219B – Final Exam – Spring 2014

Question #1 (Inattention)

In this Question we consider a simple model of inattention as we discussed in class and empirical evidence. Assume that a commodity's price p is given by $p_v + p_o$, where p_v is the part of the price that is visible, while p_o is the part of the price that is opaque (think of the tax or of the shipping costs). An inattentive agent perceives the price to be $p_v + (1-\theta)\,p_o$.

a) Discuss briefly the extent why $\theta \in [0,1]$ captures the degree of inattention.

b) Consider first the Hossain and Morgan (2007) paper on eBay auction with varying levels of the shipping cost p_o. (Neglect the role of the reserve price) Assume that bidders have independent private values. Consider first fully attentive bidders ($\theta = 0$) Since eBay is essentially a second-price auction, argue that an attentive bidder with value v should bid $b^* = v - p_o$ (the bid does not include the shipping cost). What is the revenue raised by the seller (the revenue includes the shipping cost)? What level(s) of p_o should a revenue-maximizing seller set when $\theta = 0$?

c) Re-compute the optimal bidding and the revenue raised for the case of inattention ($\theta \in (0,1]$, equal for all bidders). What level(s) of p_o should a revenue-maximizing seller set when $\theta > 0$?

d) (trickier) Consider now the case in which the inattention is not equal for all bidders, but rather each bidder has an inattention parameter θ drawn from a distribution F_θ with mean μ_θ. To simplify, assume that all bidders have the same value v. How does the fact that θ is stochastic affect the conclusions you derived in (b) in particular about the revenue raised? That is, is it the same to assume that all bidders have constant inattention $\bar{\theta}$ versus assuming a distribution F_θ which has mean $\bar{\theta}$?

e) Assume from now on the inattention model as in (b) and (c). Table 3 in Hossain and Morgan (2007) presents the revenue raised for treatment A (zero shipping cost, $p_o = 0$) and treatment B (high shipping cost $p_o = 3.99$). Using the information on the average revenue raised, provide an estimate for $\hat{\theta}$.(exclude the unsold item).

Table 3. Revenues from Low Reserve Treatments

CD Title	Revenues under Treatment A	Revenues under Treatment B	B - A	Percent Difference
Music	5.50	7.24	1.74	32%
Ooops! I Did it Again	6.50	7.74	1.24	19%
Serendipity	8.50	10.49	1.99	23%
O Brother Where Art Thou?	12.50	11.99	-0.51	-4%
Greatest Hits - Tim McGraw	11.00	15.99	4.99	45%
A Day Without Rain	13.50	14.99	1.49	11%
Automatic for the People	0.00	9.99	9.99	
Everyday	7.28	9.49	2.21	30%
Joshua Tree	6.07	8.25	2.18	36%
Unplugged in New York	4.50	5.24	0.74	16%
Average	*7.54*	*10.14*	*2.61*	*35%*
Average excluding unsold	*8.37*	*10.16*	*1.79*	*21%*

f) Table 4 in Hossain and Morgan (2007) presents the revenue raised for treatment C (shipping cost $p_o = 2$) and treatment D (high shipping cost. $p_o = 6$). Using the information on the average revenue raised, provide an estimate for $\hat{\theta}$.(exclude the unsold item). Provide an explanation for why $\hat{\theta}$ may be lower in this case (other than because of sampling error)

Table 4. Revenues from High Reserve Treatments

CD Title	Revenues under Treatment C	Revenues under Treatment D	D - C	Percent Difference
Music	9.00	8.00	-1.00	-11%
Ooops! I Did it Again	0.00	0.00	0.00	
Serendipity	12.50	13.50	1.00	8%
O Brother Where Art Thou?	11.52	11.00	-0.52	-5%
Greatest Hits - Tim McGraw	18.00	17.00	-1.00	-6%
A Day Without Rain	15.50	16.00	0.50	3%
Automatic for the People	0.00	0.00	0.00	
Everyday	10.50	13.50	3.00	29%
Joshua Tree	8.00	11.10	3.10	39%
Unplugged in New York	8.00	0.00	-8.00	-100%
Average	*9.30*	*9.01*	*-0.29*	*-3%*
Average excluding unsold	*12.15*	*12.87*	*0.73*	*6%*

