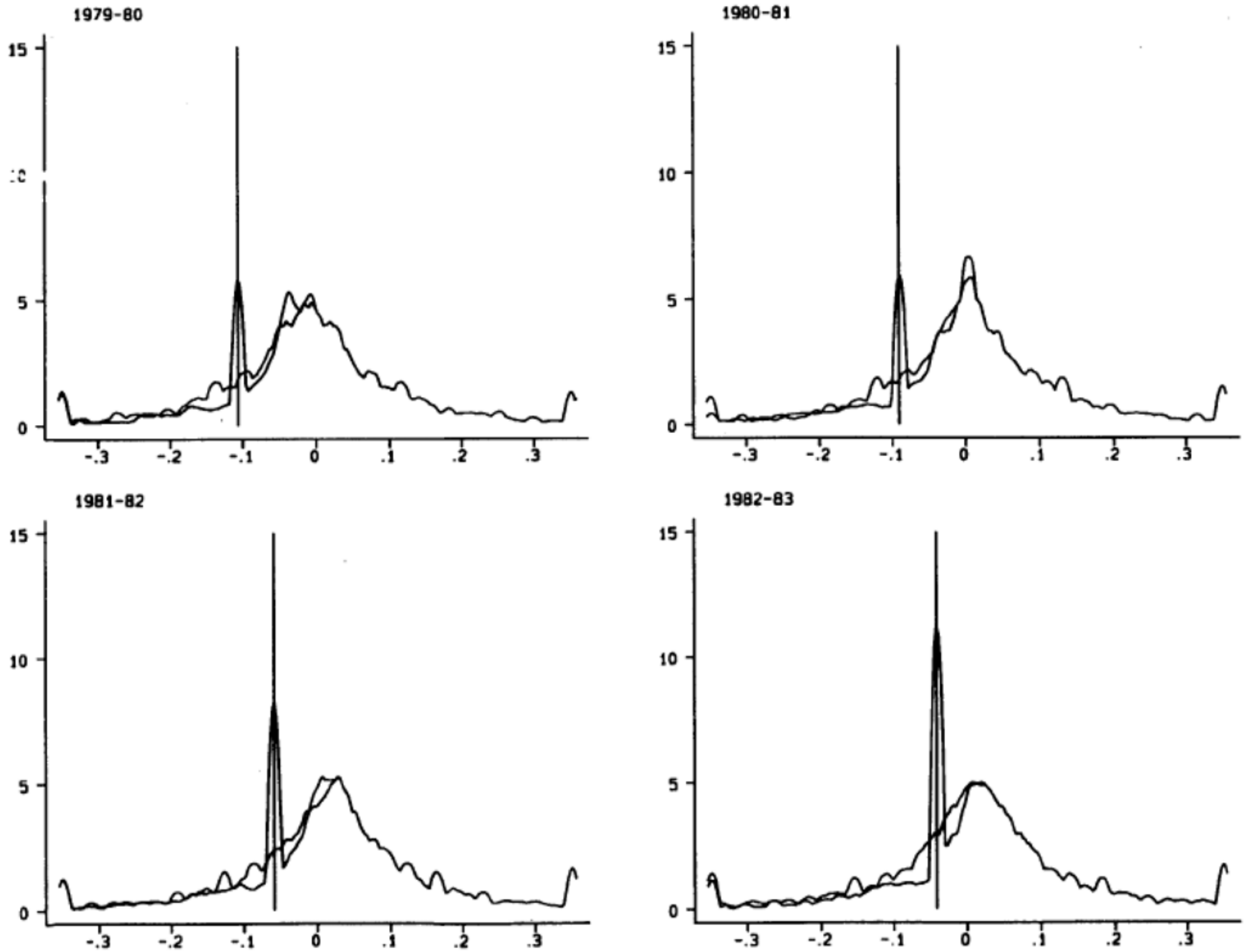


Figure 4: Smoothed (Kernel) Estimates of Actual and Counterfactual Densities of Real Wage Changes, CPS Samples from 1979-80 to 1982-83

