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

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Outline

1 Market Reaction to Biases: Introduction

- So far, we focused on consumer deviations from standard model:

    1. Self-control and naivete'

    2. Reference dependence

    3. Narrow Framing

    4. Attention

- Who exhibits these deviations?

1. **Self-control and naivete'.** Consumers (health clubs, food, credit cards, smoking), workers (retirement saving, benefit take-up)

2. **Reference dependence.** Workers (labor supply, increasing wages), (inexperienced) traders (sport cards), financial investors, house owners

3. **Narrow Framing.** Consumers (environmental goods, coherent arbitrariness, housing choice)

4. **Attention.** Financial investors

- What is missing from picture?

- Experienced agents!

- Firms!

- In a market, interaction between different groups

- Everyone 'born' with biases

- Effect of biases lower if:

  - learning

  - advice

  - consulting

– specialization

- For which agents are these conditions likely to be satisfied?

- Firms

- In particular, firms are likely to be aware of biases.

- Implications?

- Study biases in the market

- Four major instances:

  - Interaction between experienced and inexperienced agents (noise traders – see Lecture 9)

  - Interaction between firms and consumers (contract design, price choice)

  - Interaction between managers and investors (corporate finance)

  - Interaction between employers and employees (labor economics)

2 Market Reaction to Biases: Pricing

2.1 Self-Control

MARKET (I). INVESTMENT GOODS

Firm

- Monopoly

- Two-part tariff: L (lump-sum fee), p (per-unit price)

- Cost: set-up cost K, per-unit cost a

Consumption of investment good

Payoffs relative to best alternative activity:

- Cost c at $t = 1$, stochastic

  – non-monetary cost

– experience good, distribution $F(c)$

- Benefit $b > 0$ at $t = 2$, deterministic

CONSUMER BEHAVIOR.

- Long-run plans at $t = 0$:

  Consume $\Longleftrightarrow \beta\delta(-p - c + \delta b) > 0$

  $$\Longleftrightarrow c < \delta b - p$$

- Actual consumption decision at $t = 1$:

  Consume $\Longleftrightarrow c < \beta\delta b - p$ (Time Inconsistency)

- Forecast at $t = 0$ of consumption at $t = 1$:

  Consume $\Longleftrightarrow c < \hat{\beta}\delta b - p$ (Naiveté)

FIRM BEHAVIOR. Profit-maximization

$$\max_{L,p} \delta\left\{L - K + F(\beta\delta b - p)(p - a)\right\}$$

$$\text{s.t. } \beta\delta\left\{-L + \int_{-\infty}^{\hat{\beta}\delta b - p}(\delta b - p - c)\,dF(c)\right\} \geq \beta\delta\overline{u}$$

Solution for the per-unit price p^*:

$$
\begin{aligned}
p^* = \ & a & \text{[exponentials]} \\
& - \left(1 - \hat{\beta}\right) \delta b \frac{f\left(\hat{\beta}\delta b - p^*\right)}{f\left(\beta\delta b - p^*\right)} & \text{[sophisticates]} \\
& - \frac{F\left(\hat{\beta}\delta b - p^*\right) - F\left(\beta\delta b - p^*\right)}{f\left(\beta\delta b - p^*\right)} & \text{[naives]}
\end{aligned}
$$

Features of the equilibrium

1. *Exponential agents $\left(\beta = \hat{\beta} = 1\right)$.*
   Align incentives of consumers with cost of firm
   $\Longrightarrow$ marginal cost pricing: $p^* = a$.

2. *Hyperbolic agents.* Time inconsistency
   $\Longrightarrow$ below-marginal cost pricing: $p^* < a$.

   (a) *Sophisticates $\left(\beta = \hat{\beta} < 1\right)$:* commitment.

   (b) *Naives $\left(\beta < \hat{\beta} = 1\right)$:* overestimation of consumption.

MARKET (II). LEISURE GOODS

Payoffs of consumption at $t = 1$:

- Benefit at $t = 1$, stochastic

- Cost at $t = 2$, deterministic

$\implies$ Use the previous setting:

$-c$ is "current benefit",

$b < 0$ is "future cost."

Results:

1. *Exponential agents.*

   Marginal cost pricing: $p^* = a$, $L^* = K$ (PC).

2. *Hyperbolic agents* tend to overconsume. $\implies$

   Above-marginal cost pricing: $p^* > a$.

   Initial bonus $L^* < K$ (PC).

EMPIRICAL PREDICTIONS

Two predictions for time-inconsistent consumers:

1. Investment goods (Proposition 1):

   (a) Below-marginal cost pricing

   (b) Initial fee (Perfect Competition)

2. Leisure goods (Corollary 1)

   (a) Above-marginal cost pricing

   (b) Initial bonus or low initial fee (Perfect Competition)

FIELD EVIDENCE ON CONTRACTS

- US Health club industry ($11.6bn revenue in 2000)

  - monthly and annual contracts

  - Estimated marginal cost: $3-$6 + congestion cost

  - Below-marginal cost pricing despite...

  - ...Small transaction costs

  - ...Price discrimination

- Vacation time-sharing industry ($7.5bn sales in 2000)

  - high initial fee: $11,000 (RCI)

  - minimal fee per week of holiday: $140 (RCI)

- Credit card industry ($500bn outstanding debt in 1998)

  – Resale value of credit card debt: 20% premium (Ausubel, 1991)

  – No initial fee, bonus (car / luggage insurance)

  – Above-marginal-cost pricing of borrowing

- Gambling industry: Las Vegas hotels and restaurants:

  – Price rooms and meals below cost, at bonus

  – High price on gambling

WELFARE EFFECTS

Result 1. Self-control problems + Sophistication $\Rightarrow$ First best

- Consumption if $c \leq \beta\delta b - p^*$

- Exponential agent:

  - $p^* = a$

  - consume if $c \leq \delta b - p^* = \delta b - a$

- Sophisticated time-inconsistent agent:

  - $p^* = a - (1 - \beta)\delta b$

  - consume if $c \leq \beta\delta b - p^* = \delta b - a$

- Perfect commitment device

- Market interaction maximizes joint surplus of consumer and firm

Result 2. Self-control + Partial naiveté $\Rightarrow$ Real effect of time inconsistency

- $p^* = a - [F(\delta b - p^*) - F(\beta \delta b - p^*)]/f(\beta \delta b - p^*)$

- Firm sets p^* so as to accentuate overconfidence

- Two welfare effects:

  - Inefficiency: $\text{Surplus}_{\text{naive}} \leq \text{Surplus}_{\text{soph.}}$

  - Transfer (under monopoly) from consumer to firm

- Profits are increasing in naivete' $\hat{\beta}$(monopoly)

- $\text{Welfare}_{\text{naive}} \leq \text{Welfare}_{\text{soph.}}$

- Large welfare effects of non-rational expectations

2.2   Bounded Rationality

- Gabaix and Laibson (2003), *Competition and Consuemr 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

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

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

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

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

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 $p_1 = p_2$

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

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.

2.3 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

Pride=0	Pride=6	FutureGain=3	FutureGain>12
Penthouse	Art and Antiques	Penthouse	Forbes
Playboy	Art and Auction	Playboy	Fortune
Easy riders	Barron's	The Rolling Stone	HBR
Movieline	Business Week	Spin	Kiplingers
National Enquirer	Forbes	Vibe	Astronomy
National Examiner	Fortune	The Source	Worth
People	Harvard Business Review	Entertainment Weekly	Money
Premiere	Kiplingers	Interview	New York Review of Books
Soap Opera Digest	The New Yorker	Movieline	The Nation
Soap Opera Weekly	E-The Environmental Magazine	National Enquirer	Venture Reporter
Star	Architectural Digest	National Examiner	E-The Environmental Magazine
Starlog	American Heritage	People	Red Herring
TV Guide	Foreign Policy	Premiere	American History
True Story	NY Review of Books	Soap Opera Digest	Inc
US Weekly	Smithsonian	Soap Opera Weekly	
Cat Fancy	Economist	Star	
Traier Life	The Nation	Starlog	
Details	Faith & Family	Ttrue Story	
Maxim	Reform Judaism	US Weekly	
ESPN Magazine		Advocate	
Cosmopolitan		Details	
In Style		Maxim	
Marie Claire		Jet	
Amazing Spiderman		ESPN	
Cosmo Girl!		Amazing Spiderman	
Realms of Fantasy		Mad	
Teen		Realms of Fantasy	
Teen People		Teen People	

Table 3: Regression Results

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

Variable	(1) Expert	(2) Genre	(3) Pride	(4) FutureGain
Circulation	4.22E-08** (9.25E-09)	3.76E-08** (9.14^E-09)	4.09^E-08** (9.17^E-09)	4.19^E-08** (9.26^E-09)
Ln(Circ)	-0.53** (.011)	-.043** (.011)	-.047** (.011)	-.052** (.011)
Available	-.012** (.004)	-.012** (.004)	-.014** (.004)	-.013** (.004)
Number of issues	-.0055** (.0010)	-.0060** (.0010)	-.0056** (.0010)	-.0056** (.0010)
No. issues interaction	.0021 (.0011)	.0023** (.0011)	.0022 (.0011)	.0020 (.0011)
Intro offer	-.140** (.037)	-.160** (.037)	-.145** (.036)	-.144** (.037)
Ad rate	-.276** (.109)	-.247** (.107)	-.278** (.108)	-.275** (.109)
Expert	.054** (.022)	……..	……..	…..
Trade	………….	.136** (.047)	………	…..
Religious	……….	.130** (.051)	………..	….
Intellectual	………	.072** (.035)	…….	…
Pride	……….	……….	.020** (.006)	….
FutureGain	………..	……….	….	.0096** (.0043)
Constant	1.44** (.139)	1.33** (.140)	1.34** (.144)	1.38** (.147)
No observations	298	298	298	298
Adj R^2	.273	.295	.282	.270

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

3 Market Reaction to Biases: Corporate Decisions

3.1 Financing

- Firm has to decide how to finance investment project:

1. internal funds (cash flow/retained earnings)

2. bonds

3. stocks

- Does it matter how they do this?