g) Consider now the Chetty et al. (AER) paper on taxation and inattention. As you recall, the setting considered there is one in which consumers may be inattentive with respect to the tax, so $p_o = t$ and $p_v = P$, which is the price of an item pre-tax. Without going into details, explain the strategy from the quasi-field experiment to identify the inattention parameter θ in that paper, and compare it to the strategy used to identify θ in the Hossain and Morgan (2007) paper. (That is, focus on the experiment in the store, not the evidence on the excise tax for alcohol)

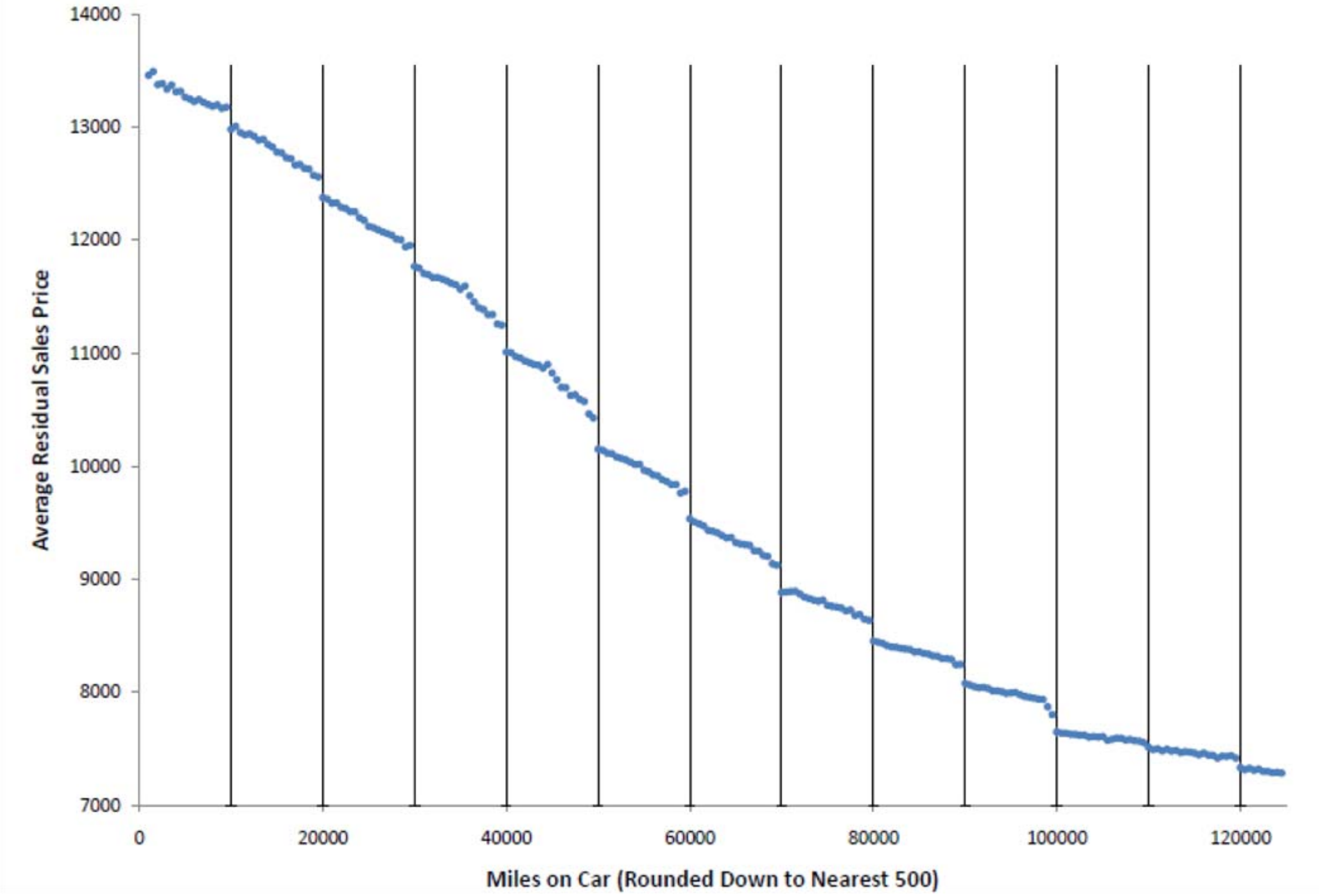
h) Finally, consider a related model of inattention which refers to the perception of round numbers. A seller sells one unit of a good produced at zero marginal cost. The sale price is p, which we can write as the sum of $\$d$ and c cents, that is, $p = d + .01c$, with $c \in \{0, 1, ..., 99\}$. The buyers are attentive to the dollars, but inattentive to the cents. That is, d plays the role of p_v above and c plays the role of p_o. Briefly discuss the plausibility of this assumption. How does an inattentive consumer perceive a price $p = d + .01c$? Plot the perceived price $\hat{p}$ as a function of the true price p.

