Econ 219B
Psychology and Economics: Applications
(Lecture 11)

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Outline

1. Market Reaction to Biases: Pricing II
2. Market Reaction to Biases: Corporate decisions II
3. Market Reaction to Biases: Employers
4. Market Reaction to Biases: Betting
5. Market Reaction to Biases: Political Economy
6. Welfare Response to Biases

1 Market Reaction to Biases: Pricing

1.1 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

Three steps:

1. Given product complexity, given number of firms: What is the mark-up? Comparative statics.

2. Given product complexity: endogenous market entry. What is the mark-up? What is the number of firms?

3. Endogenous product complexity, endogenous market entry: What are mark-up, number of firms, and degree of product complexity?

We will go through 1 and talk about the intuition of 2 and 3.

Example: Checking account. Value depends on

- interest rates
- fees for dozens of financial services (overdraft, 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 $(U_i)_{i=1}^n$.

  (**Assumption!** What justifies this assumption?)

  Demand for good i

$$\begin{aligned} D_i &= P\left(U_i > \max_{j \neq i} U_j\right) \\ &= E\left[P\left[\text{for all } j \neq i, U_i > U_j | \varepsilon_i\right]\right] \\ &= E\left[\prod_{j \neq i} P\left[U_i > U_j | \varepsilon_i\right]\right] \\ &= E\left[\prod_{j \neq i} P\left[\frac{Q_i - p_i - \left(Q_j - p_j\right) + \sigma_i \varepsilon_i}{\sigma_j} > \varepsilon_j | \varepsilon_i\right]\right] \\ &= E\left[\prod_{j \neq i} F\left(\frac{Q_i - p_i - \left(Q_j - p_j\right) + \sigma_i \varepsilon_i}{\sigma_j}\right)\right] \end{aligned}$$

$$D_i = \int f(\varepsilon_i) \prod_{j \neq i} F\left(\frac{Q_i - p_i - \left(Q_j - p_j\right) + \sigma_i \varepsilon_i}{\sigma_j}\right) d\varepsilon_i$$

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. (*Problematic simplification. 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

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

Consider different demand curves

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

Demand curve faced by firm 1:

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

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 $1/2$.

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

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

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

2. Other distributions.

   - Benefit of lower markup: probability of sale increases.

   - Benefit of higher markup: rent (if sale takes place) increases

   For "thin tailed" noise, mark-up decreases in number of firms. Larger and larger numbers of firms entering drive the equilibrium price to MC.

   For "fat tailed" noise, mark-up *increases* with number of firms. ("Cherry-Picking")

Endogenous number of firms

Intuition: As complexity increases, mark-ups & industry profit margins increase, thus entry increases.

These effects strongest for fat-tailed case. (Endogenous increases in n reinforce the effects of σ on mark-ups.)

Endogenous complexity

- Assumption: $Q_i(\sigma_i)$!

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

In a nutshell: market does not help to overcome bounded rationality. Rather competition exacerbates the problem.

1.2 Self-Control 2

- Oster&Scott-Morton, Pricing of Magazine Subscriptions, 2004

- Two types of magazines:
  - *People*
  - *Astronomy*

- Individuals with self-control problems want to commit to read *Astronomy* more

- Higher demand of subscriptions for *Astronomy* than for *People*

- Magazines offers deeper discount on subscription on *People*

- Data on 300 US magazines (ABC, MRI)

- Three measures of *Astronomy* (vs. *People*):

    1. Expert (0/1). RA rating of whether sources mentioned

    2. Genre: Non-business trade, Religion, Intellectual

    3. Pride-Future Gain. RA rating of "would you be proud" and "pleasure of the moment". (English PhD not representative)

- Various control variables

- Table 3. OLS regression of relative subscription price ($S/12p$):
  - All '*Astronomy* magazine' predictors associated with higher relative subscription prices
  - Magnitudes consistent: 1 SD increase –> .02-.03 higher $S/12p$

- BUT:
  1. Model makes predictions on quantities, not prices
  2. Hard to control for important counfounding factors

Table 1: A Sample of Magazine Ratings

FutureGain=3	FutureGain>12
Penthouse	Forbes
Playboy	Fortune
The Rolling Stone	HBR
Spin	Kiplingers
Vibe	Astronomy
The Source	Worth
Entertainment Weekly	Money
Interview	New York Review of Books
Movieline	The Nation
National Enquirer	Venture Reporter
National Examiner	E-The Environmental Magazine
People	Red Herring
Premiere	American History
Soap Opera Digest	Inc
Soap Opera Weekly	
Star	
Starlog	
Ttrue Story	
US Weekly	
Advocate	
Details	
Maxim	
Jet	
ESPN	
Amazing Spiderman	
Mad	
Realms of Fantasy	
Teen People	

Table 3a: Unconditional Regression Results: Subscriptions

Dependent Variable: Percentage sold on subscription

Variable	*(1) expert*	*(2) genre*	*(3) FutureGain*
Expert	6.54** (2.77)	---	---
Trade	---	2.10 (7.5)	---
Religious	---	2.30 (9.9)	---
Intellectual	---	10.0** (4.57)	---
FutureGain	---	---	2.62** (.489)
Constant	79.4** (1.49)	80.4** (1.36)	63.2** (3.60)
Adj R^2/Obs	.02/ 238	.01/238	.10/238

** denotes significance at the 5% level or better.
Standard errors in parentheses.

Table 3b: Unconditional Regression Results: Price Ratio

Dependent Variable: One year subscription price/(newsstand price*number of annual issues)

Variable	*(1) expert*	*(2) genre*	*(3) FutureGain*
Expert	.080** (.024)	---	---
Trade	---	.145** (.052)	---
Religious	---	.194** (.058)	---
Intellectual	---	.043 (.038)	---
FutureGain	---	---	.011** (.0048)
Constant	.528** (.014)	.534** (.012)	.474** (.035)
Adj R^2/Obs	.03/ 298	.052/298	.02/298

** denotes significance at the 5% level or better.
Standard errors in parentheses.

Table 4: Empirical Specification of Subscription Ratio

Dependent Variable: One year subscription price/(newsstand price*number of annual issues)

Variable	*(1) Expert*	*(2) Genre*	*(3) FutureGain*
Circulation	4.22E-08** (9.25E-09)	3.76E-08** (9.14E-09)	4.19E-08** (9.26E-09)
Ln(Circ)	-0.53** (.011)	-.043** (.011)	-.052** (.011)
Available	-.012** (.004)	-.012** (.004)	-.013** (.004)
Number of issues	-.0055** (.0010)	-.0060** (.0010)	-.0056** (.0010)
No. issues interaction	.0021 (.0011)	.0023** (.0011)	.0020 (.0011)
Intro offer	-.140** (.037)	-.160** (.037)	-.144** (.037)
Ad rate	-.276** (.109)	-.247** (.107)	-.275** (.109)
Expert	.054** (.022)	……..	…..
Trade	……	.136** (.047)	…..
Religious	…….	.130** (.051)	….
Intellectual	……	.072** (.035)	…
FutureGain	……..	…….	.0096** (.0043)
Constant	1.44** (.139)	1.33** (.140)	1.38** (.147)
No. Obs/Adj R^2	298/.273	298/.295	298/.270

** significant at the .05 level or better
Standard errors in parentheses

2 Market Reaction to Biases: Corporate Decisions

- Baker, Ruback, and Wurgler. "Behavioral Corporate Finance: A Survey", 2004.

- Behavioral corporate finance:
  - biased investors (overvaue or undervalue company)
  - smart managers

- Firm has to decide how to finance investment project:
  1. internal funds (cash flow/retained earnings)
  2. bonds

3. stocks

- 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.
  - Consistent with insider trading.

Evidence on performance of market as a whole

- Baker-Wurgler (2000a): Can we forecast the performance of the market as a whole based on the equity-fraction of aggregate external finance?

$$\begin{aligned} r_{mt} &= \alpha_0 + \alpha_1 \ln\left(\frac{M}{B}\right)_{m,t-1} + \alpha_2 \ln\left(\frac{D}{P}\right)_{m,t-1} \\ &\quad + \alpha_3 S_{t-1} + ... + e_{it} \end{aligned}$$

with M_{it} = nat. log. of market value of equity
$\ln(M/B)_{mt}$ = nat. log of Market-to-Book ratio of aggregate market
$\ln(D/P)_{mt}$ = nat. log of Dividend-Price ratio of aggregate market
S_{t-1} = equity share inpw new issues.

- Only time-series identification

- Cross-section was shown before

Figure 2. Mean equity returns by prior-year equity share in new issues, 1928-1997. Mean annual real returns on the CRSP value-weighted (hatched) and equal-weighted (solid) indexes by quartile of the prior-year share of equity issues in total equity and debt issues. Real returns are created using the consumer price index from *SBBI*.

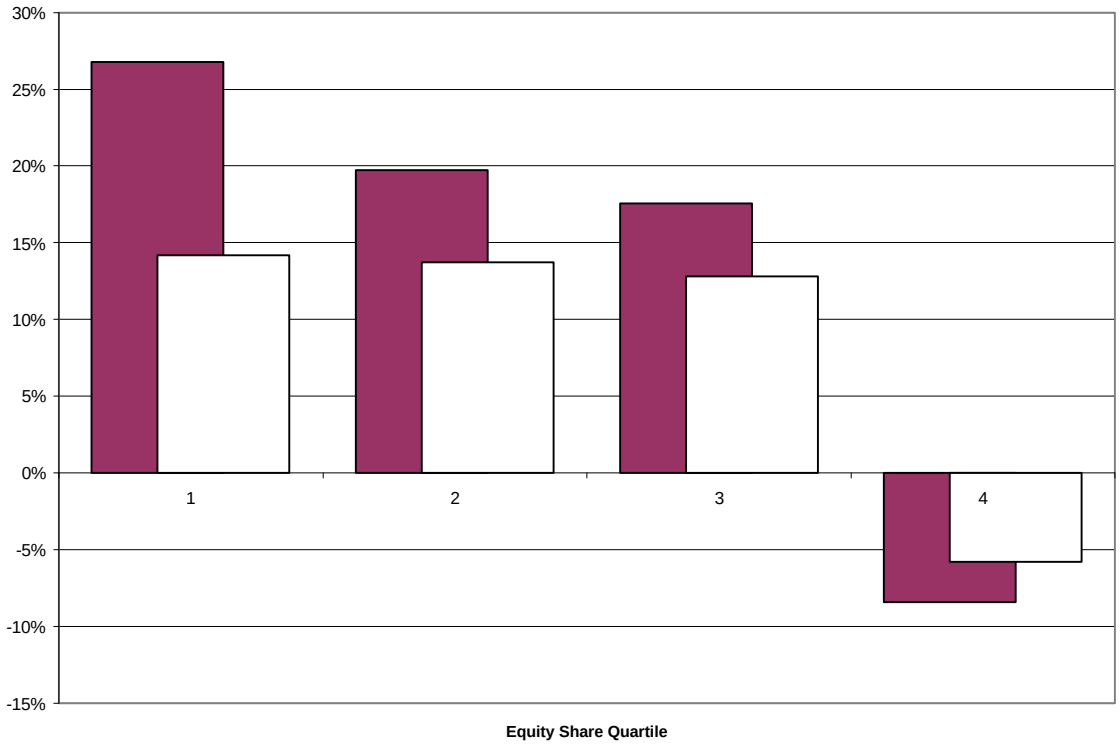

Table 5. Multivariate OLS regressions for predicting one-year-ahead market returns. OLS regressions of real equity market returns on the dividend-price ratio (*D/P*), the book-to-market ratio (*B/M*), and the equity share in new issues ($S = e/(e+d)$). We also include the lag of the return on the market (R_E), the yield on treasury bills (*BILL*), and the premium of long-term government bonds over treasuries (*TERM*).

$$R_{Et} = a + b_1 R_{Et-1} + b_2 BILL_{t-1} + b_3 TERM_{t-1} + b_4 D/P_{t-1} + b_5 B/M_{t-1} + b_6 S_{t-1} + u_t$$

Equity market returns are real returns on the CRSP value-weighted (VW) and equal-weighted (EW) portfolios. All return variables are expressed in percentage terms. The dividend price ratio, the book-to-market ratio, and the equity share are standardized to have zero mean and unit variance. t-statistics are in brackets using heteroskedasticity robust standard errors.