Modigliani-Miller Theorem

- Proposition (1958): Capital structure irrelevance.

– Intuition:

* Value additivity. If operating cashflows are fixed, value of the pie unaffected by split-up of the pie.

– Assumptions:

* No taxes.

* No costs of financial distress / no other transaction costs.

* Fixed, exogenous operating cashflows.

* Symmetric information.

* Absence of arbitrage opportunities.

* Rational beliefs, standard preferences!

- **A theory of timing**

- 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.

  - Jenter (2002): Sell own stock when Market-to-Book ratio is high, buy when Market-to-Book is low. [Market is market capitalization, Book is accounting balue of company]

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?

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

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 in 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*.
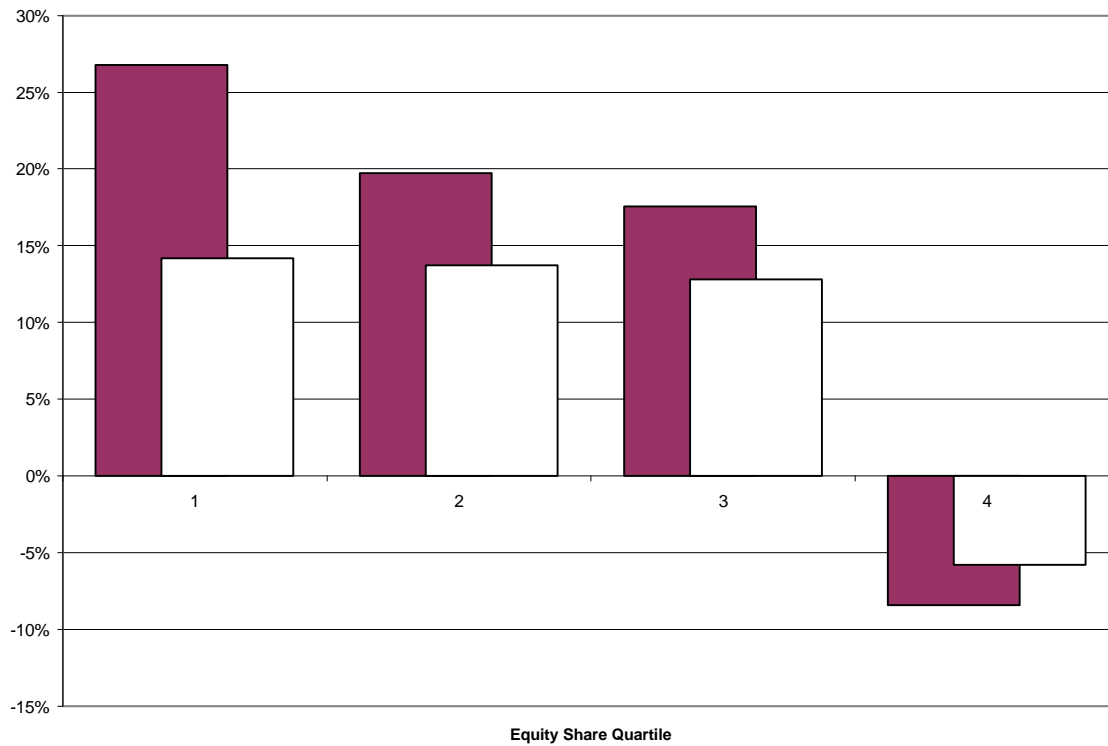
Table 5. Multivariate OLS regressions for predicting one-year-ahead market returns. OLS regressions of real equity market returns on the dividend-price ratio (*D/P*), the book-to-market ratio (*B/M*), and the equity share in new issues (*S = e/(e+d)*). We also include the lag of the return on the market (*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]
$\bar{R}^2$	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]
$\overline{R}^2$	-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).

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

The Journal of Finance

Annual percentage return
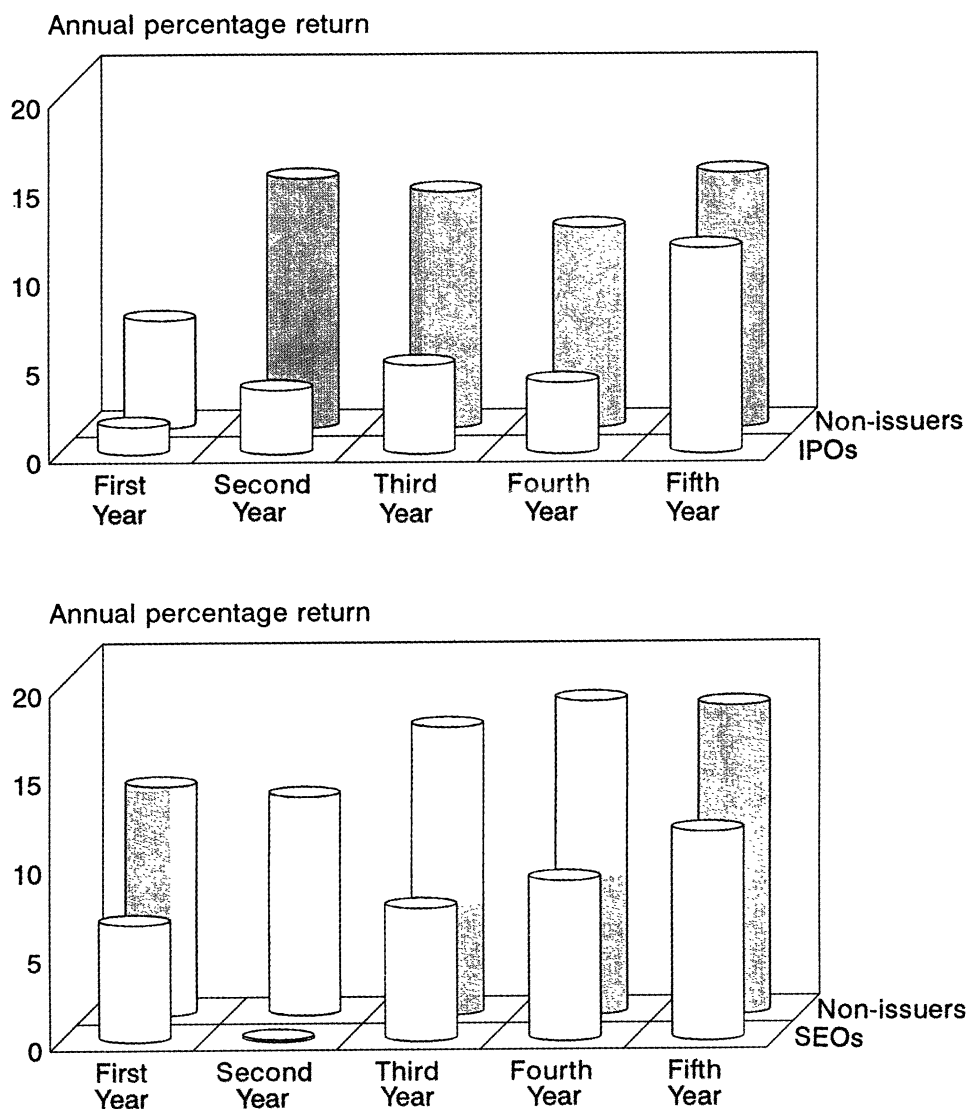

Annual percentage return

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.

Stylized Facts (US)

1. Most investment financed by retained earnings and debt. (*Sample of 360 firms over 10 years –> only 80 equity issues, i.e. 2% per year.*)
   1980: retained earnings (60%), debt (24%), increases in accounts payable (12%). Very little financing with new equity (4%).

2. Announcement effects after securities issues, retirements, or exchanges

   (a) Positive stock price reaction to leverage increases (stock repurchases; debt-for-equity exchanges).

   (b) Negative stock price reaction to leverage decrease (stock issues; equity-for-debt exchanges).

   (c) No significant reaction to debt issues.

