Paying Not to Go to the Gym (June, 2006)

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Abstract

- How do consumers choose from a menu of contracts?
- The observed behavior is difficult to reconcile with standard preferences and beliefs.
- Cellular phone users; credit card users.
- A large literature in IO analyzes the profit-maximizing contract design (Jean Tirole,1988).
- Standard assumption: rational expectations about future consumption frequency.

Introduction

- In this paper we provide evidence that standard assumptions does not hold
- We compare different contracts and observe people choose the suboptimal one.
- We also document cancellation delays and attendance expectations.

The purpose of this paper…

- Showing the standard assumptions in contract theory does not hold here.
- It is important, both in terms of monetary magnitude and in terms of population involved and it has significant economic impact.
- We use datasets from three U.S. health clubs.
- The industry revenues for the year 2000 totalled $11.6 billion.
- It has also implications for the policy debate on obesity.
- Exploring potential explanations

Dataset

- Panel dataset from three health clubs in New England
- In contains information on the contractual choices and the day-to-day attendance of users who enrolled after April 1,1997 and tracked them through February 2001.
- Four types: standard, student, family and corporate.
- Subsidized, not-subsidized.

Contractual Menu

- Four Options :
- Monthly contract; range between $70(discounted) and $85(standard) for non-corporate users. Automatically renewed and cancellation can be done in person or by sending a letter.
- Annual contract; charges up front ten times the applicable monthly fee. contract expires at the end of the year.
- The pay-per-visit system; pay $12 per visit or purchase a ten-visit pass for $100.

Descriptive Statistics

- Average fee per month ranges between $44 and $52.
- Corporate memberships account for 50% of the sample, while students account for 2%.
- Individuals with monthly contract attend on average 4 times per month.
- Individuals with annual contract attend on average 4.4 times per month.

Contract Choice at enrollment; The model

- health club attendance involves immediate effort costd

And delayed health benefits.

- Two types of people:

  Low cost c=$\underline{c}$ high cost c=$\bar{c}$

  Differ in

- ex ante probabilities that cost will be high.
- A contract *(L′,p′,T′)* gives right to the customers to exercise for time T′ for a fee p′, once the flat fee L′ has been paid.

Contract Choice at enrollment; Predictions

- Prediction 1:
- Between two contracts *(L,o,T) ,(o,p,T)*
  for agents who choose flat rate contract

$$\frac{L}{E_f[\mathrm{v}]}\, a(T) \leq p$$

$$a(T) = \frac{(1-\delta)T}{(1-\delta^T)}$$

Predictions

- Prediction 2(attendance of monthly and annual members):

  The average initial attendance of annual members is higher than the average initial attendance of monthly members:

$$E_A[\mathrm{v}] > E_M[\mathrm{v}]$$

Predictions

- **Prediction 3 (forecast of attendance):** *The average forecast of attendance equals the average actual attendance.*

Contract Choice at enrollment; Findings

TABLE 3—PRICE PER AVERAGE ATTENDANCE AT ENROLLMENT

	Sample: No subsidy, all clubs		
	Average price per month (1)	Average attendance per month (2)	Average price per average attendance (3)
	Users initially enrolled with a monthly contract		
Month 1	55.23	3.45	16.01
	(0.80)	(0.13)	(0.66)
	$N = 829$	$N = 829$	$N = 829$
Month 2	80.65	5.46	14.76
	(0.45)	(0.19)	(0.52)
	$N = 758$	$N = 758$	$N = 758$
Month 3	70.18	4.89	14.34
	(1.05)	(0.18)	(0.58)
	$N = 753$	$N = 753$	$N = 753$
Month 4	81.79	4.57	17.89
	(0.26)	(0.19)	(0.75)
	$N = 728$	$N = 728$	$N = 728$
Month 5	81.93	4.42	18.53
	(0.25)	(0.19)	(0.80)
	$N = 701$	$N = 701$	$N = 701$
Month 6	81.94	4.32	18.95
	(0.29)	(0.19)	(0.84)
	$N = 607$	$N = 607$	$N = 607$
Months 1 to 6	75.26	4.36	17.27
	(0.27)	(0.14)	(0.54)
	$N = 866$	$N = 866$	$N = 866$
	Users initially enrolled with an annual contract, who joined at least 14 months before the end of sample period		
Year 1	66.32	4.36	15.22
	(0.37)	(0.36)	(1.25)
	$N = 145$	$N = 145$	$N = 145$