	1928-1997 Returns		*1928-1962 Returns*		*1963-1997 Returns*	
	VW CRSP	**EW CRSP**	**VW CRSP**	**EW CRSP**	**VW CRSP**	**EW CRSP**
Intercept	6.95	21.72	14.33	21.71	11.50	19.23
	[1.13]	[1.68]	[0.53]	[0.76]	[0.78]	[1.16]
R_E	0.05	0.08	0.27	0.20	-0.20	-0.09
	[0.39]	[0.82]	[1.12]	[1.09]	[-1.01]	[-0.68]
BILL	0.71	-0.85	4.96	9.60	0.66	4.20
	[0.89]	[-0.47]	[0.75]	[1.28]	[0.40]	[1.46]
TERM	-0.86	-3.66	-7.98	-10.86	0.15	6.09
	[-0.41]	[-0.96]	[-0.70]	[-0.84]	[0.08]	[1.45]
D/P	4.26	-1.58	-4.37	-9.17	14.51	63.21
	[1.13]	[-0.27]	[-0.51]	[-1.55]	[1.43]	[2.41]
B/M	1.51	13.50	19.59	34.10	-7.30	-14.30
	[0.38]	[2.38]	[1.99]	[6.34]	[-1.29]	[-1.47]
S	-7.88	-13.17	-8.84	-14.34	-8.27	-13.63
	[-3.97]	[-3.77]	[-1.94]	[-2.21]	[-2.13]	[-2.48]
$\overline{R}^2$	0.12	0.28	0.27	0.51	0.12	0.29
N	70	70	35	35	35	35

Table 8. New issues leverage and equity market returns. OLS regressions of real equity market returns on leverage and the equity share in new issues. The sample includes returns from 1928 through 1996. Equity market returns are real returns on the CRSP value-weighted (VW) and equal-weighted (EW) portfolios. Returns are expressed in percentage terms. Market leverage is equal to book leverage capitalized at the prior-year book-to-market ratio of the Dow Jones Industrial Average. The book leverage data are from *Statistics of Income: Corporation Income Tax Returns*, Internal Revenue Service, and apply to the prior (fiscal) year. All independent variables are standardized to have zero mean and unit variance. t-statistics are shown in brackets using heteroskedasticity robust standard errors.

	VW CRSP			*EW CRSP*		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Intercept	8.56	8.56	8.63	13.98	13.98	14.08
	[3.46]	[3.55]	[3.77]	[3.64]	[3.99]	[4.31]
Book leverage	-0.66			-1.28		
	[-0.27]			[-0.36]		
Market leverage		4.67	3.46		13.06	11.07
		[1.81]	[1.71]		[2.57]	[2.72]
S			-6.79			-11.19
			[-3.73]			[-3.65]
$\bar{R}^2$	-0.01	0.04	0.14	-0.01	0.16	0.27
N	69	69	69	69	69	69

Evidence on long-run performance of equity issuers

- Loughran-Ritter (1995): IPO's and SEO's underperform by about 30% (1-1/1.44) over 5 years post-issue.

$$r_{it} = \alpha_0 + \alpha_1 \ln M_{it} + \alpha_2 \ln(B/M)_{it} + \alpha_3 ISSUE_{it} + e_{it}$$

with M_{it} = nat. log. of market value of equity
$\ln(B/M)_{it}$ = nat. log of book-to-market ratio
$ISSUE_{it}$ = dummy variable, equal to 1 if a firm conducted one or more public equity issues within the previous five years. (Problem? Industry Effect?)

- Matching mechanism: same market capitalization, but no issue (within last five years).

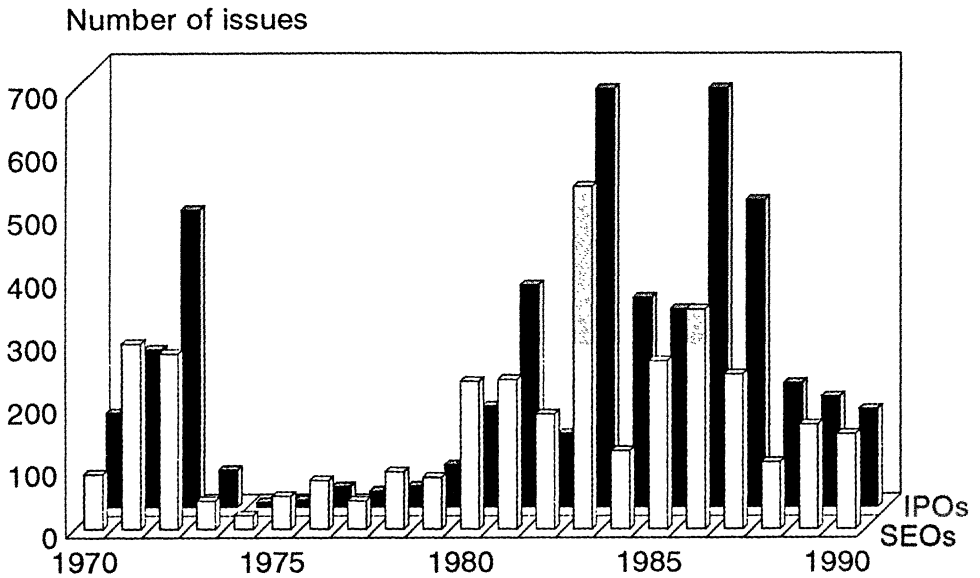

Figure 1. The annual volume of initial public offerings (IPOs) and seasoned equity offerings (SEOs), 1970–1990. The SEO volume excludes issues by utilities. The numbers graphed above are reported in Tables I (IPOs) and II (SEOs).

variability of returns. Balancing these two features, we have chosen two intervals: a three-year (756 trading days) window, to facilitate comparisons with other studies, and a five-year (1,260 trading days) window, which captures almost the entire period of underperformance. We choose a five-year interval based upon the evidence in Loughran (1993), who reports that IPOs underperform for approximately five years.[2]

To avoid problems caused by frequent transactions, we calculate the buy-and-hold return from the first CRSP-listed postissue closing price to the appropriate anniversary date of the offering. We do not include the issue-day return for several reasons. First, for offers from the early 1970s, there is frequently a multimonth or even multiyear period before the firm is listed on the CRSP tapes, primarily because the CRSP Nasdaq tape does not report returns before December 14, 1972. Second, for unit offerings, which typically involve shares and warrants, we only have the unit offering price and the market price of the stock (CRSP does not report unit prices; all of our returns are for common stock only). Third, and most importantly, it is frequently difficult for an investor to purchase shares at the offering price, whereas the

[2] Loughran (1993, Figure 2) reports underperformance for the five calendar years following the year of the IPO for 3,656 Nasdaq-listed IPOs from 1967 to 1988. Seyhun (1992) also reports underperformance for about six years after going public for a sample of 2,298 U.S. IPOs from 1975 to 1987. Levis (1993a) reports that British IPOs underperform beyond a three-year period as well.

Table I

The Long-Run Performance of IPOs by Cohort Year, 1970 to 1990

The sample consists of 4,753 IPOs by firms subsequently listed on Nasdaq, the American Stock Exchange (Amex), or the New York Stock Exchange (NYSE). Buy-and-hold returns for the companies going public in cohort year τ are computed using the first CRSP-listed closing price as the purchase price. Wealth relatives are computed as $[(\Sigma(1 + R_{iT}))/(\Sigma(1 + R_{mT}))]$, where R_{iT} is the holding-period return from the first CRSP-listed closing price until the earlier of the delisting date or the three-year (or five-year) anniversary of the IPO, R_{mT} is the holding-period return on a matching firm over the same holding period, and the summations are over the N observations in a cohort year. For example, 1970's five-year wealth relative of 0.67 is computed as 0.537/0.800, with 0.537 being the terminal wealth per dollar invested after having lost 46.3 percent on the IPO portfolio. The average holding period for firms held up to five years is 47 months.

		3 Years			5 Years		
		Mean Buy-and-Hold Returns (%)			Mean Buy-and-Hold Returns (%)		
Cohort Year	Number of IPOs	IPOs	Matching Firms[b]	Wealth Relative	IPOs	Matching Firms[b]	Wealth Relative
1970[a]	151	−20.9	−12.9	0.91	−46.3	−20.0	0.67
1971[a]	252	−55.6	−27.3	0.65	−31.6	6.1	0.64
1972[a]	473	−47.2	−10.8	0.59	−18.2	33.4	0.61
1973	60	−33.6	29.5	0.51	0.8	104.4	0.49
1974	8	73.2	87.5	0.92	234.4	173.0	1.22
1975	12	59.3	106.5	0.77	117.9	127.3	0.96
1976	33	135.3	81.3	1.30	259.4	205.0	1.18
1977	26	151.3	126.2	1.11	173.8	234.0	0.82
1978	34	131.0	87.5	1.23	217.9	227.0	0.97
1979	68	63.0	80.6	0.90	52.6	193.1	0.52
1980	162	80.1	123.4	0.81	−2.1	188.0	0.34
1981	354	6.3	90.5	0.56	14.9	194.7	0.39
1982	118	21.4	83.9	0.66	76.7	137.6	0.74
1983	665	21.4	55.4	0.78	3.8	67.2	0.62
1984	334	48.1	60.0	0.93	44.0	82.2	0.79
1985	316	5.7	28.9	0.82	9.5	58.6	0.69
1986	666	5.3	29.9	0.81	9.3	33.4	0.82
1987	489	−10.4	0.3	0.89	6.2	14.0	0.93
1988[c]	198	17.5	26.1	0.93	80.8	60.3	1.13
1989[c]	177	44.3	20.6	1.20	44.4	25.3	1.15
1990[c]	157	22.7	42.7	0.86	22.7	42.7	0.86
1970–90	4,753	8.4	35.3	0.80	15.7	66.4	0.70

[a]Prior to December 14, 1972, only returns from firms listed on the Amex and NYSE are included. After December 14, 1972, returns on Nasdaq-listed firms are included.