3.2   Accounting 1

- Degeorge, Patel, and Zeckhauser (1999)

- Investors react asymmetrically to gains/losses

- Large stock price penalty to small losses relative to small gains

- Managers interested in boosting *short-term* company value or smoothing earnings (Justin, Paige)

  - stock options

  - relatively short tenure of many managers

- Managers will manipulate the accounting books to reduce the likelihood of a loss

- Best response to investor loss aversion

- Three measures of earning quality:

  1. Non-negative operating profits

  2. Non-negative surprise relative to analyst forecast (e^1)

  3. Non-negative surprise relative to last year same quarter (e^3)

- Data sources:

  - I/B/E/S

  - Compustat

- On each measure, expect a discontinuity around 0

Figure 2. Optimal amount of period-1 manipulation, M_1, as a function of latent period-1 earnings L_1. Latent earnings L_1 are normally distributed with mean 0 and standard deviation 10. If reported earnings $R_1 = L_1 + M_1$ reach at least $R_0 = 0$, the executive reaps a bonus of 10. The period-2 cost of manipulation is $k(M_1) = e^M - 1$. The executive knows L_1 exactly when choosing the manipulation level M_1.
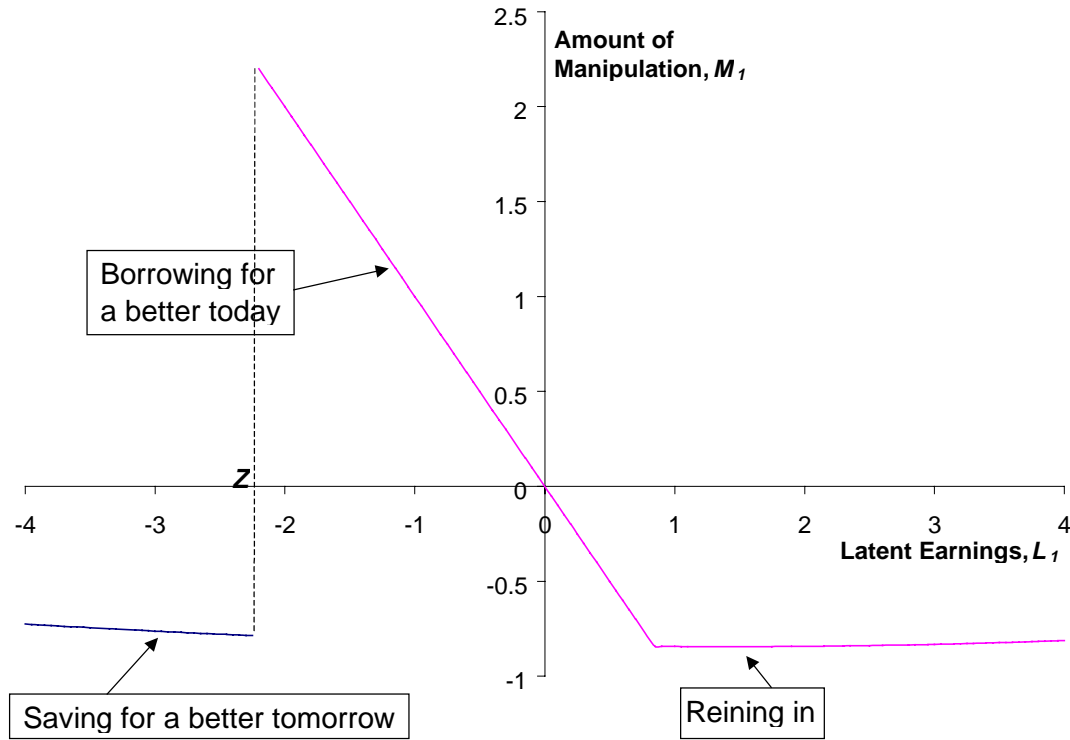
Figure 3. Simulated distribution of reported earnings R_1. Latent earnings L_1 are normally distributed with mean 0 and standard deviation 10. If reported earnings $R_1 = L_1 + M_1$ reach at least $R_0 = 0$, the executive reaps a bonus of 10. The period-2 cost of manipulation is $k(M_1) = e^M - 1$. The executive knows L_1 imprecisely when choosing the manipulation level M_1 (he has a probability distribution centered on L_1 with a variance of 1). The dark shaded areas below the horizontal show shortfalls relative to the equidistant bin on the other side of the threshold of 0.
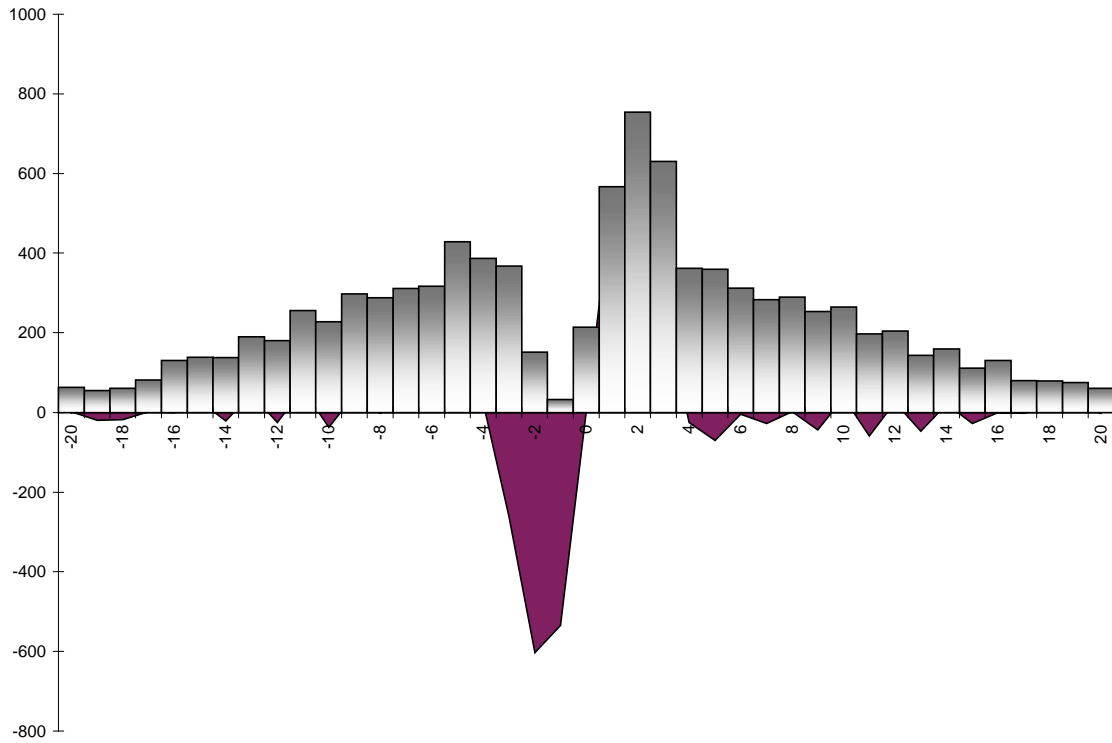
Figure 5. Histogram of Change in *EPS* ($\Delta EPS = EPS_t - EPS_{t-4}$): Exploring the threshold of "sustain recent performance"
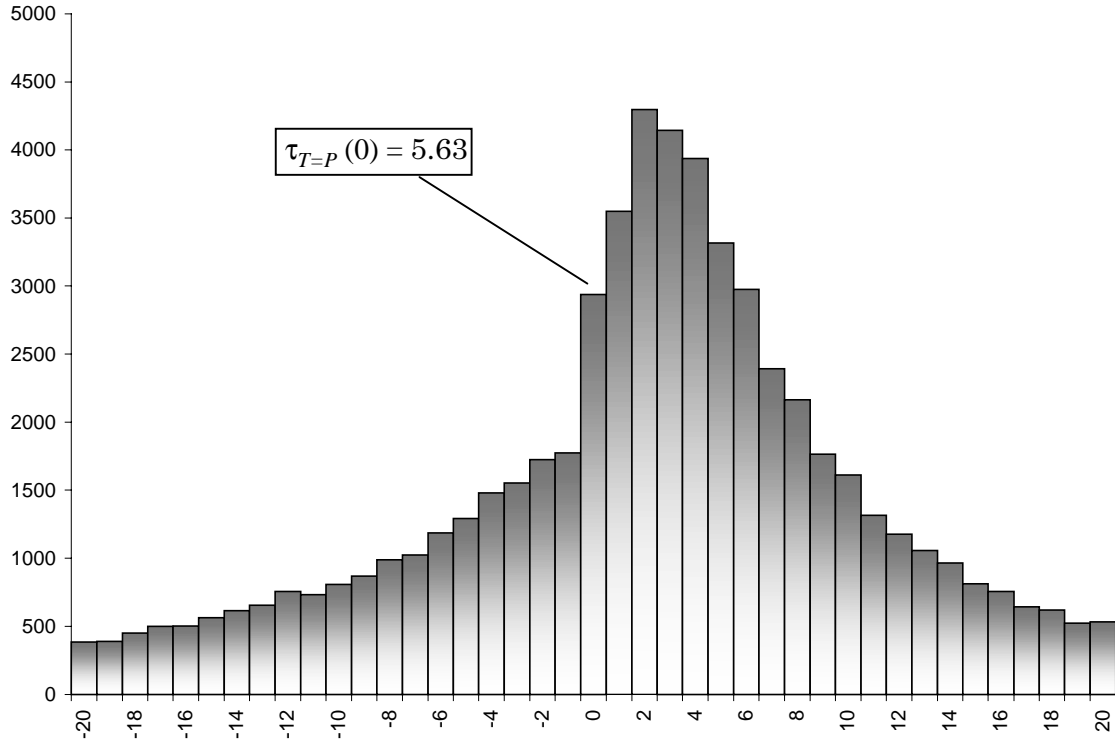
Figure 6. Histogram of Forecast Error for Earnings Per Share: Exploring the threshold of "meet analysts' expectations"
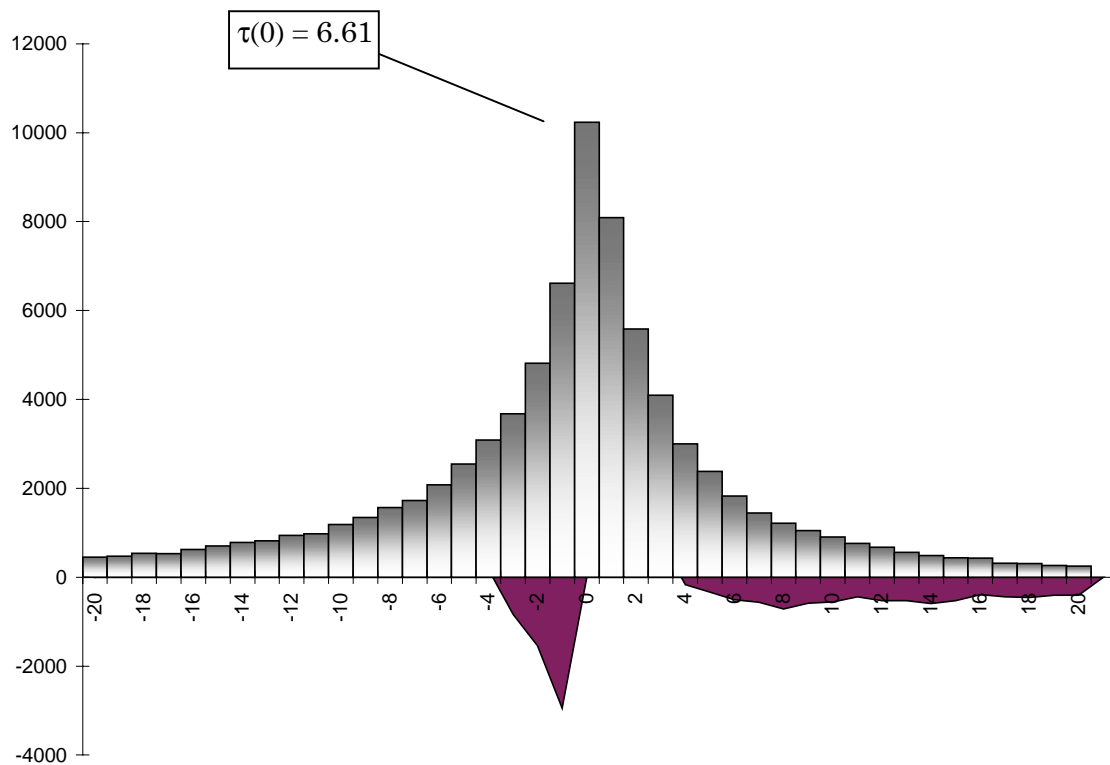
Figure 7. Histogram of *EPS*: Exploring the threshold of "positive/zero profits"
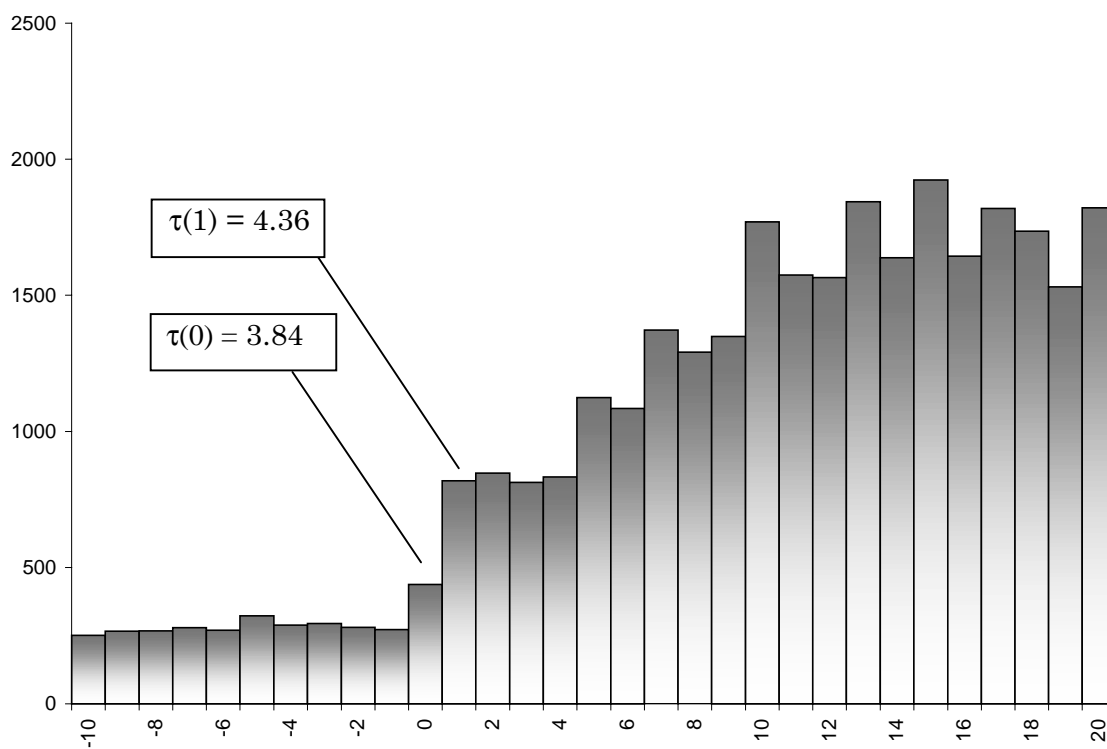
- Issues:

  - Effect of competition: what if other firms do it?
    (Shleifer, AEA 2004)

  - Uncertainty about ability to meet threshold

  - Managers want to insure themselves against risks

3.3   Accounting 2

- DellaVigna and Pollet (2004)

- On Friday investors appear to be less responsive to earning surprises

- Immediate stock response to F earning surprises 20 percent lower then on non-F

- Do firms respond by timing more negative earnings on Friday?

- Three measures of earning quality:

  1. Non-negative operating profits

  2. Non-negative surprise relative to analyst forecast (e^1)

  3. Returns around announcement date (0,1)

Figure 1a: Response To Earnings Surprise From 0 To +1
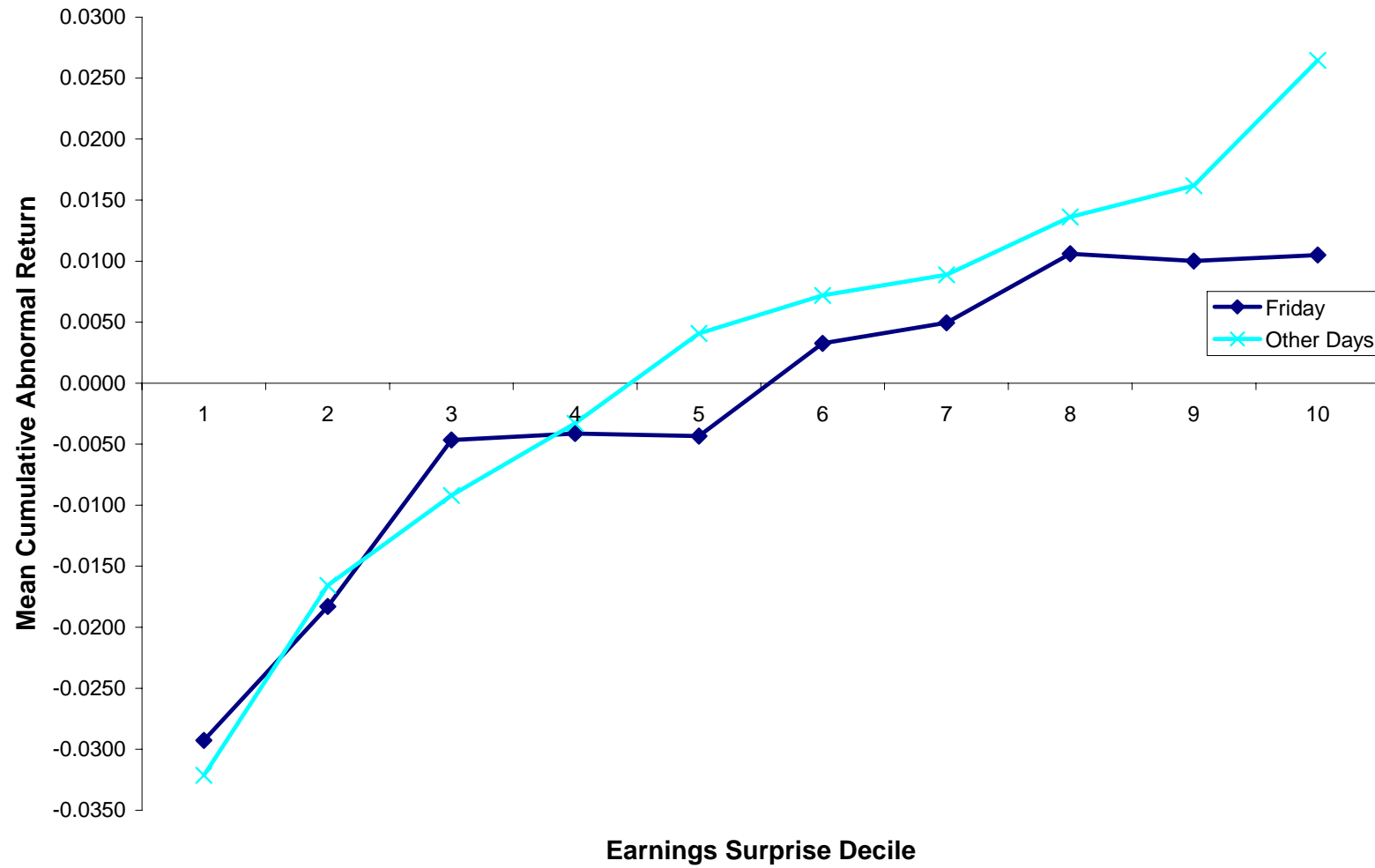
Figure3a: Non-negative Earnings by Day of the Week
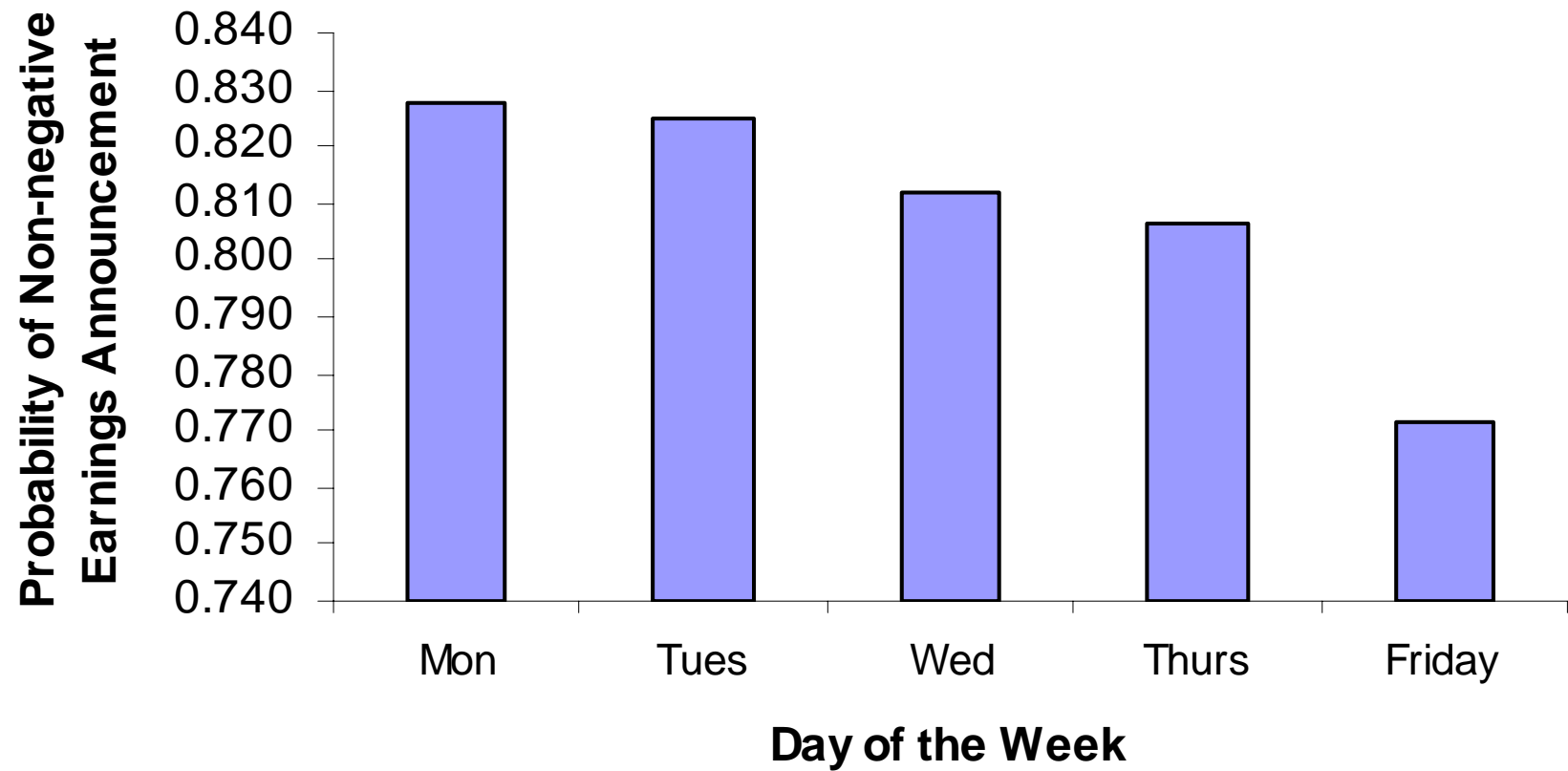
Figure 3b: Non-negative Earnings Surprise by Day of Week
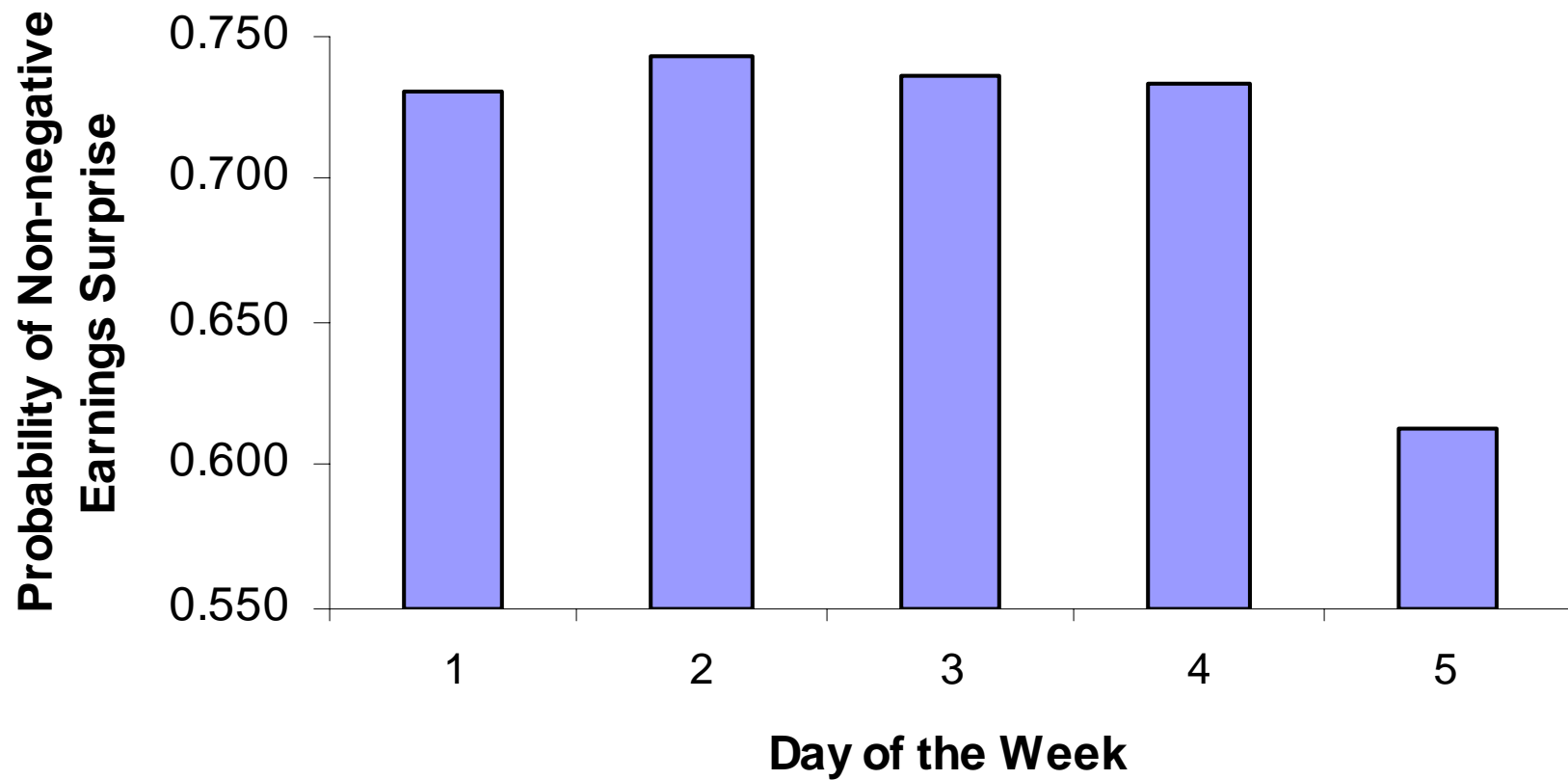
Figure 3c: Abnormal Return from 0 to +1 by Day of Week
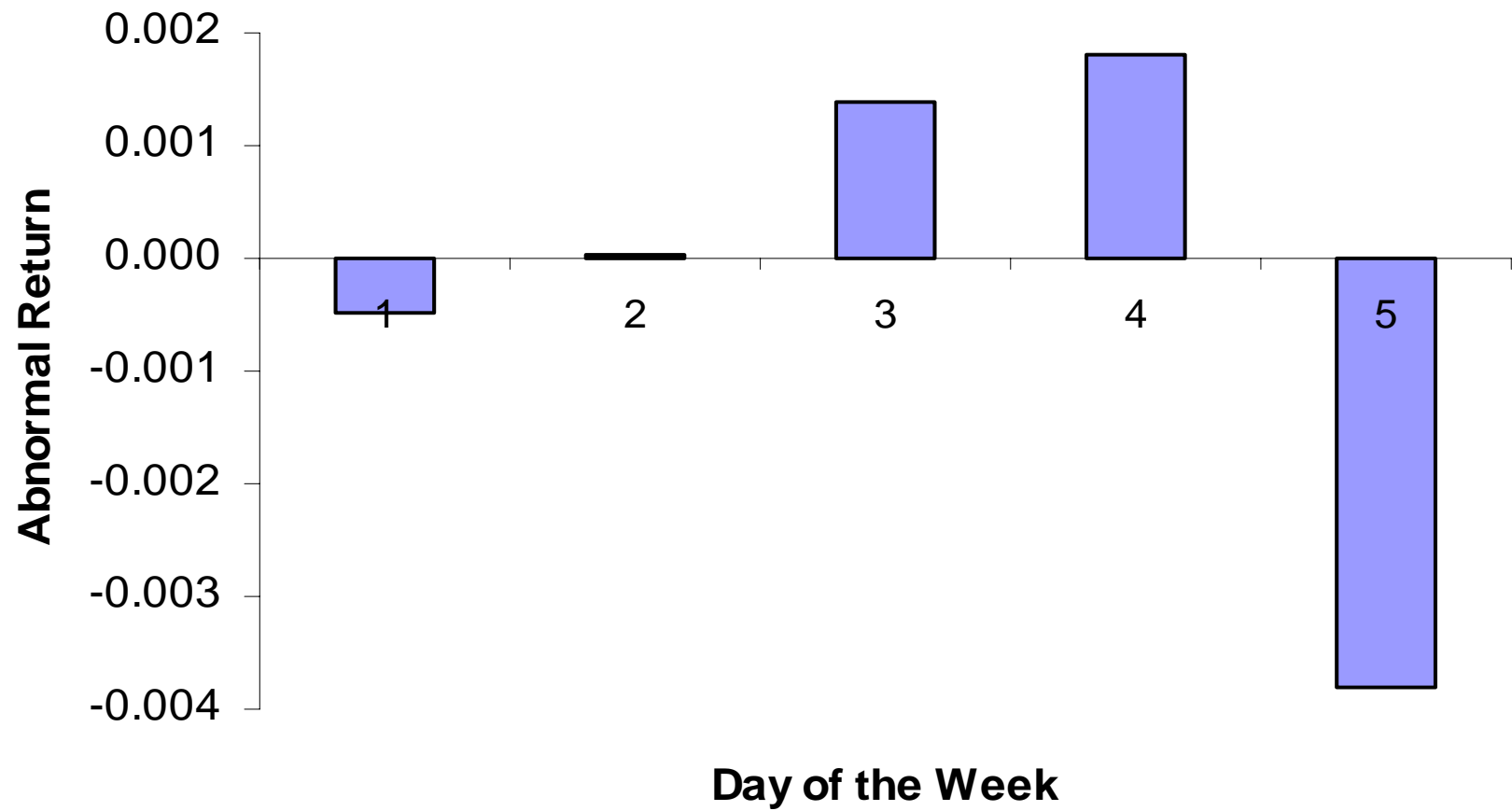
4 Market Reaction to Biases: Employers