Findings

TABLE 4—DISTRIBUTION OF ATTENDANCE AND PRICE PER ATTENDANCE AT ENROLLMENT

	Sample: No subsidy, all clubs			
	First contract monthly, months 1–6 (monthly fee ≥ $70)		First contract annual, year 1 (annual fee ≥ $700)	
	Average attendance per month (1)	Price per attendance (2)	Average attendance per month (3)	Price per attendance (4)
Distribution of measures				
10th percentile	0.24	7.73	0.20	5.98
20th percentile	0.80	10.18	0.80	8.81
25th percentile	1.19	11.48	1.08	11.27
Median	3.50	21.89	3.46	19.63
75th percentile	6.50	63.75	6.08	63.06
90th percentile	9.72	121.73	10.86	113.85
95th percentile	11.78	201.10	13.16	294.51
	$N = 866$	$N = 866$	$N = 145$	$N = 145$

Findings

- **Finding 1 (price per expected attendance at enrollment):** *Users who choose an unsubsidized flat-rate contract pay a price per average attendance of over $17 in the monthly contract and over $15 in the annual contract. The share of users who pay ex post less than $10 per visit is 20 percent in the monthly contract and 24 percent in the annual contract.*

Robustness

- Sample
- Underrecording of attendance
- Ex post subsidies
- Membership benefits

Findings

TABLE 5—AVERAGE ATTENDANCE IN MONTHLY AND ANNUAL CONTRACTS
(Sorting)

	Average attendance during the *n*-th month since enrollment		
	Sample: All clubs		
	Month 2	Month 3	Month 4
Monthly contract	5.507	5.005	4.614
	(0.0668)	(0.0696)	(0.0709)
	$N = 6219$	$N = 5693$	$N = 5225$
Annual contract	5.805	5.629	5.193
	(0.1885)	(0.1934)	(0.1913)
	$N = 862$	$N = 841$	$N = 817$

Findings

- **Finding 2 (attendance of monthly and annual members):** *Average attendance in months 2–4 is 10 percent higher under the annual contract than under the monthly contract.*

Findings on the rational expectation

- **Finding 3 (forecasts of attendance):** *The average forecasted number of monthly visits, 9.50 (s.e. 0.66), is more than twice as large as average attendance, 4.17.*

- Consistent with Prediction 1
- With known expectations 30 out of 48 people on the survey chose a ten-visit pass

Contract Choice over Time

- Comparing Renewal Decisions
- Monthly contracts requires a small effort for cancellation while annual contract needs none.
- We evaluate the impact of these differences on cancellation lag, survival probabilities,
  and average attendance over time in a simple
  setup with standard preferences and beliefs

Calibration

- Two Agents with identical preferences an effort cost; one with a monthly contract, the other with annual one.

  s: daily saving from switching to pay-per-visit contract

  δ=discount factor

  k=one-time effort cost of cancellation

Renewal on Annual Contract

- Cancellation cost is zero
- Drops out if $\frac{\delta s}{1-\delta}$ >o or equivalently s>o

Renewal on monthly Contract

- Cancellation cost k is stochastic with i.i.d each day from cdf F

$$V = E[\max(-k, -\delta s + \delta V)]$$

- The solution of the agent's dynamic programming problem is a threshold level k^*

Renewal on monthly Contract

- $E[T]$: the expected number of days until the cancellation
  - $E[T] = \frac{(1-F(k^*)}{F(k^*)}$
- We derive the upperbound for $E[T]$

Upper Bound for $E[T]$

- $k_{0.2}$= $bottom\ quintile\ of\ cost\ distribution$
- $\underline{k} = lower\ bound\ on\ cost\ distribution$
  - $E[T] < \max(4, [\frac{k_{0.2} - \underline{k}}{s}]$
- $k_{0.2}$=10 , $\underline{k} = 0$ yields $E[T]$<4.3

Predictions

- **Prediction 4 (cancellation lags under the monthly contract):** *Low attenders under the monthly contract delay cancellation for at most a few days.*

Predictions

- **Prediction 5 (survival probability):** *The survival probability after one and after two years is higher for agents who initially chose the annual membership than for agents who initially chose the monthly membership*

Predictions

- **Prediction 6 (expected attendance over time for annual contract):** *Among users initially enrolled in an annual contract, the expected attendance in the second year among stayers is higher than the expected attendance in the first year for the initial group.*

Predictions

- **Prediction 7 (expected attendance over time for monthly contract):** *Among users initially enrolled in a monthly contract, the expected attendance among stayers should increase from month to month.*

Findings

- **Finding 4 (cancellation lags under the monthly contract):** *On average, 2.31 full months elapse between the last attendance and contract termination for monthly members, with associated membership payments of $187. This lag is at least four months for 20 percent of the users*