[b]At the time of going public, each IPO is matched with the seasoned firm (CRSP-listed for at least five years, without having issued equity during the prior five years) having the closest, but higher, market capitalization on the prior December 31. If this matching firm is delisted or issues equity prior to the end of the IPO aftermarket return interval, the next highest seasoned market cap firm that has not issued equity is spliced in on the delisting date. The same procedure is used if this firm is subsequently removed. For 1970 to 1977, all matching firms are Amex-NYSE listed. After 1977, the universe of firms from which matching firms are picked includes all operating companies listed on the Amex-NYSE and Nasdaq tapes which have not conducted an equity issue during the prior five years.

[c]The return window for these cohorts is truncated at December 31, 1992.

Table II

The Long-Run Performance of SEOs by Cohort Year, 1970 to 1990

The sample consists of 3,702 seasoned equity offers (SEOs) involving at least some newly issued shares (primary or combined primary and secondary shares) by firms listed on Nasdaq, the American Stock Exchange (Amex), or New York Stock Exchange (NYSE). Offerings by utilities (SIC codes 491–494) are excluded. The prior return is the raw buy-and-hold return for the 252 trading days ending on the issue date. If less than 252 trading days are available, the shorter holding period is used. For firms that went public less than one year before the SEO, the prior return is measured from the first CRSP-listed closing price. Wealth relatives are computed as $[(\Sigma(1 + R_{iT}))/(\Sigma(1 + R_{mT}))]$, where R_{iT} is the holding-period return from the closing price on the issue date until the earlier of the delisting date or the three-year (or five-year) anniversary of the SEO, R_{mT} is the holding-period return on a matching firm over the same holding period, and the summations are over the N observations in a cohort year. The average holding period for firms held up to five years is 52 months.

			3 Years			5 Years		
			Mean Buy-and-Hold Returns (%)			Mean Buy-and-Hold Returns (%)		
Cohort Year	Number of SEOs	Prior Return (%)	SEOs	Matching Firms[b]	Wealth Relative	SEOs	Matching Firms[b]	Wealth Relative
1970[a]	88	−6.2	−11.1	−4.2	0.93	−29.2	−4.7	0.74
1971[a]	296	59.2	−50.7	−29.9	0.70	−35.0	16.3	0.56
1972[a]	280	43.1	−49.3	−19.5	0.63	−22.0	25.9	0.62
1973	45	−1.4	−34.6	3.2	0.63	−15.7	37.9	0.61
1974	22	−1.0	50.1	74.0	0.86	91.0	155.0	0.75
1975	53	70.3	50.9	81.1	0.83	107.6	162.4	0.79
1976	78	80.8	35.8	45.6	0.93	135.5	136.4	1.00
1977	45	40.3	147.8	103.2	1.22	181.2	178.3	1.01
1978	92	65.2	83.5	101.5	0.91	126.1	266.5	0.62
1979	83	59.0	54.9	70.8	0.91	90.0	193.5	0.65
1980	236	99.0	69.4	140.7	0.70	43.7	214.2	0.46
1981	239	92.0	9.6	77.8	0.62	36.9	178.2	0.49
1982	184	53.3	51.3	113.2	0.71	90.6	207.9	0.62
1983	545	138.8	17.4	70.5	0.69	20.3	95.9	0.61
1984	125	16.6	49.3	80.2	0.83	73.4	105.4	0.84
1985	268	57.7	11.9	60.3	0.70	24.2	84.0	0.68
1986	350	68.7	11.3	30.8	0.85	23.2	32.4	0.93
1987	247	51.7	1.4	13.7	0.89	37.5	40.2	0.98
1988[c]	107	18.2	16.5	23.1	0.95	65.2	63.4	1.01
1989[c]	167	65.8	17.6	16.3	1.00	31.0	31.1	1.00
1990[c]	152	45.1	37.2	42.5	0.96	37.2	42.5	0.96
1970–90	3,702	72.3	15.0	48.0	0.78	33.4	92.8	0.69

[a]Prior to December 14, 1972, only returns from firms listed on the Amex and NYSE are included. After December 14, 1972, returns on Nasdaq-listed firms are included. Because CRSP Nasdaq returns are unavailable prior to December 14, 1972, the prior returns are available for only 283 of the 664 SEOs during 1970 to 1972.

[b]At the time of the new issue, each firm conducting an SEO is matched with the seasoned firm (CRSP-listed for at least five years, without having issued equity during the prior five years) having the closest, but higher, market capitalization on the prior December 31. If this matching firm conducts an SEO or is delisted prior to the end of the three- or five-year postissue holding period, the next highest seasoned market cap firm that has not issued equity is spliced in on the removal date. The same procedure is used if this firm is subsequently removed. For 1970 to 1977, all matching firms are Amex–NYSE listed. After 1977, the universe of firms from which matching firms are picked includes all operating companies listed on the Amex-NYSE and Nasdaq tapes which have not conducted an equity issue during the prior five years.

[c]The return window for these cohorts is truncated at December 31, 1992.

Table III

Average Annual Percentage Returns during the Five Years after Issuing for Firms Conducting Initial Public Offerings (IPOs) and Seasoned Equity Offerings (SEOs) during 1970 to 1990, and Their Matching Firms

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 portfolios are rebalanced to equal weights and the average buy-and-hold return during the next year for all of the surviving issuers and their matching firms is calculated. The first two columns report returns per six months (or shorter, if less than six months of returns are available). 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). For each of the five years, the average holding period is about seven or eight days shorter than 252 trading days because about six percent of the firms are subject to either a late listing (especially for years 1 and 2) or a midyear delisting (especially for years 4 and 5). Returns are calculated until December 31, 1992. The *t*-statistics for the difference in returns are calculated using the difference in returns for each issuer and its matching firm, and assume independence of the observations.

	First 6 Months	Second 6 Months	First Year	Second Year	Third Year	Fourth Year	Fifth Year	Geometric Mean, Years 1–5
Panel A. Firms Going Public								
(1) IPO firms (%)	3.1	−1.1	1.6	3.6	5.0	4.0	11.6	5.1
(2) Matching firms (%)	3.0	3.4	6.1	14.1	13.3	11.3	14.3	11.8
(3) *t*-Statistic for difference	0.13	−5.50	−3.51	−8.01	−6.45	−5.61	−1.67	−11.37
(4) Sample size	4,082	4,351	4,363	4,526	4,277	3,717	3,215	4,753
Panel B. Firms Conducting SEOs								
(5) SEO firms (%)	5.6	0.5	6.6	0.1	7.5	9.1	11.8	7.0
(6) Matching firms (%)	5.7	6.8	12.9	12.3	16.2	17.7	17.4	15.3
(7) *t*-Statistic for difference	−0.22	−9.00	−5.59	−12.24	−8.08	−7.35	−4.50	−16.80
(8) Sample size	3,469	3,550	3,561	3,614	3,496	3,154	2,805	3,702

underperformance effect of 8 percent per year. It is also worth noting that the average annual returns on issuing firms are no higher than T-bill returns, which have averaged 7 percent per year during our sample period.

In rows 3 and 7 of Table III, we report *t*-statistics for the null hypothesis that the difference in annual returns between the issuing firms and their matching firms is zero. Except for IPOs in their fifth year of seasoning, the null hypothesis can be rejected at high levels of statistical significance, with *t*-statistics in the second year of seasoning as large as −8.01 for IPOs and −12.24 for SEOs. The *t*-statistics are calculated using the standard deviation of the mean of $r_{it} - r_{mt}$, where r_{it} is the return on issuing firm i during year t of seasoning, and r_{mt} is the return on its matching firm during the identical time period. Because the *t*-statistics are calculated assuming independence of

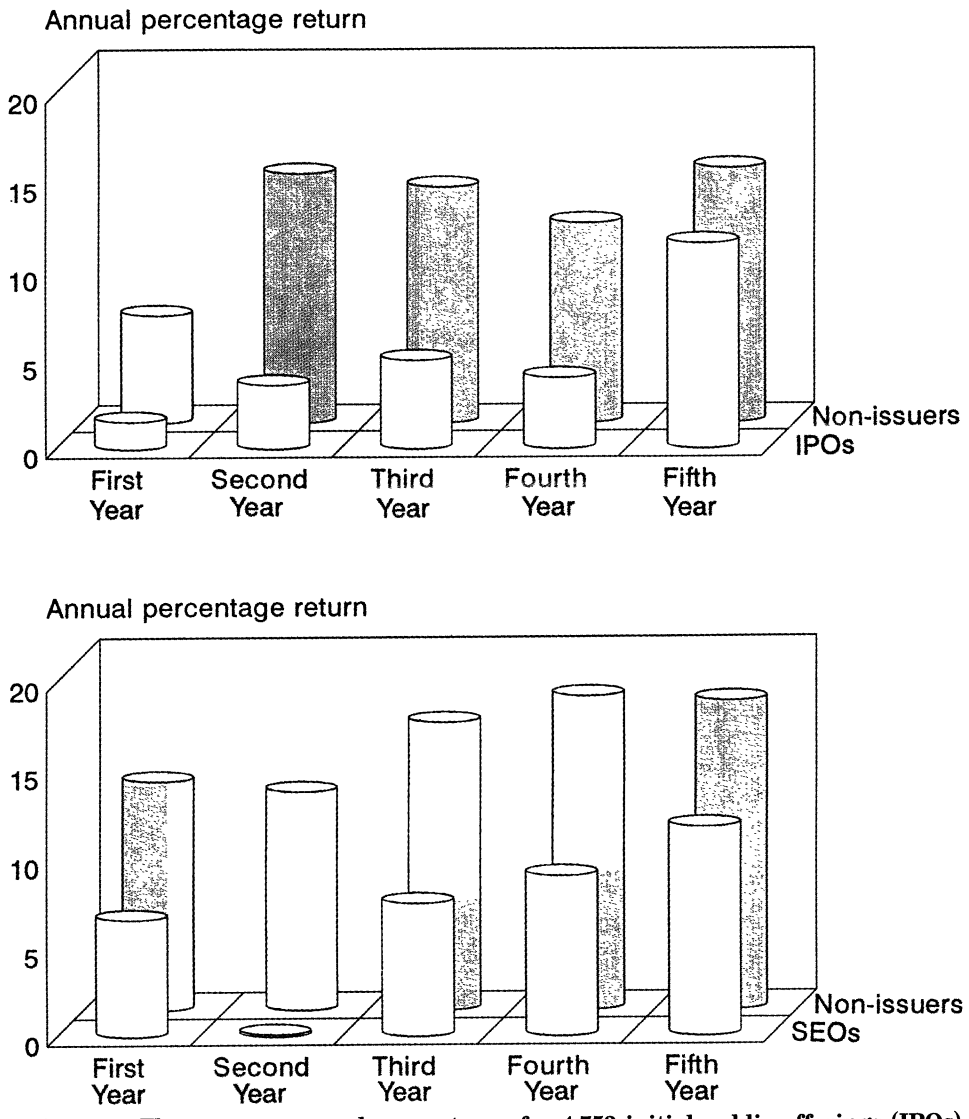

Figure 2. The average annual raw returns for 4,753 initial public offerings (IPOs), and their matching nonissuing firms (top), and the average annual raw returns for 3,702 seasoned equity offerings (SEOs), and their matching nonissuing firms (bottom), during the five years after the issue. The equity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