i) A monopolist seller maximizes profits from the sale of the one unit knowing that the consumer will only buy if $\hat{p} \leq \bar{p} = \bar{d} + .01\bar{c}$, a reservation price. What pattern of pricing will we observe with full *in*attention, that is, $\theta = 1$? Will the pattern persist for intermediate inattention ($0 < \theta < 1$)? Characterize the qualitative features of the solution. Do we see evidence of this ins stores?

j) Assume now that the monopolist is setting hourly wages of a worker and seeks to minimize the wage bill subject to an individual rationality constraint. The manager sets the hourly wage to be $w = d + .01c$, same as above. How is perceived wage $\hat{w}$ by an inattentive employee? Qualitatively, what kind of wage setting would you expect with inattentive workers in this case?

k) Lacetera, Sydnor, and Pope (2009) consider a related case in which buyers of used cars pay full attention to the first digit of kilometers from the left in the odometer, but are inattentive with respect to the other digits. The attached Figure plots the distribution of auction prices for used cars on a wholesale auction sites (where the buyers are car dealers who will then re-sell the car to used car buyers) as a function of the number of miles on the odometer. Explain to what extent these findings refer to inattention. How do the authors estimate the amount of inattention θ that this graph suggests? (Explain the qualitative procedure)

Figure 4 - Price Residuals. This figure plots the average residual sales price within 500-mile bins for the more than 22 million auctioned cars in our dataset. The residual is obtained by removing make-model-model year-body effects from the sales price.



Question 2. (Short Questions)

a) **Wage Rigidity.** Discuss how the figure below from Card and Hyslop provides evidence of wage rigidity. (Reminder: the figure plots the observed and counterfactual distribution of real wage changes, with the line indicating the negative of the inflation rate)