- 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 paid by the hour and to same 2-digit industry in the two year

    * 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
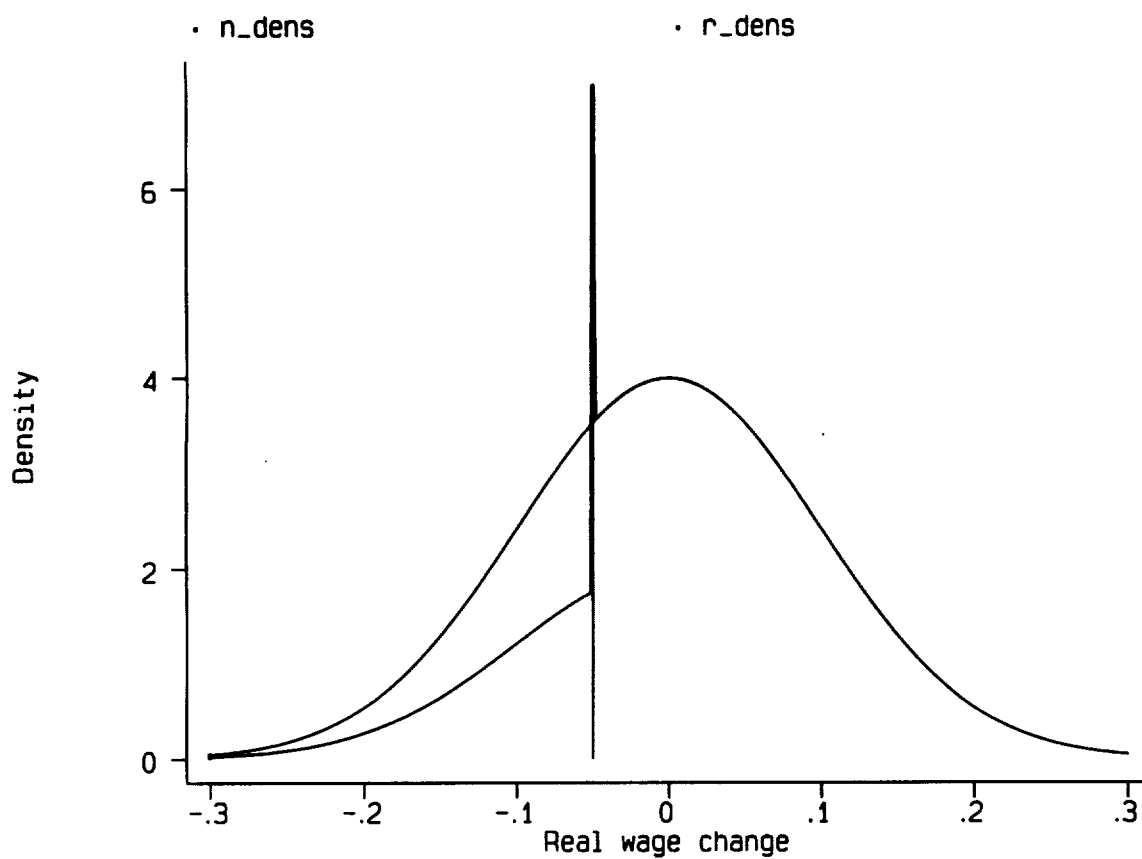
  - Positive log wage changes would not be affected

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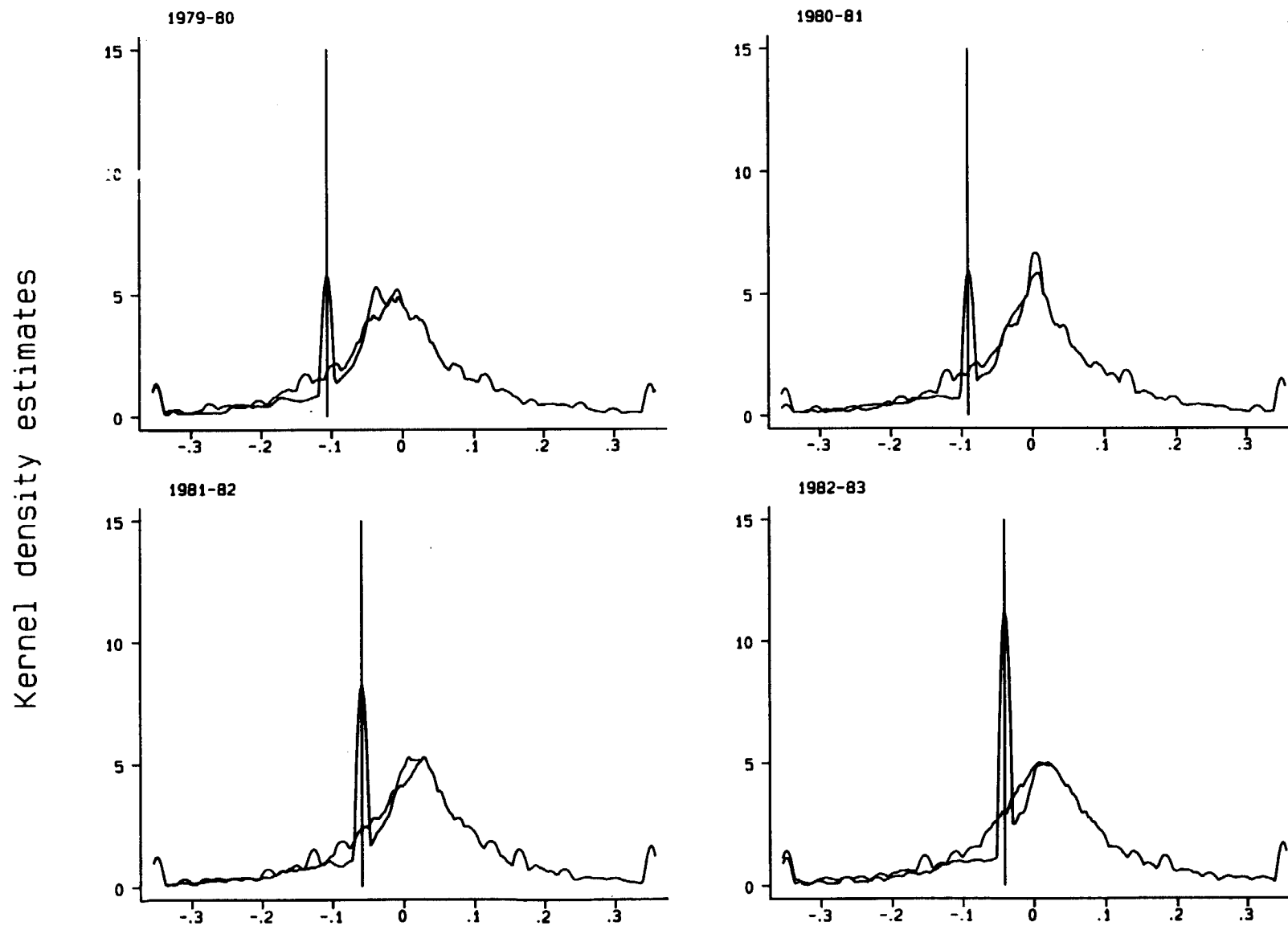of Real Wage Changes -- Theoretical Illustration