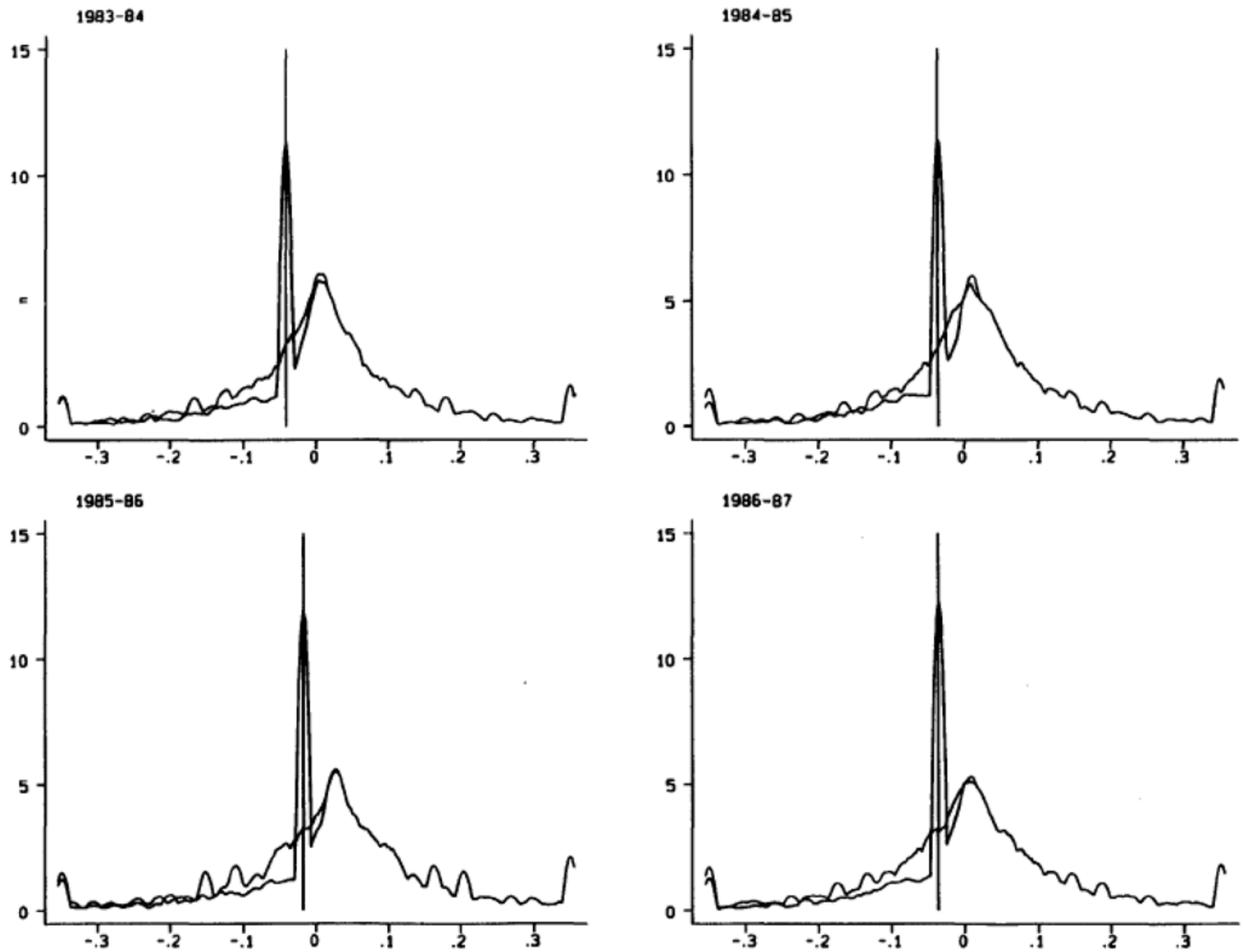


Figure 4 (Continued): Smoothed (Kernel) Estimates of Actual and Counterfactual Densities of Real Wage Changes, CPS Samples from 1983-84 to 1986-87