Table VIII

Average Parameter Values from Monthly Cross-sectional Regressions of Percentage Stock Returns on Size, Book-to-Market, and a New Issues Dummy Variable, 1973 to 1992

The universe is New York Stock Exchange (NYSE), American Stock Exchange (Amex), and Nasdaq firms for which the book value of equity is available from COMPUSTAT or our new issues data. *t*-Statistics, computed from the time-series standard deviation of the parameter values, and the percentage of the coefficient estimates that are positive, are listed in brackets. r_{it} is the percentage return on stock i in calendar month t. MV_{it} is the market value of equity (in millions) on the most recent June 30. BV/MV_{it} is the ratio of the book value of equity to the market value of equity, where the book value is the book value of equity for the most recent fiscal year ending on or before the January 31 preceding June 30. For recent IPOs where the offering was after the end of the fiscal year, the postoffering book value is used. For companies conducting SEOs after the end of their fiscal year, we add the proceeds to the prior book value. Companies with book values below \$100,000, including negative book values, are assigned book values of \$100,000. $ISSUE_{it}$ is a [0, 1] dummy variable taking on the value of 1 if a company conducted at least one public equity offering within the 60 months preceding a given June 30. The sample includes issues through June 30, 1992. Utility stocks (SIC = 491–494) are excluded from the universe of firms. Logs are natural logarithms. Firms are excluded from the following 12 months if they have a market value on June 30 of less than \$1,000,000 during 1973 to 1979, \$2,000,000 during 1980 to 1989, and \$3,000,000 during 1990 to 1992. Periods following light and heavy volume are based upon the fraction of our sample stocks that have the *ISSUE* dummy variable equal to 1. The periods following heavy volume during our 20-year sample period are January 1973 to June 1974 and July 1983 to December 1991.

$$r_{it} = a_o + a_1 \ln MV_{it} + a_2 \ln BV/MV_{it} + a_3 ISSUE_{it} + e_{it}$$

Model	Average Parameter Values				Avg. R^2	No. of Months
	Intercept	ln *MV*	ln *BV/MV*	*ISSUE*		
All months (1)	1.70 [3.46, 59%]	−0.05 [−0.91, 50%]	0.30 [4.57, 65%]	−0.38 [−3.68, 40%]	0.019	240
January only (2)	12.94 [5.88, 95%]	−1.46 [−6.12, 5%]	0.55 [1.47, 60%]	0.00 [0.01, 45%]	0.039	20
Feb.–Dec. only (3)	0.68 [1.55, 55%]	0.08 [1.45, 55%]	0.27 [4.40, 66%]	−0.42 [−4.03, 39%]	0.017	220
All months (4)	1.42 [3.67, 63%]			−0.49 [−3.98, 37%]	0.004	240
All months (5)	1.58 [3.10, 59%]	−0.05 [−0.84, 51%]	0.33 [4.82, 66%]		0.016	240
Periods following light volume (6)	3.45 [4.63, 71%]	−0.26 [−3.12, 42%]	0.20 [1.80, 59%]	−0.17 [−1.19, 44%]	0.021	120
Periods following heavy volume (7)	−0.05 [−0.08, 47%]	0.16 [2.11, 59%]	0.39 [6.30, 72%]	−0.60 [−3.98, 35%]	0.016	120

Table IX

Time-series Regressions of Equally Weighted and Value-Weighted Monthly Percentage Returns on Fama and French's Market, Size, and Book-to-Market Return Realizations, for Portfolios of Large and Small Firms, Categorized by Whether the Firm Issued Equity during the Prior Five Years, January 1973 to December 1992

The universe is CRSP-listed New York Stock Exchange (NYSE), American Stock Exchange (Amex), and Nasdaq firms for which the book value of equity is available from COMPUSTAT or our new issues data. Large firms are those whose market cap on June 30 of year t is greater than the market cap of the median NYSE and Amex operating company in our sample; while small firms are those whose market cap is below this median. R_{mt} is the return on the value-weighted index of NYSE, Amex, and Nasdaq stocks in month t; R_{ft} is the beginning-of-month three-month T-bill yield in month t; SMB_t is the return on small firms minus the return on large firms in month t; and HML_t is the return on high book-to-market stocks minus the return on low book-to-market stocks in month t. The factor definitions are described in Fama *et al.* (1993). The dependent variable in regressions (3), (6), (9), and (12) is the difference in returns between the issuing and nonissuing portfolios. t-Statistics are in parentheses. Each regression uses 240 monthly observations.

$$R_{pt}\text{-}R_{ft} = a + b[R_{mt} - R_{ft}] + sSMB_t + hHML_t + e_t$$

	Coefficient Estimates				
	a	b	s	h	R^2_{adj}
Panel A. Value-Weighted Portfolio Returns					
(1) Large nonissuers	0.03	1.02	−0.05	0.00	0.99
	(1.0)	(159.9)	(−5.0)	(0.1)	
(2) Large issuers	−0.21	1.03	0.19	−0.19	0.92
	(−1.9)	(40.0)	(5.0)	(−4.2)	
(3) Return difference (2) − (1)	−0.24	0.01	0.24	−0.19	0.19
	(−2.0)	(0.2)	(5.7)	(−3.9)	
(4) Small nonissuers	−0.08	0.97	1.19	0.31	0.98
	(−1.3)	(63.9)	(51.9)	(11.8)	
(5) Small issuers	−0.34	1.12	1.36	−0.01	0.95
	(−3.0)	(41.0)	(33.1)	(−0.3)	
(6) Return difference (5) − (4)	−0.26	0.15	0.17	−0.32	0.51
	(−2.6)	(6.4)	(4.9)	(−8.0)	
Panel B. Equally Weighted Portfolio Returns					
(7) Large nonissuers	0.08	1.07	0.52	0.18	0.99
	(1.8)	(101.5)	(32.5)	(10.1)	
(8) Large issuers	−0.27	1.16	0.80	−0.21	0.96
	(−2.8)	(50.8)	(23.0)	(−5.3)	
(9) Return difference (8) − (7)	−0.36	0.10	0.28	−0.39	0.62
	(−4.2)	(4.9)	(9.3)	(−11.3)	
(10) Small nonissuers	0.02	0.91	1.34	0.36	0.94
	(0.2)	(35.1)	(34.2)	(8.2)	
(11) Small issuers	−0.45	1.05	1.50	0.09	0.92
	(−3.1)	(31.0)	(29.2)	(1.6)	
(12) Return difference (11) − (10)	−0.47	0.14	0.16	−0.27	0.48
	(−5.0)	(6.4)	(4.7)	(−7.1)	

3 Market Reaction to Biases: Employers

- Nominal rigidity of wages
- Employee dislike for nominal wage cuts
- Kahneman, Knetsch and Thaler (1986)
- It is fair to have a real (but not nominal) wage cut
- It is NOT fair to have a real and nominal wage cut

tives to it no longer readily come to mind. Terms of exchange that are initially seen as unfair may in time acquire the status of a reference transaction. Thus, the gap between the behavior that people consider fair and the behavior that they expect in the marketplace tends to be rather small. This was confirmed in several scenarios, where different samples of respondents answered the two questions: "What does fairness require?" and "What do you think the firm would do?" The similarity of the answers suggests that people expect a substantial level of conformity to community standards—and also that they adapt their views of fairness to the norms of actual behavior.

II. The Coding of Outcomes

It is a commonplace that the fairness of an action depends in large part on the signs of its outcomes for the agent and for the individuals affected by it. The cardinal rule of fair behavior is surely that one person should not achieve a gain by simply imposing an equivalent loss on another.

In the present framework, the outcomes to the firm and to its transactors are defined as gains and losses in relation to the reference transaction. The transactor's outcome is simply the difference between the new terms set by the firm and the reference price, rent, or wage. The outcome to the firm is evaluated with respect to the reference profit, and incorporates the effect of exogenous shocks (for example, changes in wholesale prices) which alter the profit of the firm on a transaction at the reference terms. According to these definitions, the outcomes in the snow shovel example of Question 1 were a \$5 gain to the firm and a \$5 loss to the representative customer. However, had the same price increase been induced by a \$5 increase in the wholesale price of snow shovels, the outcome to the firm would have been nil.

The issue of how to define relevant outcomes takes a similar form in studies of individuals' preferences and of judgments of fairness. In both domains, a descriptive analysis of people's judgments and choices involves rules of *naive accounting* that diverge in major ways from the standards of rationality assumed in economic analysis. People commonly evaluate outcomes as gains or losses relative to a neutral reference point rather than as endstates (Kahneman and Amos Tversky, 1979). In violation of normative standards, they are more sensitive to out-of-pocket costs than to opportunity costs and more sensitive to losses than to foregone gains (Kahneman and Tversky, 1984; Thaler, 1980). These characteristics of evaluation make preferences vulnerable to framing effects, in which inconsequential variations in the presentation of a choice problem affect the decision (Tversky and Kahneman, 1986).

The entitlements of firms and transactors induce similar asymmetries between gains and losses in fairness judgments. An action by a firm is more likely to be judged unfair if it causes a loss to its transactor than if it cancels or reduces a possible gain. Similarly, an action by a firm is more likely to be judged unfair if it achieves a gain to the firm than if it averts a loss. Different standards are applied to actions that are elicited by the threat of losses or by an opportunity to improve on a positive reference profit —a psychologically important distinction which is usually not represented in economic analysis.

Judgments of fairness are also susceptible to framing effects, in which form appears to overwhelm substance. One of these framing effects will be recognized as the money illusion, illustrated in the following questions:

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%

Although the real income change is approximately the same in the two problems, the judgments of fairness are strikingly different. A wage cut is coded as a loss and consequently judged unfair. A nominal raise

- Examine discontinuity around 0 of nominal wage decreases (Card and Hyslop, 1997)

- 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

- Construct counterfactual density of LogWage changes

  - Assume symmetry

  - Positive log wage changes would not be affected

- Large effect of nominal rigidities

- Effect on firings?