Figure 4: Smoothed (Kernel) Estimates of Actual and Counterfactual Densities of Real Wage Changes, CPS Samples from 1979-80 to 1982-83
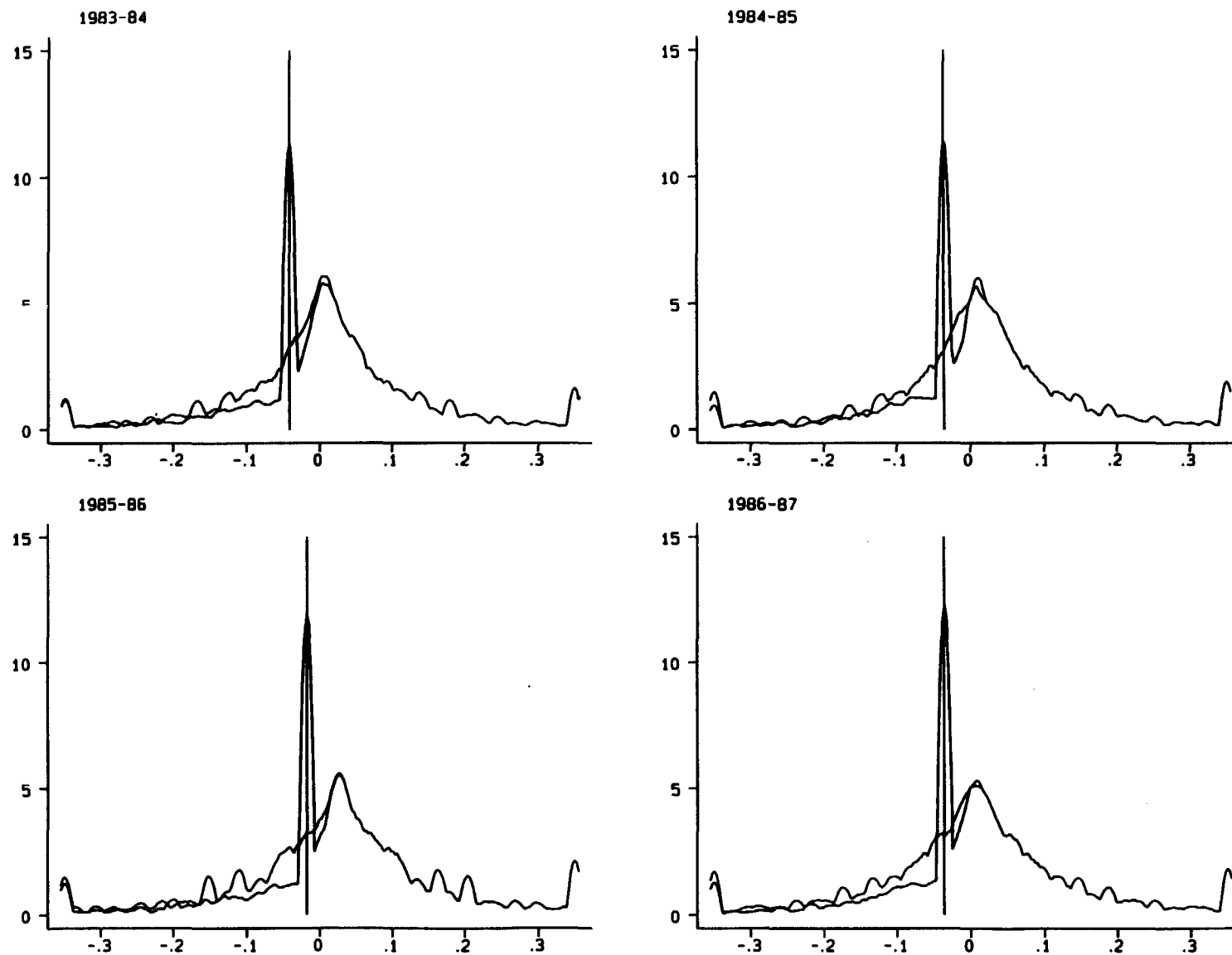
Figure 4 (Continued): Smoothed (Kernel) Estimates of Actual and Counterfactual Densities
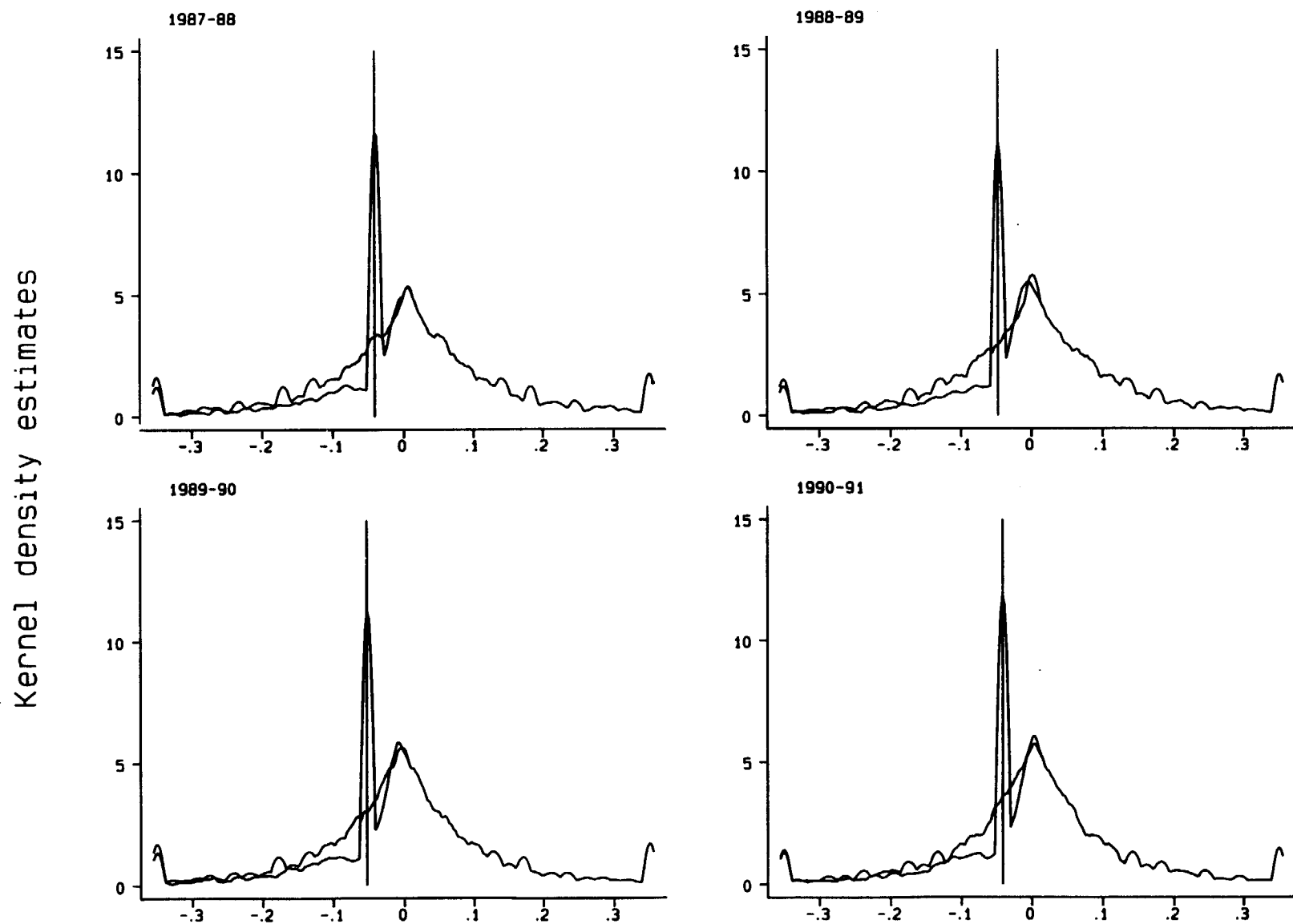of Real Wage Changes, CPS Samples from 1983-84 to 1986-87