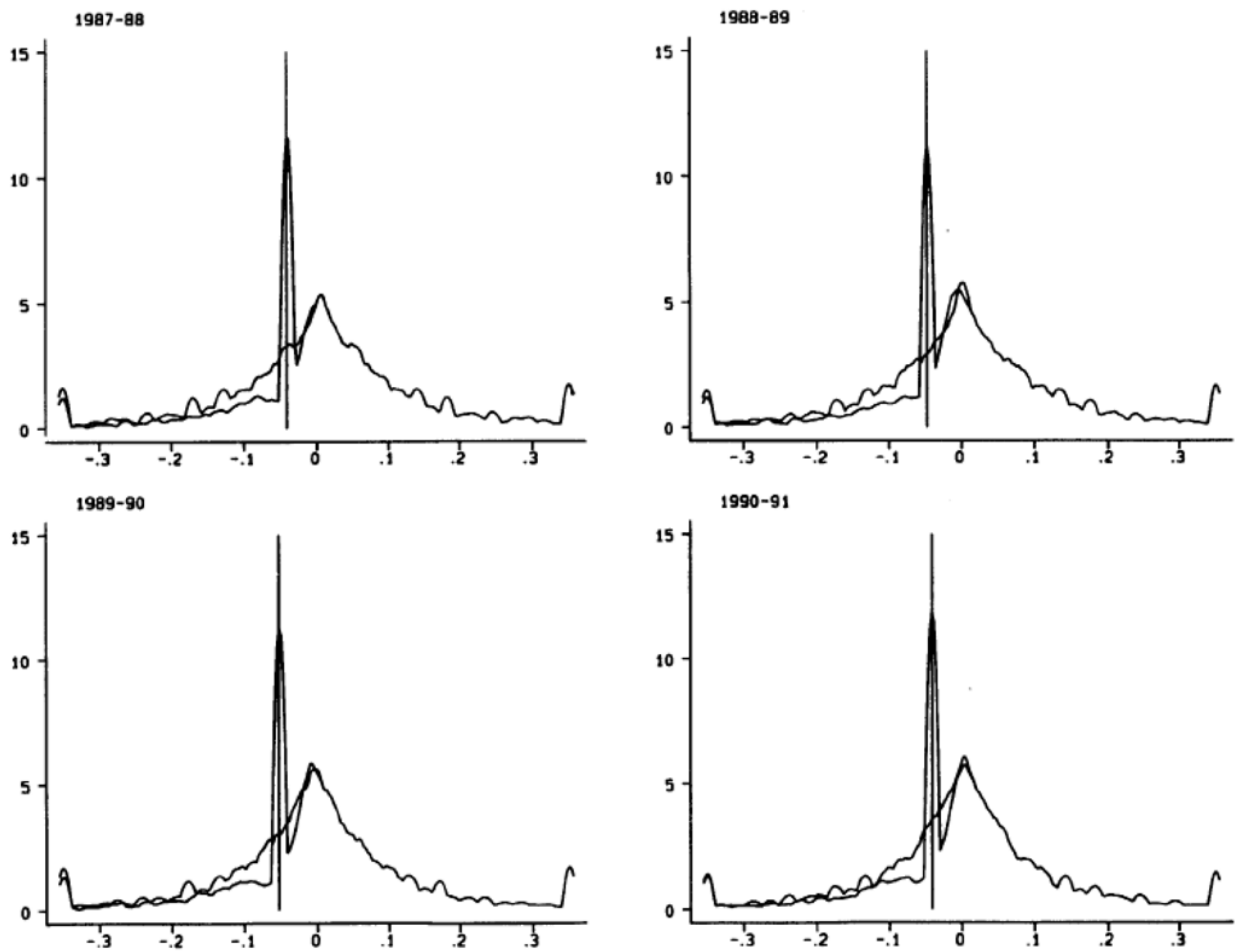
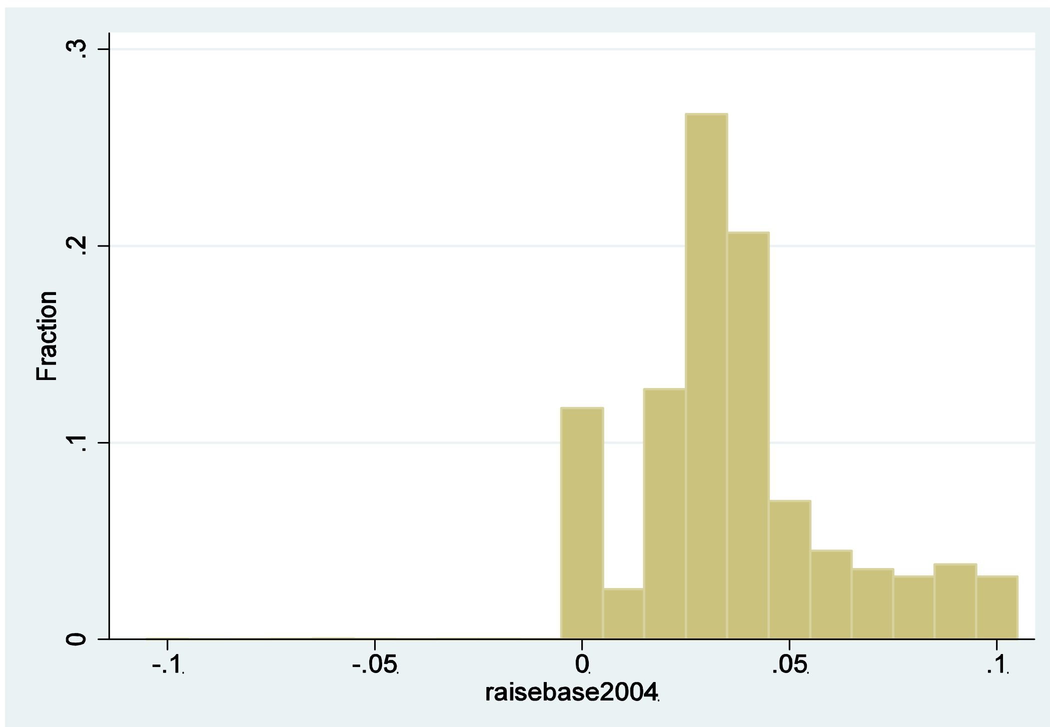