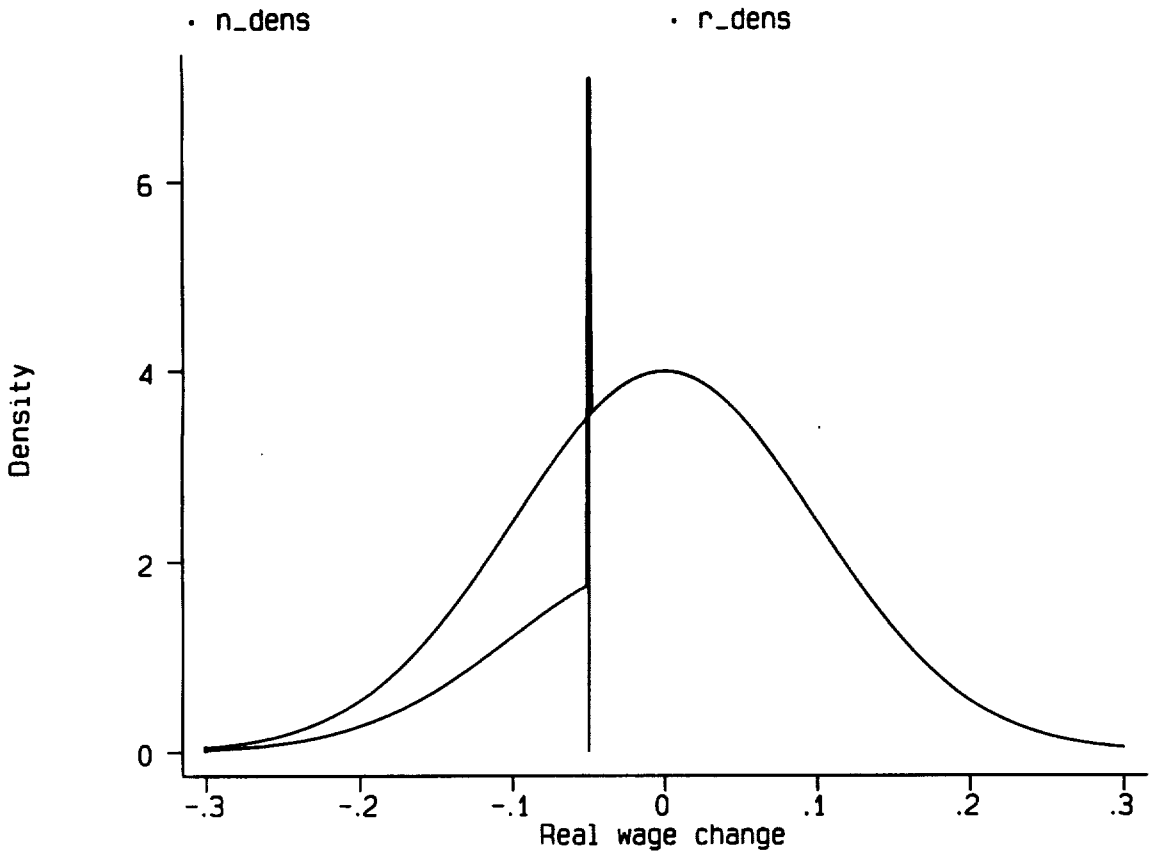

Figure 3a: Effect of Downward Nominal Rigidities on the Distribution of Real Wage Changes -- Theoretical Illustration

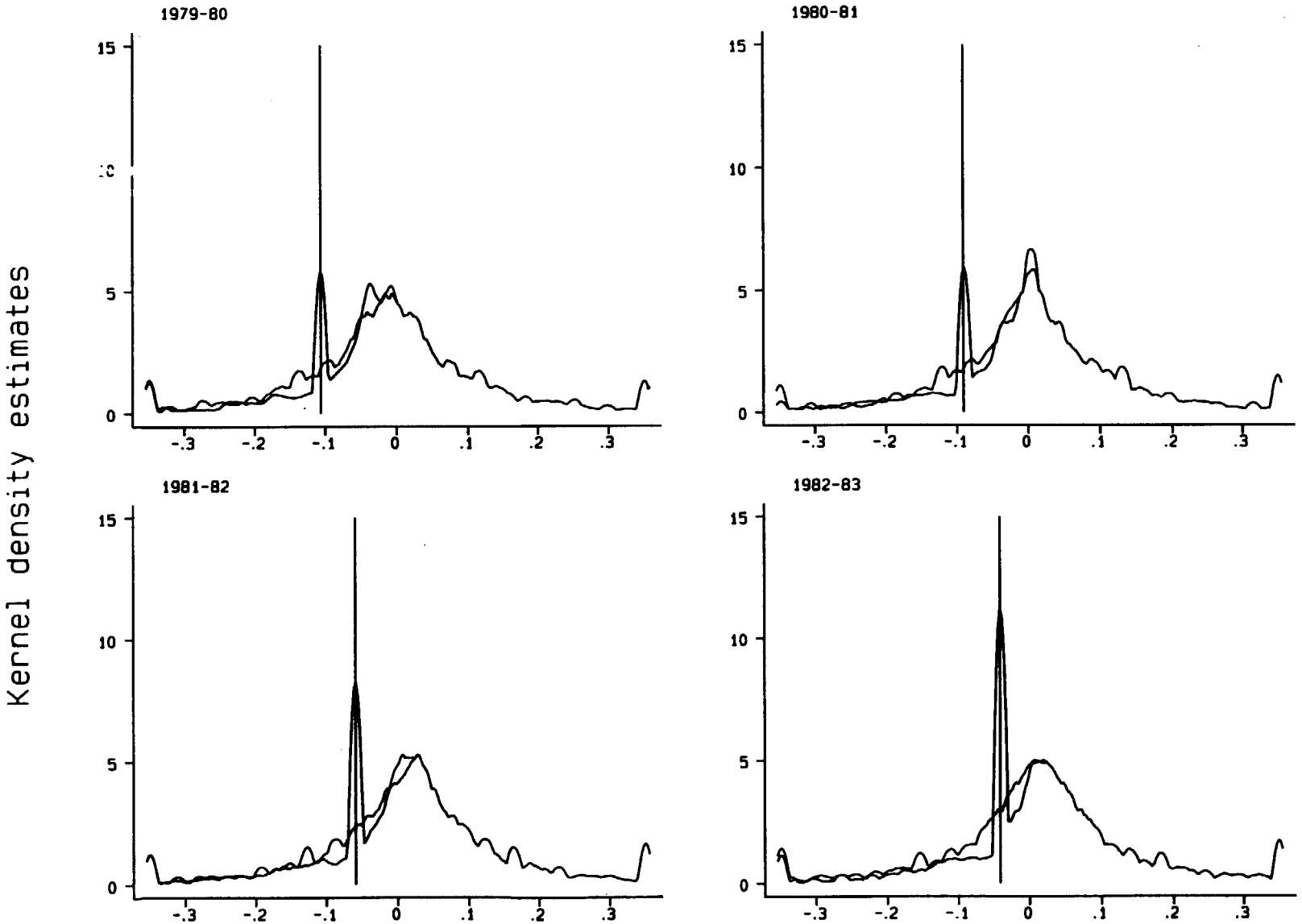

Figure 4: Smoothed (Kernel) Estimates of Actual and Counterfactual Densities of Real Wage Changes, CPS Samples from 1979-80 to 1982-83

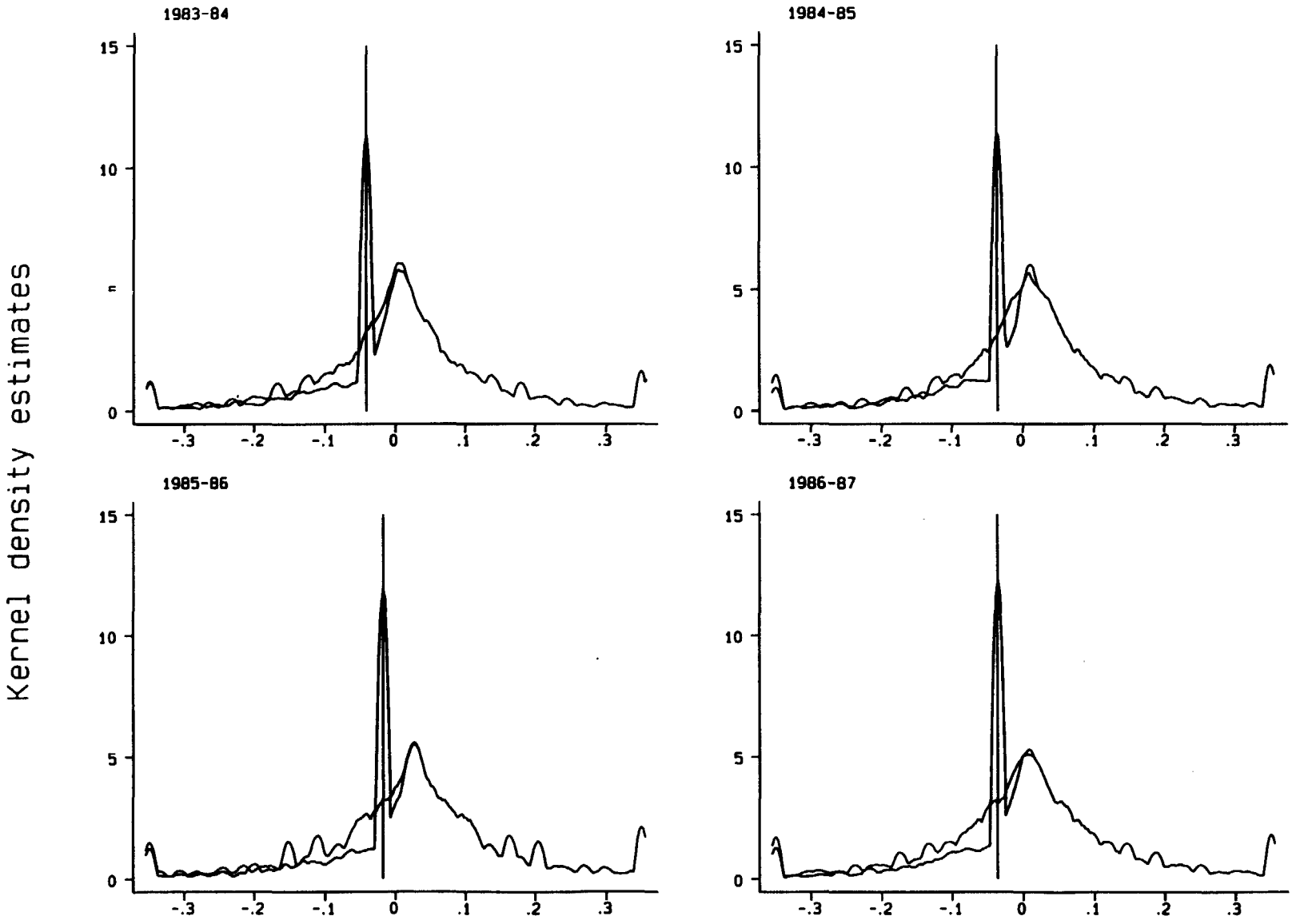

Figure 4 (Continued): Smoothed (Kernel) Estimates of Actual and Counterfactual Densities of Real Wage Changes, CPS Samples from 1983-84 to 1986-87