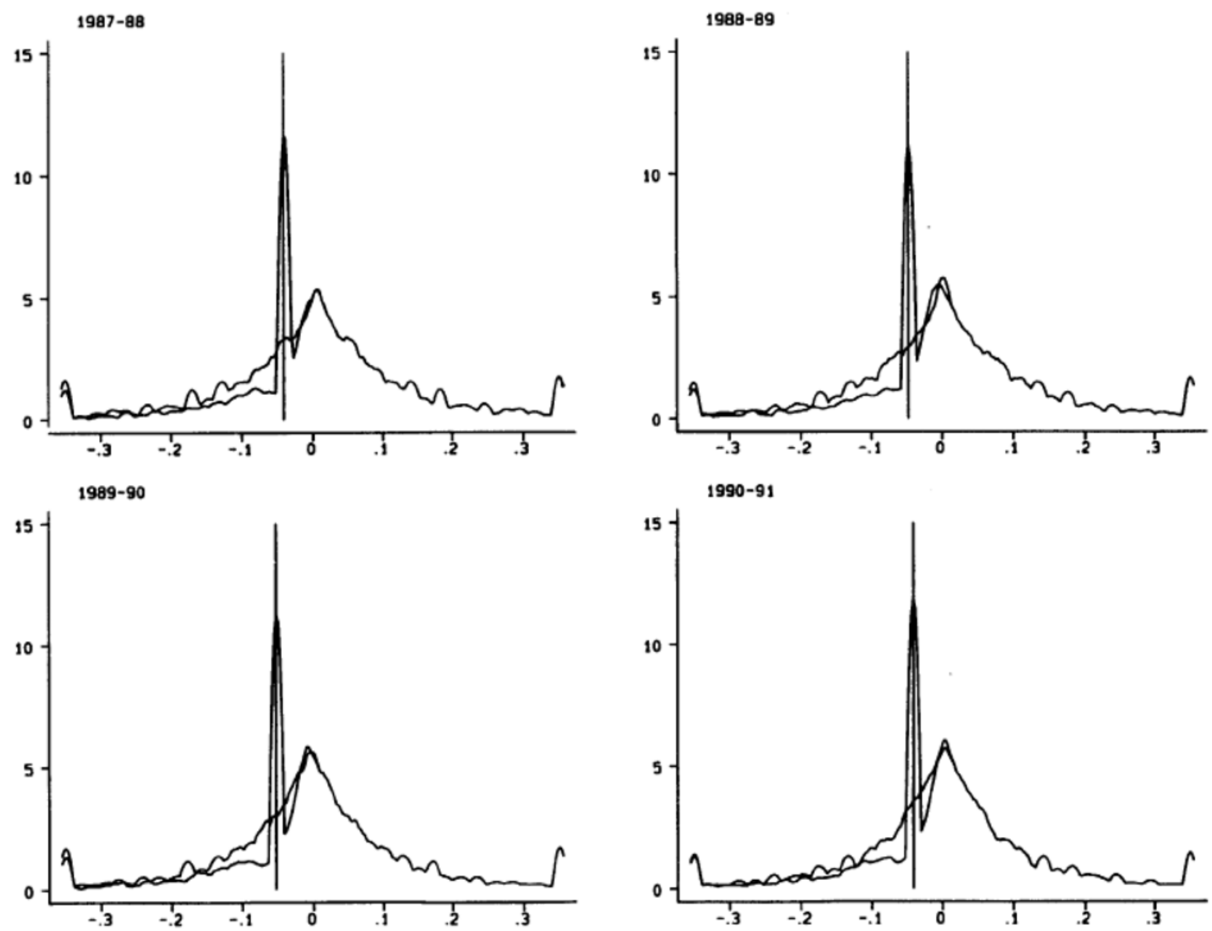


Figure 4 (Continued): Smoothed (Kernel) Estimates of Actual and Counterfactual Densities of Real Wage Changes, CPS Samples from 1987-88 to 1990-91

b) **Overconfidence.** Discuss how the Odean (1999) results on excessive trading relate to the literature on overconfidence. (Reminder: The returns results in Table 1 from trading do not include the trading costs)

TABLE 1—AVERAGE RETURNS FOLLOWING PURCHASES AND SALES

Panel A: All Transactions

	n	84 trading days later	252 trading days later	504 trading days later
Purchases	49,948	1.83	5.69	−24.00
Sales	47,535	3.19	9.00	27.32
Difference		−1.36	−3.31	−3.32
N1		(0.001)	(0.001)	(0.001)
N2		(0.001)	(0.001)	(0.002)

c) **(Reference Dependence and Bunching)** Consider a setting in which a decision-maker is putting effort e to achieve an objective, and faces a convex cost of effort $c(e)$. The return of effort e is ve, and the return is evaluated relative to a reference point r. The individual hence maximizes

$$\max_e ve + \eta [ve - r] - c(e) \text{ for } ve \geq r$$
$$\max_e ve + \eta\lambda [ve - r] - c(e) \text{ for } ve < r$$

Derive the first order conditions and provide the solution as a function of v. Comment: '*Bunching is a hallmark of the reference-dependent model*'. Discuss and explain where there would be bunching.

d) **(ctd)** Relate to the findings on marathon-runners (Allen, Dechow, Pope, Wu (2014)) and on tax elusion (Rees-Jones (2014)).