Survival Probability

- *Running the probit estimation:*
  - $s_i = 1 \; if \; s_i^* = \alpha + \Upsilon M_i + BX_i + \epsilon_i \geq 0$

Probit Estimation

TABLE 6—PROBIT OF RENEWAL DECISION

Sample	Non-missing controls, all clubs						No subsidy, all		No subsidy II, all	
Dependent variable	Enrollment at 15th month		Enrollment at 16th month		Enrollment at 27th month		Enrollment at 15th month		Enrollment at 15th month	
Controls	No controls (1)	Controls + time dummies (2)	No controls (3)	Controls + time dummies (4)	No controls (5)	Controls + time dummies (6)	No controls (7)	Controls + time dummies (8)	No controls (9)	Controls + time dummies (10)
Dummy for enrollment with monthly contract	0.0483 (0.0218)**	0.066 (0.0221)***	0.0337 (0.0221)	0.0546 (0.0224)**	0.0011 (0.0260)	0.0271 (0.0254)	0.0634 (0.0479)	0.0694 (0.0501)	0.091 (0.0368)**	0.1019 (0.0372)***
Female		−0.0438 (0.0143)***		−0.0425 (0.0144)***		−0.0762 (0.0165)***		−0.0187 (0.0394)		−0.0186 (0.0277)
Age		0.0133 (0.0046)***		0.0155 (0.0046)***		0.0228 (0.0052)***		0.0304 (0.0111)***		0.0229 (0.0077)***
Age squared		−0.0001 (0.0001)**		−0.0002 (0.0001)**		−0.0002 (0.0001)***		−0.0003 (0.0001)**		−0.0003 (0.0001)***
Corporate member		0.0728 (0.0144)***		0.0676 (0.0145)***		0.0676 (0.0167)***		0.234 (0.0471)***		0.0024 (0.0319)
Student member		−0.1123 (0.0503)**		−0.0924 (0.0519)*		−0.0894 (0.0567)		0.1966 (0.2669)		−0.1173 (0.0666)*
Month and year of enrollment		X		X		X		X		X
Baseline renewal probability for annual contract	0.3983	0.4017	0.3906	0.3932	0.2609	0.2589	0.4701	0.5537	0.4252	0.4347
Number of observations	$N = 4,962$	$N = 4,962$	$N = 4,833$	$N = 4,833$	$N = 2,860$	$N = 2,860$	$N = 715$	$N = 715$	$N = 1,384$	$N = 1,384$

Findings

- **Finding 5 (survival probability):** *The survival probability after 14 months for the monthly contract is 17 percent higher than for the annual contract*

Attendance over time

TABLE 7—ATTENDANCE AND PRICE PER AVERAGE ATTENDANCE OVER TIME

	Sample: No subsidy, all clubs			Sample: All clubs		
	Average price per month (1)	Average attendance per month (2)	Average price per average attendance (3)	Average price per month (4)	Average attendance per month (5)	Average price per average attendance (6)
	Users initially enrolled with a monthly contract					
Months 1–6	75.26	4.36	17.27	44.77	4.33	10.35
	(0.27)	(0.14)	(0.54)	(0.23)	(0.05)	(0.13)
	$N = 866$	$N = 866$	$N = 866$	$N = 6,875$	$N = 6,875$	$N = 6,875$
Months 7–12	81.89	3.63	22.56	52.81	3.91	13.50
	(0.26)	(0.17)	(1.07)	(0.31)	(0.07)	(0.26)
	$N = 577$	$N = 577$	$N = 577$	$N = 3,867$	$N = 3,867$	$N = 3,867$
Months 13–18	81.27	3.89	20.88	52.99	4.41	12.03
	(0.34)	(0.23)	(1.26)	(0.41)	(0.10)	(0.29)
	$N = 331$	$N = 331$	$N = 331$	$N = 2,131$	$N = 2,131$	$N = 2,131$
Months 19–24	81.82	3.97	20.59	53.95	4.45	12.12
	(0.37)	(0.31)	(1.62)	(0.59)	(0.14)	(0.39)
	$N = 189$	$N = 189$	$N = 189$	$N = 1,130$	$N = 1,130$	$N = 1,130$
	Users initially enrolled with an annual contract					
Year 1	66.32	4.36	15.22	44.16	4.19	10.55
	(0.37)	(0.36)	(1.25)	(0.69)	(0.16)	(0.45)
	$N = 145$	$N = 145$	$N = 145$	$N = 598$	$N = 598$	$N = 598$
Year 2	67.70	5.98	11.32	46.72	5.82	8.02
	(1.07)	(0.87)	(1.67)	(1.68)	(0.45)	(0.68)
	$N = 35$	$N = 35$	$N = 35$	$N = 108$	$N = 108$	$N = 108$