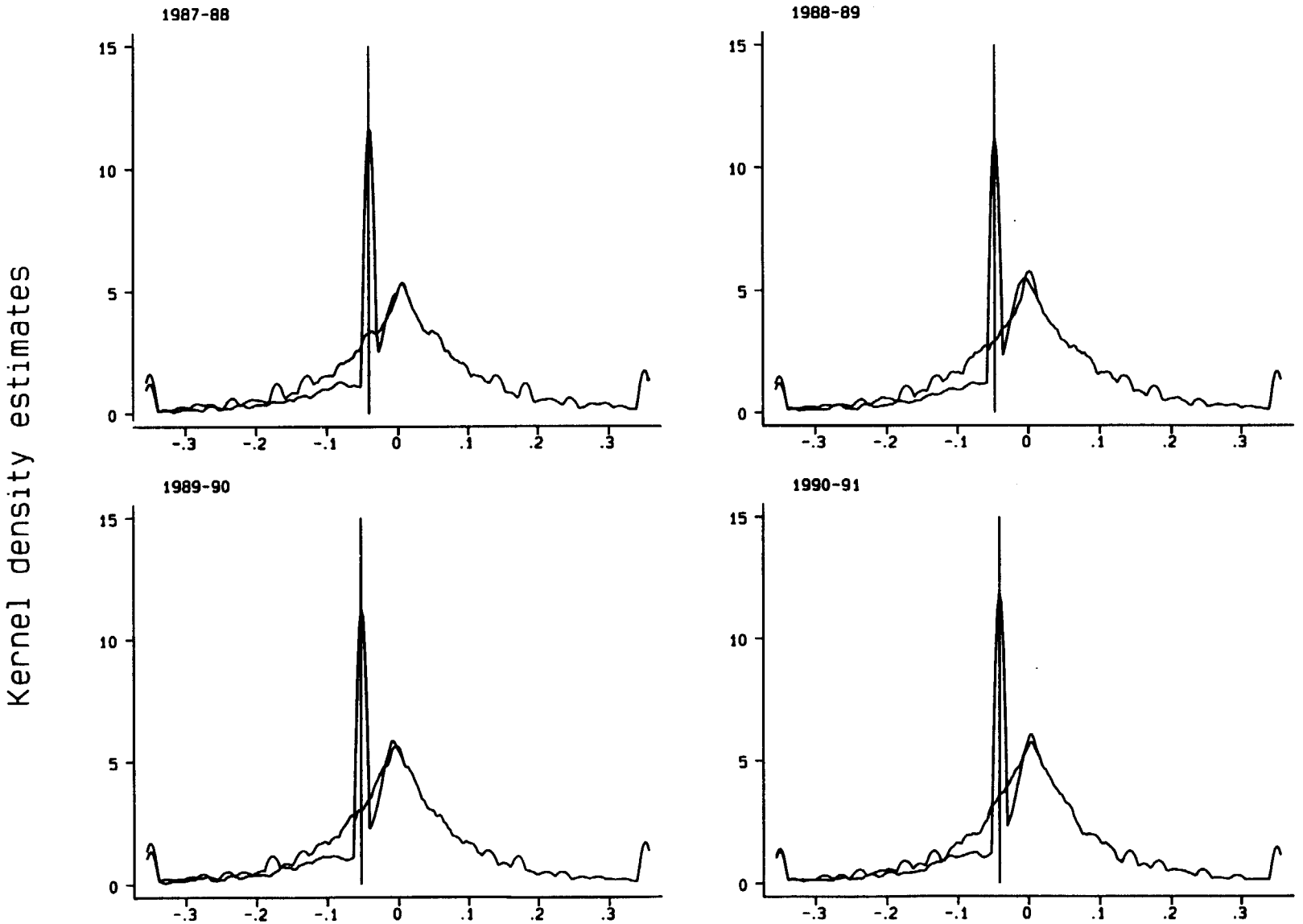

Figure 4 (Continued): Smoothed (Kernel) Estimates of Actual and Counterfactual Densities of Real Wage Changes, CPS Samples from 1987-88 to 1990-91

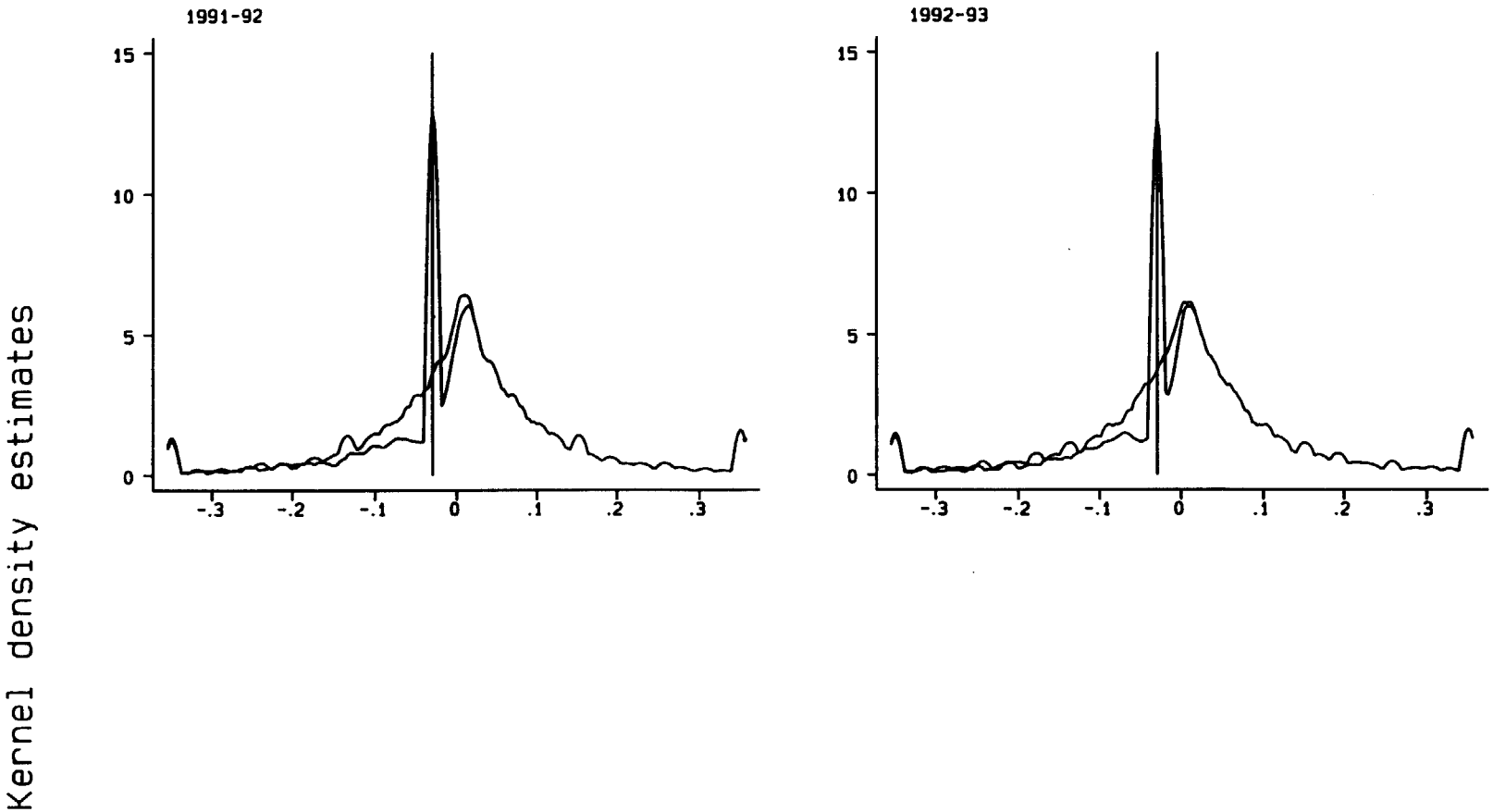

Figure 4 (Continued): Smoothed (Kernel) Estimates of Actual and Counterfactual Densities of Real Wage Changes, CPS Samples from 1991-92 to 1992-93

4 Market Reaction to Biases: Betting

- Levitt (2003)
- NFL (football) betting
- Firm side: bookmakers in Casinos (plus Internet and illegal market) set prices
- Consumer side: bettors choose team to bet on (and how much money)
- Institutional features
  - Bookmakers choose line. Ex.: Team A wins over Team B by 3 points.

  - Bookmakers seem to collude on one line
  - Bettors bet $\$x$ on either side of line
  - Win $\$x$ if bet on (ex-post) right side
  - Lose $\$1.1x$ if bet on (ex-post) wrong side

- Unusual financial market. Line could be set to equilibrate supply and demand

- Why not?

- Answer: Bookmakers can make even more money by setting line

- Bettor bets clearly biased toward Favorite: p percent of bets placed on favourite

- Trick: Set line to make favorite win less than 50% of time!