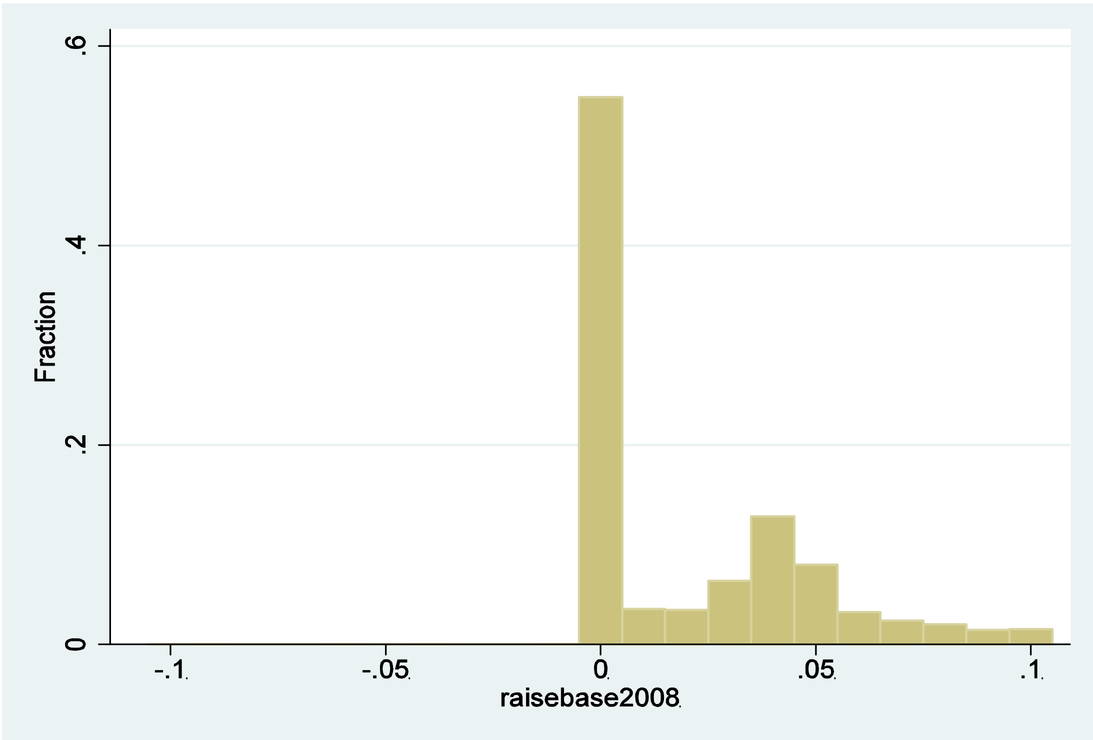