Question #3 (Contract Design and Self-Control)

This Question elaborates on the DellaVigna-Malmendier (QJE, 2004) paper. Assume that consumers have preferences $\left(\beta, \hat{\beta}, \delta\right)$ and they are interested in consuming an investment good which yields a payoff of $-c$ at $t = 1$ and a delayed payoff of $b > 0$ at $t = 2$. At $t = 0$, c is unknown, with a distribution $F(c)$; the realization c is realized at $t = 1$, before the consumer decides whether to consume the good. A monopolistic firm produces such investment goods for a marginal cost a (paid at $t = 1$) and intends to sell them to the consumer using a two-part tariff: L (paid at $t = 1$) is the lump-sum fee and p (also paid at $t = 1$) is the per-usage fee. The consumer alternative option yields a utility $\bar{u}$, realized at $t = 1$. The firm offers a contract (L, p) to the consumer at $t = 0$ and the consumer accepts it or rejects it also at $t = 0$. At $t = 1$, the consumer (if she accepted the contract) decides whether to consume the good.

a) Under what condition for c the consumer *actually* consumes at $t = 1$ (assuming that she signs the contract)? Under what condition for c the consumer *expects* to consume at of $t = 0$? Under what condition for c the consumer *would like* to consume at $t = 1$, as of $t = 0$? Relate to the notions of self-control and naiveté.

b) Write down the maximization problem for the monopolist at $t = 0$. The monopolist maximizes profits subject to the Individual Rationality constraint for the agent. (Remember: The firm is aware of the self-control problems of the agent) Solve for L from the IR constraint and substitute it into the maximization problem.

c) Derive the first-order condition and derive an expression for p^*. [Hint: You may need the rule $\frac{\partial}{\partial x}\left(\int_{g(x)}^{f(x)} h(x, z)\, dz\right) = \frac{\partial f(x)}{\partial x} h(x, f(x)) - \frac{\partial g(x)}{\partial x} h(x, g(x)) + \int_{g(x)}^{f(x)} \frac{\partial h(x,z)}{\partial x} dz$] After rearranging, you should obtain: [work with this expression below if you are stuck]

$$p^* - a = -\left(1 - \hat{\beta}\right)\delta b \frac{f\left(\hat{\beta}\delta b - p^*\right)}{f\left(\beta\delta b - p^*\right)} - \frac{F\left(\hat{\beta}\delta b - p^*\right) - F\left(\beta\delta b - p^*\right)}{f\left(\beta\delta b - p^*\right)}.$$

d) What type of pricing for p^* do you get for exponential agents ($\beta = \hat{\beta} = 1$)? Provide intuition on this result.

e) What type of pricing for p^* do you get for sophisticated agents ($\beta = \hat{\beta} < 1$)? Provide intuition on this result, commenting on the magnitude of p^*.

f) What type of pricing for p^* do you get for fully naive agents ($\beta < \hat{\beta} = 1$)? Provide intuition on this result.

g) So far we assumed homogeneity of consumers. Assume now that there are two groups of consumers. As share μ of consumers are fully naive with $\hat{\beta} = 1$, while a share $1 - \mu$ of consumers are exponential ($\beta = \hat{\beta} = 1$). The two consumers have the same δ and the same cost distribution $F(c)$. Set-up the firm maximization problem. [Hint: Argue that these consumers choose the same contract]

h) Derive the first-order conditions and solve for p^* for the case in point g). Compare the solution to the solutions that you derived in points d) (for exponentials) and f) (for naives).

i) Consider now the case of perfect competition, reverting back to the assumption of homogeneity among consumers. Instead of having just one company, there are multiple firms competing on the contracts, as in a Bertrand model. A way to solve the case of perfect competition is to maximize the perceived utility of consumers, subject to a condition that the firm profits equal zero. (Since we know that in equilibrium, profits will equal zero in a Bertrand-type competition). Set up this problem.

j) Solve for p^*_{PC} and compare to the p^* that you derived above. How does the optimal contract (L^*, p^*) differ under perfect competition and monopoly?

k) Going back to the monopoly case above, how would the problem change if the firm cannot offer a two-part tariff, but only a price p. Does self-control still matter in the determination of prices? Discuss.