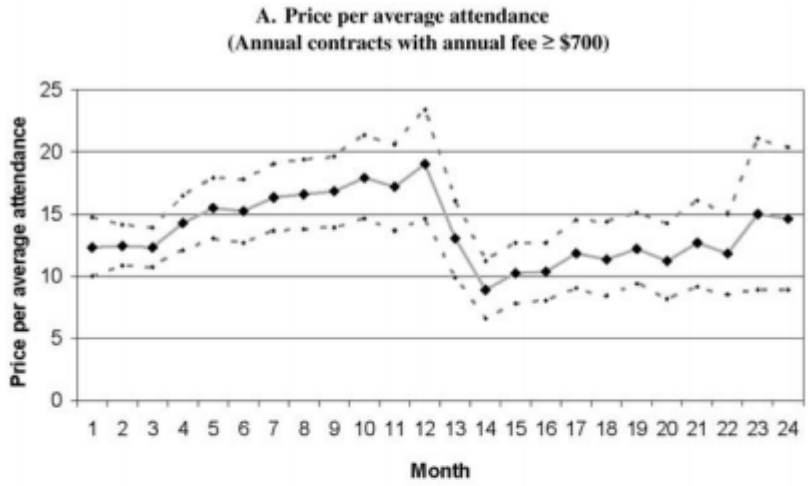
Findings

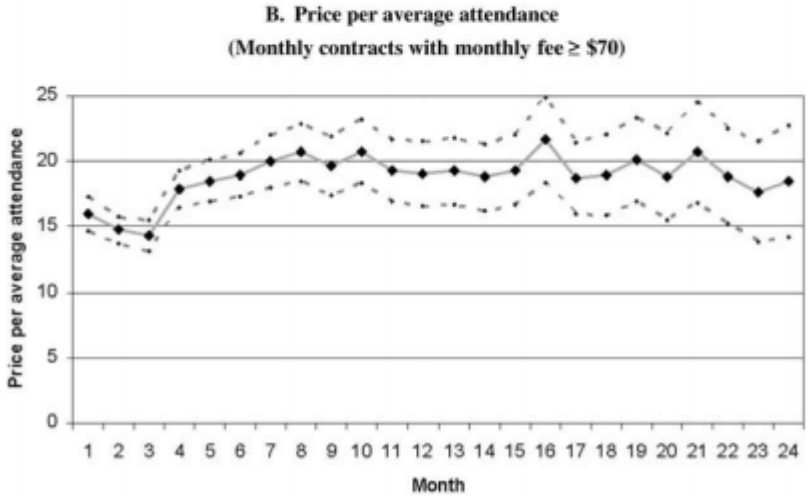
- **Finding 6 (average attendance over time in annual contract):** *In the annual contract, average monthly attendance for the initial group in the first year, 4.36, is significantly lower than for stayers in the second year, 5.98*

Findings

- **Finding 7 (average attendance over time in monthly contract):** *Average monthly attendance in the first six months of a monthly contract, 4.36, is 20 percent higher than in the next six months and is significantly higher than in any of the later six-month periods among stayers.*

Attendance over time





Summary

- Unsubsidized monthly members spend on average $187 for periods with no attendance before cancellation (Finding 4
- In addition, after one year, more monthly members are still enrolled in a flat-rate contract than annual members (Finding 5). Surprisingly, members who pay higher fees for the option to cancel each month are more likely to renew past a year. (contrary to finding 2)
- . Finally, average attendance decreases by 20 percent between the first six months and the next six months in the monthly contract (Finding 7), a pattern opposite to the one found for annual contracts (Finding 6)

Possible interpretation

- Risk Aversion
- Transaction costs
- Membership benefit
- Limited memory
- Time inconsistency with sophistication
- Time inconsistency with naivete
- Overestimation of net benefits
- Persuation

Conclusions

- In this paper we have discussed a procedure for estimating the parameters of nonlinear rational expectations models when only a subset of the economic environment is explicitly specified a priori. We also described how to test the over-identifying restrictions implied by the particular economic model being estimated. The advantages of these procedures are that they circumvent the need for explicitly deriving decision rules, and they do not require the specification of the joint distribution function of the observable variables. The techniques are appropriate for any dynamic model whose econometric implications can be cast in terms of a set of orthogonality conditions. As an application of these procedures, we estimated the parameters characterizing preferences in a model relating the stochastic properties of aggregate consumption and stock market returns.


Thank
You