Figure 4 (Continued): Smoothed (Kernel) Estimates of Actual and Counterfactual Densities of Real Wage Changes, CPS Samples from 1987-88 to 1990-91

- **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

6 Market Reaction to Biases: Political Economy I

- 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 (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)

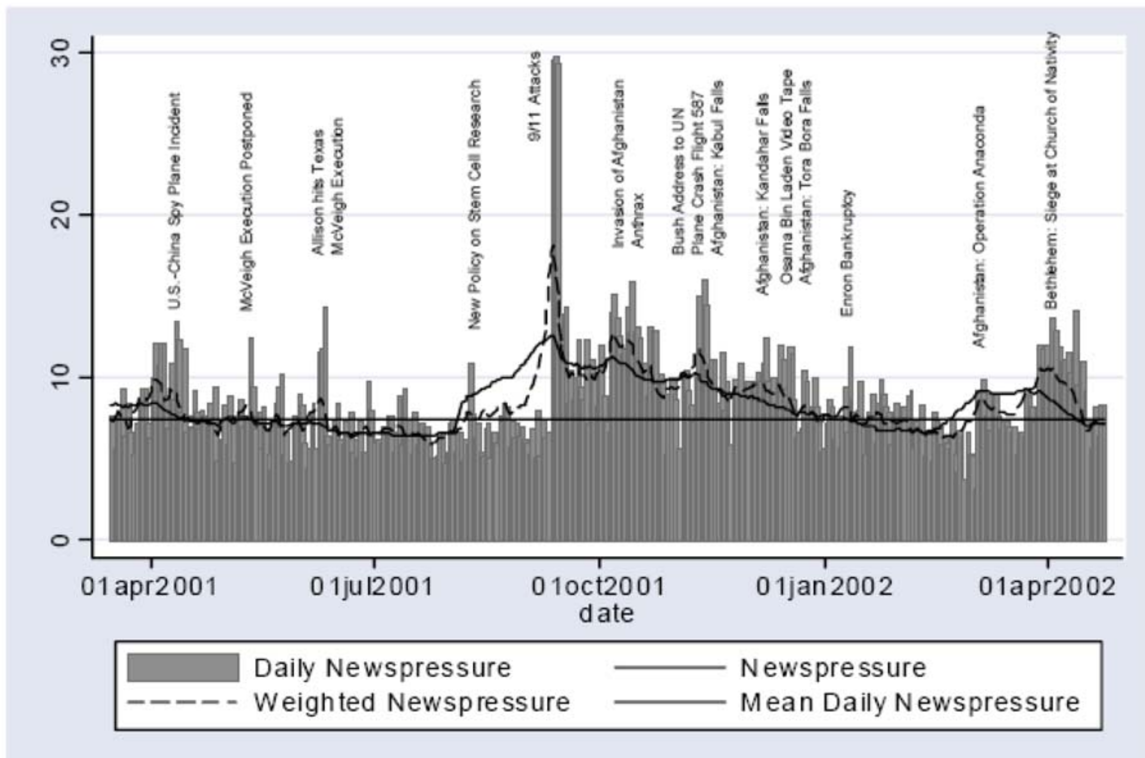


FIGURE IV
News Pressure (Minutes) during 405 Days, 15 March 2001 – 23 Apr 2002, by Day

- – 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	*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

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

- 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%.

- **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[a]				
	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 ε_i
  - Psychological benefit of participation to protest a_i
  - Benefit a_i depends on aggrievement:

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

  - 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

7 Happiness II

- **Dan Benjamin**

8 Next Lecture

- Behavioral Institutional Design
- Structural Behavioral Economics