Figure 4 (Continued): Smoothed (Kernel) Estimates of Actual and Counterfactual Densities of Real Wage Changes, CPS Samples from 1987-88 to 1990-91
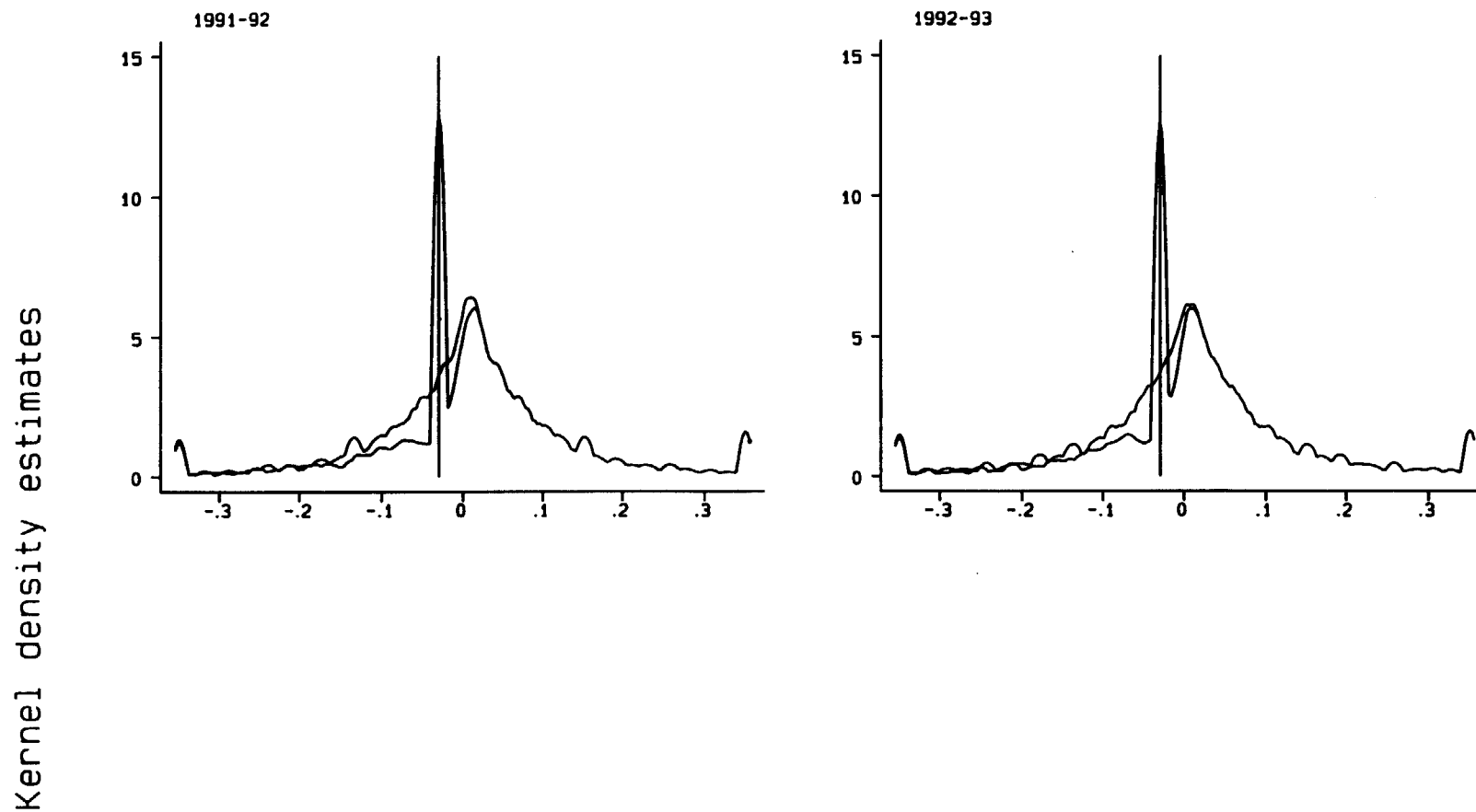
Figure 4 (Continued): Smoothed (Kernel) Estimates of Actual and Counterfactual Densities of Real Wage Changes, CPS Samples from 1991-92 to 1992-93

- Large effect of nominal rigidities

- Effect on firings?

5 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

- In other market, marginal investor knows more

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

Percent of Games

.113924

0

0   .1   .2   .3   .4   .5   .6   .7   .8   .9   1
frac_hf
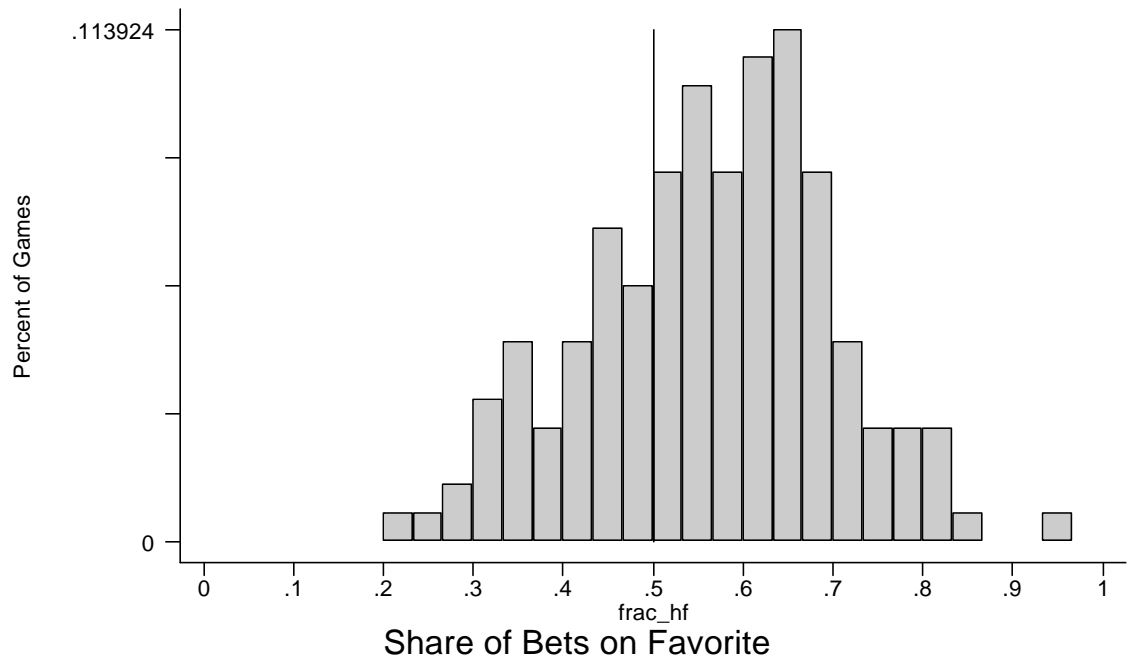
Share of Bets on Favorite

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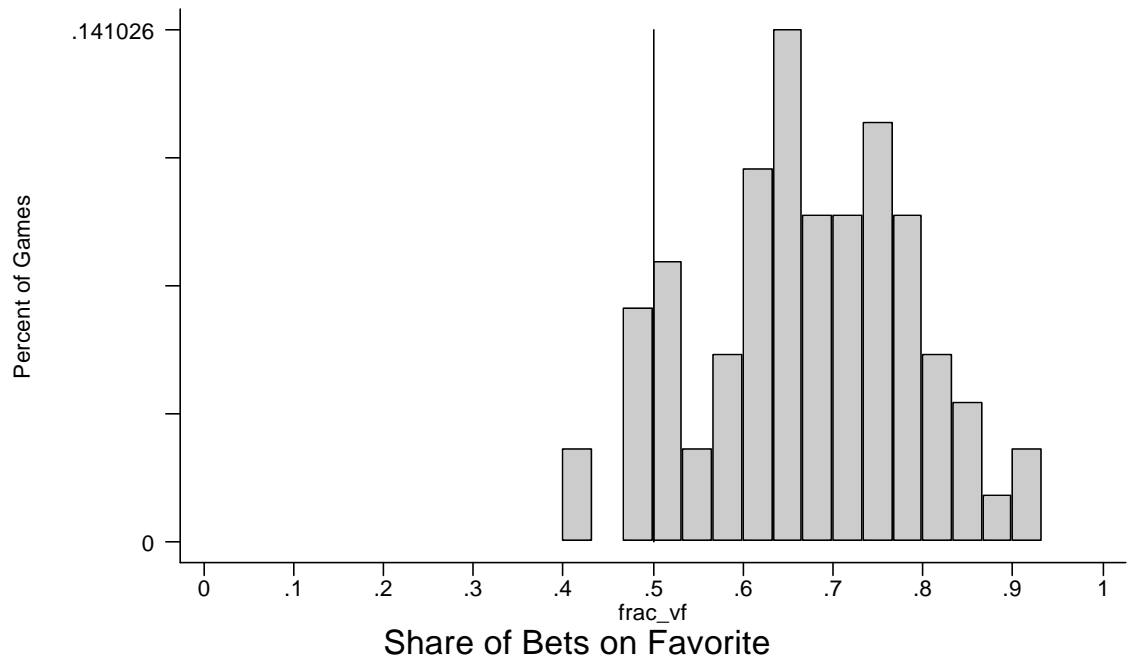when the Visiting Team is the Favorite

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

Variable	Dependent variable: Percent of bettors placing bets on the team that is favored			
	(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.