- Favorite wins $q < .5$ percent of the time

- Why are (sport) betting markets different from financial markets?
  - Betting markets: bookmakers think they have informational advantage they can exploit
  - Other markets: marginal investor knows more

Figure II: Share of Bets on the Favorite
when the Home Team is the Favorite

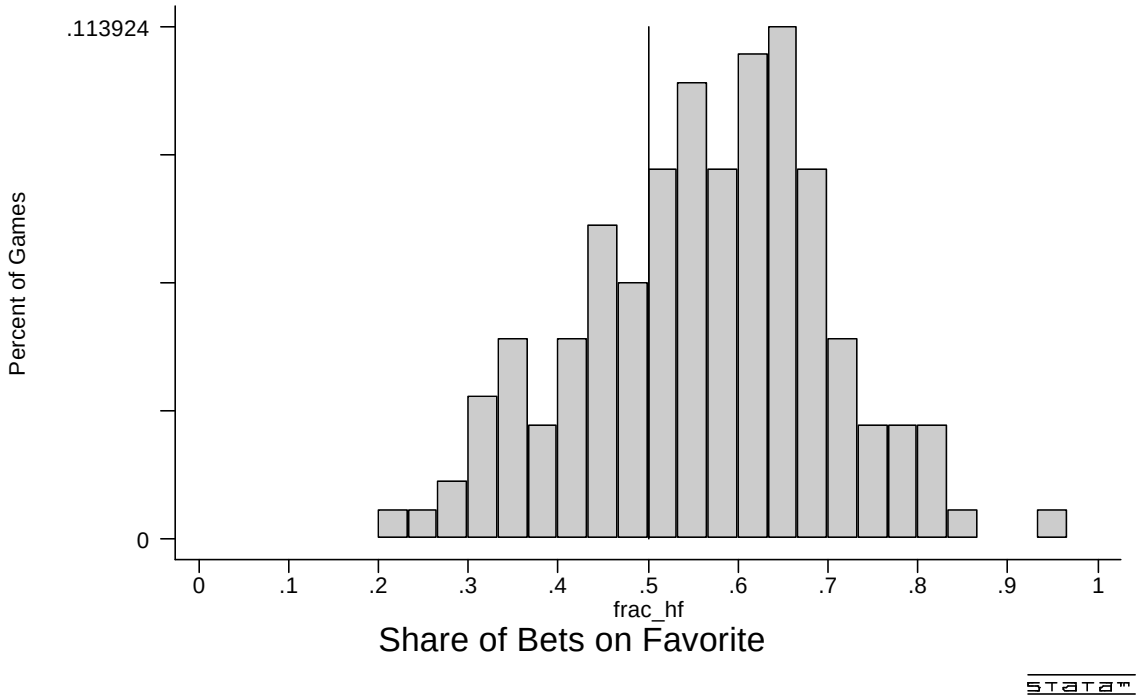

Figure III: Share of Bets on the Favorite
when the Visiting Team is the Favorite

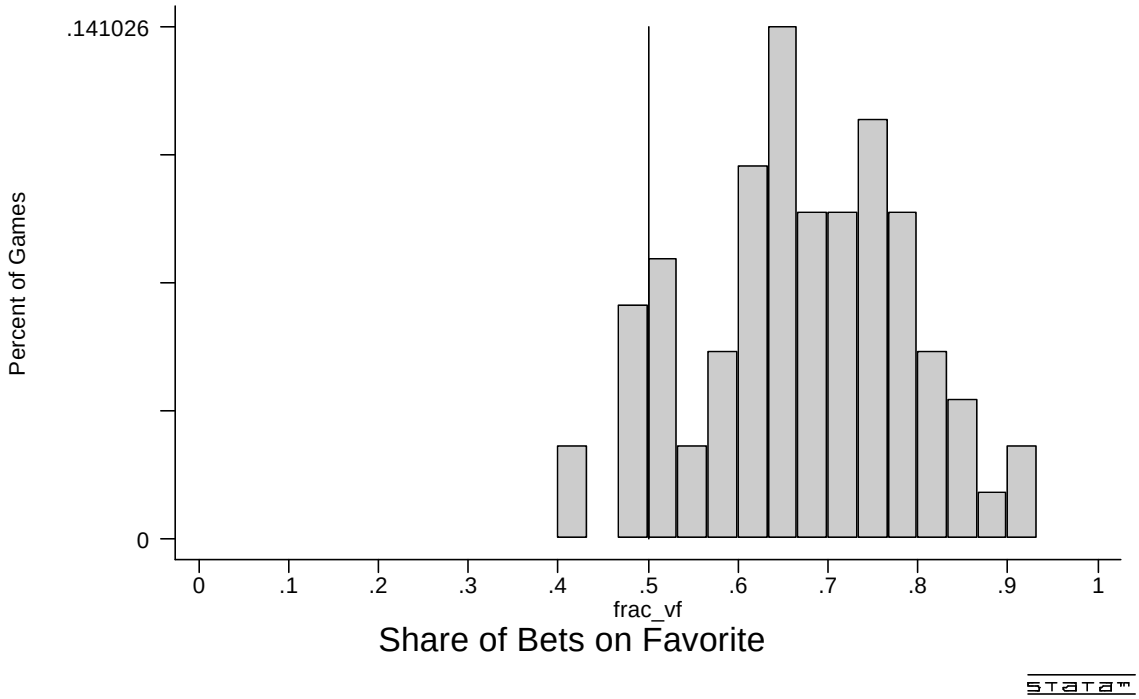

Table I: Predicting the Fraction of Bets Placed on the Favorite

	Dependent variable: Percent of bettors placing bets on the team that is favored			
Variable	(1)	(2)	(3)	(4)
Constant	.606 (.009)	.689 (.025)	-----	-----
Home team favored by more than 6 points	-----	-.129 (.031)	-.131 (.031)	-.144 (.031)
Home team favored by 3.5 to six points	-----	-.127 (.033)	-.123 (.032)	-.136 (.037)
Home team favored by 3 or fewer points	-----	-.126 (.031)	-.126 (.031)	-.123 (.043)
Visiting team favored by 3 or fewer points		-.005 (.030)	-.026 (.030)	-.057 (.033)
Visiting team favored by 3.5 to 6 points		-.016 (.035)	-.002 (.034)	-.002 (.034)
Week of season dummies included?	No	No	Yes	Yes
Team dummies included?	No	No	No	Yes
R-squared	-----	.165	.299	.484
P-value of test of joint significance of:				
Spread variables	-----	<.01	<.01	<.01
Week dummies	-----	-----	<.01	<.01
Team dummies	-----	-----	-----	<.01

Notes: Omitted category for the spread variables are games in which the visiting team is favored by ten or more points. The unit of observation is a game. The number of observations is equal to 242 in all columns. Standard errors are in parentheses. The method of estimation is weighted least squares, with the weights proportional to the total number of bets placed on the game.

Table II: Bets Placed and Won on Favorites and Underdogs

Which team is favored in the game?	Percent of total bets on the game that are placed on:			Percent of bets placed that win (i.e. cover the spread) when a team is:		
	(1)	(2)	(3)	(4)	(5)	(6)
	Favorite	Underdog	Total, favorite and underdog	Favorite	Underdog	Total, favorite and underdog
Home team	56.1 [N=12,011]	31.8 [N=7,190]	47.0 [N=19,201]	49.1 [N=6,741]	57.7 [N=2,286]	51.2 [N=9,027]
Visiting team	68.2 [N=7,190]	43.9 [N=12,011]	53.0 [N=19,201]	47.8 [N=4,904]	50.4 [N=5,270]	49.1 [N=10,174]
Total, home and visiting team	60.6 [N=19,201]	39.4 [N=19,201]	50.0 [N=19,201]	48.5 [N=11,645]	52.6 [N=7,556]	50.1 [N=19,201]

Notes: The values reported in the first three columns of the table are the percentage of total bets placed on the named team (e.g. home favorite in row 1, column 1). The values reported in the last three columns of the table are the fraction of bets placed that win. The unit of analysis is a bet. The number in square brackets is the total number of bets placed in each cell. The results in this table exclude the six games where the spread was equal to zero, i.e. neither team was favored.

5 Market Reaction to Biases: Political Economy

- Interaction between:
  - Smart politicians
  - Voters

- Politicians:
  - Personal beliefs and party affiliation
  - May pursue voters/consumers welfare maximization
  - BUT also: strong incentives to be reelected

- Voters have:
  - low (zero) incentives to vote
  - limited information through media
  - Likely to display biases

- Examples of voter biases:
  - Imperfect signal extraction (Wolfers, 2004)
  - Short memory (Andrew's idea)
  - Effect of candidate order (next class)
  - more?
- Behavioral political economy

- Glaeser (2002), Political Economy of Hatred
  - Demand side:
    - Voters are susceptible to hatred
    - Media can istigate hatred
  - Supply side:
    - Politicians maximize chances of reelection
    - Set up a hatred media campaigned toward certain groups for electoral gain
    - In particular, may target non-median voter
  - Idea:
    - Group hatred can occur, but does not tend to occur naturally
    - Group hatred can be due to political incentives

- Examples:
  - African American hatred: South, 1865-1970
    - No hatred before Civil War
    - Conservative politicians foment it to lower demand for redistribution
    - Diffuse stories of violence by Blacks
  - Hatred of Jews: 1930s
    - No hatred before 1920
    - Jews disproportionately left-wing
    - Right-wing Hitler made up Protocal of Elders of Zion

- DellaVigna and Pollet (2004): Strategic Timing of Bad News by politicians
  - Minimize coverage of controversial decisions

- Data (*Policy Agendas Project*):
  - Day of signing by US President of:
    * 718 laws (L)—1995-1998;
    * 3,674 executive orders (EO)—1945-2001

- Proxies of good news:
  1. Commemorative decisions (L,EO)
  2. Law initiated by Democratic Sen. or Rep. (L)
  3. Creation of new committee of Dept. (EO)
  4. Enlarge natural reserves (EO)

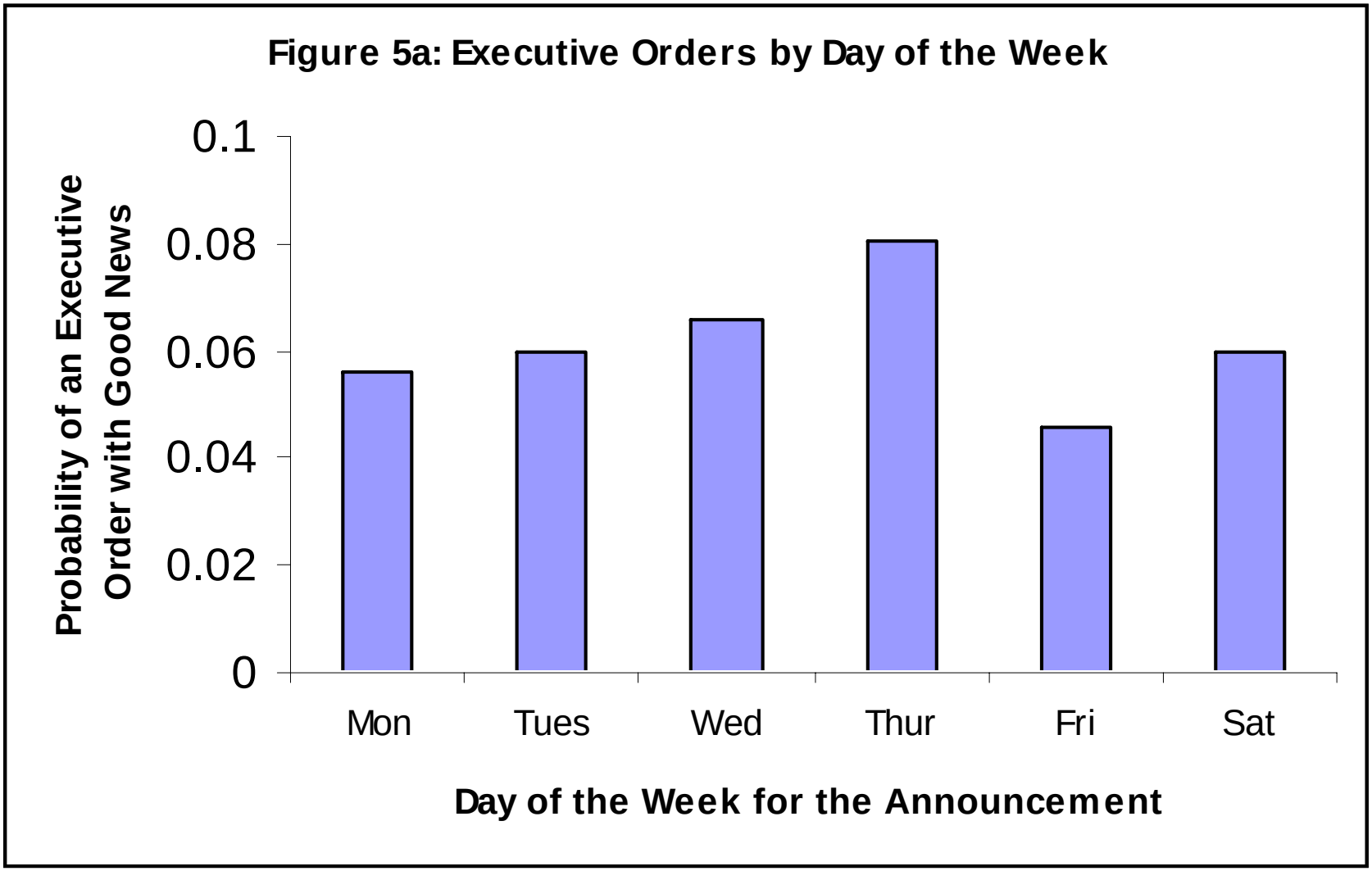
Figure 5a: Executive Orders by Day of the Week
Probability of an Executive Order with Good News
0.1
0.08
0.06
0.04
0.02
0
Mon
Tues
Wed
Thur
Fri
Sat
Day of the Week for the Announcement

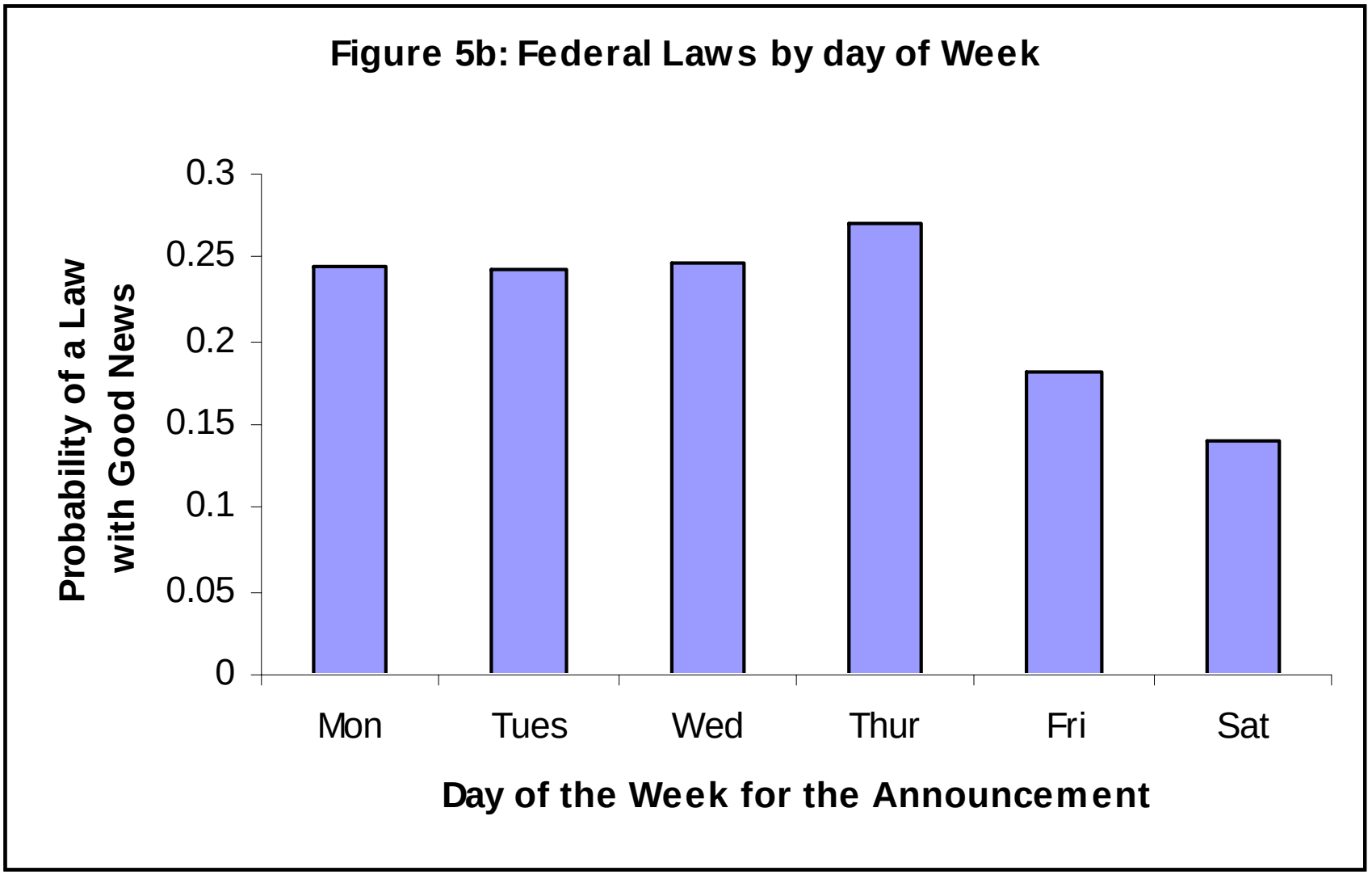
Figure 5b: Federal Laws by day of Week
Probability of a Law with Good News
0.3
0.25
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Day of the Week for the Announcement

6 Welfare Response to Biases

- SMartT plan

- Qiaowei

Save More Tomorrow™: Using Behavioral Economics to Increase Employee Saving

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Shlomo Benartzi

(*JPE*, 2004)

Presentation by Qiaowei Shen

Motivation

- A rapid change from defined-benefit plans to defined-contribution plans → employees bear more responsibility for making saving decisions

- Under defined-contribution plans, employees seem to save less than adequate (less than the predicted life cycle savings rate)

- The aim to use principles from psychology and behavioral economics to devise a program to help people save more.
  Save More Tomorrow™ (SMarT)

A Prescriptive Approach

Symptoms: undersaving

- Bounded rationality: the problem is hard
- Self-control: lack the will power to reduce current consumption
- Procrastination: postpone saving increases

  (produce inertia/status qua bias)

Solutions:

- The program should be simple and help to approximate the life cycle saving rates
- Commit in advance about future saving increases
- Loss aversion + money illusion → try to get workers to save more at their pay increase

The SMarT Program

Features:

1. Employees are approached about the plan well ahead of their scheduled pay increase.
2. If join, contribution to the plan is increased beginning with the first paycheck after a raise.
3. Contribution rate continues to increase on each raise until a preset maximum.
4. Can opt out the plan at any time.

Target: Employees who would like to save more but lack the willpower to do so

The First Implementation

1998, a midsize manufacturing company

Background: - low participation rates and saving rates

- Hired a investment consultant to give advise

  (Constrain to no more than 5% increase for employees with low willingness to increase saving)

- Offer an alternative: SMarT plan
  - Increase saving rats by 3 percentage points each year
  - Start with next pay increase (scheduled 3 months from the advice being given)

Continue…

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%

Continue…

- The saving rate of SMarT participants is much higher than those who accepted the consultant's recommendation in the end.

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.

The Second Implementation

May 2001 Ispat Inland, a large Midwestern steel company

Feature: - Implemented with minimal resources
One-shot letter solicitation
- Annual savings increase: 2% on each pay raise
- First pay raise scheduled 2 months after solicitation

Continue…

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.

The Third Implementation

Jan. 2002, Two divisions (A and O) of Philips Electronics

Implementation:

- Division A : given the option of attending educational seminars for savings
- Division O: required to attend; offered the opportunity to have a one-to-one meeting with a financial planner

- Increases in savings not link to pay raise: April. 1 each year
- Allow to pick the increase rate: 1%, 2% or 3%
- Annual increases stop once each 10% saving rate

Continue…

- SMarT participants save more than the control group
- Spill-over effect: non-participants of SMarT in experimental group increases saving rates more than the control group

TABLE 4
AVERAGE SAVING RATES (%) FOR PHILIPS ELECTRONICS

	Employees Who Were Already Saving in December 2001		Employees Who Were Not Saving in December 2001		
Date	Joined SMarT	Did Not Join SMarT	Joined SMarT	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.

Continue…

Demographics Info:

- Gender and age are not determining factor
- 4-5 tenure more likely to join the plan
- Annual income < $50,000 more likely to join

Lesson from Philips experience:

- Linking savings increases to pay increases may not be essential
- One-to-one meetings seem to be effective

Question: effect of SMarT on savings adequacy?

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.

- Replacement income rates are much higher with SMarT plan
- Not seem to induce people to save too much

Potential Impact of Widespread Adoption of SMarT

Hypothetical implementation Strategies

(Each with increases in saving rate of 1, 2, 3% per year)

Plan A: use one-to-one interaction with financial consultant

Plan B: single direct-mail campaign

Plan C: Automatic enrollment

Continue…

TABLE 7
PROJECTED SAVING RATES (%)

SMarT Annual Increments (%)	PROJECTED SAVING RATES WITH SMarT IN YEAR (%)						
	0	1	2	3	4	5	10
	A. One-on-One Interaction with a Financial Consultant						
1	5.0	5.6	6.2	6.7	7.2	7.6	9.2
2	5.0	6.2	7.3	8.2	9.0	9.7	11.9
3	5.0	6.8	8.3	9.5	10.6	11.4	12.9
	B. One-Shot Mailing						
1	5.0	5.2	5.3	5.4	5.5	5.6	6.0
2	5.0	5.3	5.6	5.8	6.0	6.1	6.7
3	5.0	5.4	5.8	6.1	6.3	6.5	6.9
	C. Automatic Enrollment						
1	5.0	5.8	6.4	7.1	7.7	8.2	10.2
2	5.0	6.5	7.8	8.9	10.0	10.9	13.7
3	5.0	7.2	9.0	10.6	11.9	13.0	15.0

- Potential increase in saving: $250 million of additional annual contributions for the sample of each 1% increase
- Extrapolate from sample to the universe: $ 25 billion!

Conclusion

Behavioral economics is useful….

- General idea:
  - Leverage biases to help biased agents
  - Do not hurt unbiased agents (cautious paternalism)

- Research agenda:
  - Identify biases (persuasion? reference dependence?)
  - Design contract/institution
  - Offer to agents
  - Field experiment

- Example: Self-control + Peer pressure(Sarah, Spring 2004):
  - Form group of peers – pay fee
  - Give rewards for health club attendance
  - Everyone in group loses if attendance too low
  - Idea: use self-control + embarassment