219B – Final Exam – Spring 2015

Question 1. (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)

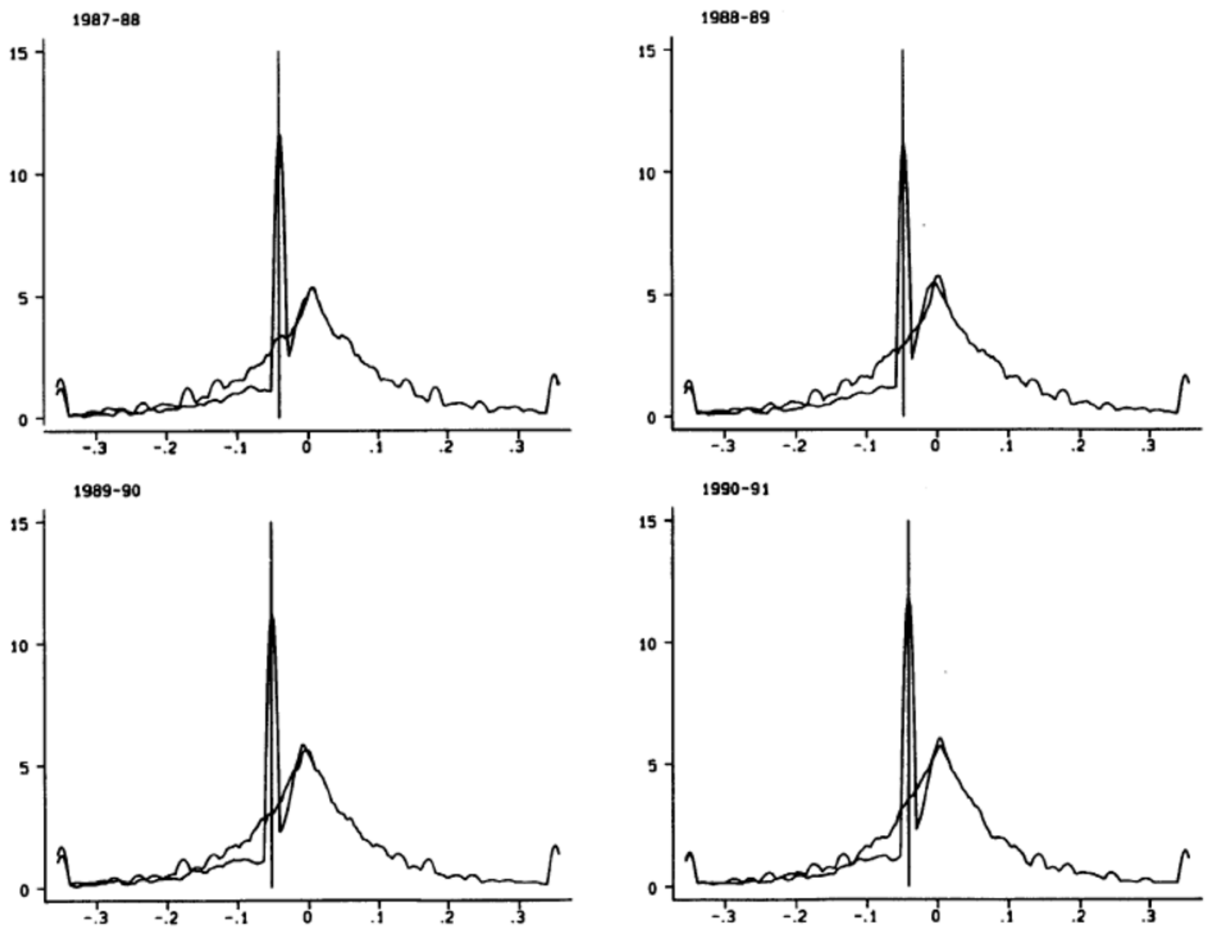


Figure 4 (Continued): Smoothed (Kernel) Estimates of Actual and Counterfactual Densities of Real Wage Changes, CPS Samples from 1987-88 to 1990-91

b **Limited Attention**. Sketch how the results of the Hossain and Morgan field experiment on shipping costs in eBay can be used to estimate a model of shipping costs. Start by describing the results in the attached table (Reminder: Treatment A has reserve price $r = \$4$ and shipping cost $c = \$0$, Treatment B has reserve price $r = \$.01$ and shipping cost $c = \$3.99$. Also, the revenue includes the shipping cost)

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%*

c) **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)

Question 2.

We consider a setting as in the Kaur, Kremer, and Mullainathan paper on self-control at work. This question extends into Question 3. The worker has time preferences $\left(\beta, \hat{\beta}, \delta\right)$ model. The worker decides how much effort e_t to put at work at time $t = 1, 2$. Effort has immediate costs $-c(e)$, with $c(0) = 0, c'(0) = 0, c' > 0$ and $c'' > 0$. The product of work is stochastic: it is high output y_H with probability e, in which case the worker earns w_H and it is low output y_L with probability $1 - e$, in which case the worker earns $w_L < w_H$. The worker decides effort at work in periods $t = 1$ and $t = 2$ and pays the effort cost immediately, but pay is at $t = 2$ in both cases. The worker is risk-neutral.

a) Discuss briefly why the maximization problem of the worker at $t = 1$ when deciding e_1 is

$$\max_{e_1} \beta\delta \left[e_1 w_H + (1 - e_1) w_L\right] - c(e_1). \tag{1}$$

b) Derive the first order conditions and derive the comparative statics of $e_1^*$with respect to β, δ, and $w_H - w_L$. Provide intuition.

c) Now write down the maximization problem of the worker at $t = 2$ when deciding e_2^*.

d) Derive the first order conditions and derive the comparative statics of e_2^* with respect to β, δ, and $w_H - w_L$. Provide intuition.

e) In light of the parts above, describe this first prediction tested in Kaur et al.: **Prediction 1.** *Worker exhibit a payday cycle (that is, $e_1^* < e_2^*$)* When is this true? Give conditions on β, $\hat{\beta}$, and δ.

f) Now consider the maximization problem (1) regarding e_1^* but evaluated from the perspective of the $t = 0$ self. Write down the value function V_0 of the problem (1) from the perspective of the self $t = 0$.

g) Consider first a time-consistent agent ($\beta = \hat{\beta} = 1$) and use the envelope theorem to derive dV_0/dw_L. (To be clear, we vary w_L holding w_H constant) What is the sign of dV_0/dw_L? Discuss the intuition.

h) Consider now a sophisticated time-inconsistent agent ($\beta = \hat{\beta} < 1$) and similarly derive an expression for dV_0/dw_L. Can you use the envelope theorem? What is the sign of dV_0/dw_L? Discuss the sign of the parts of the expression and provide intuition.

i) Consider now a (fully) naive time-inconsistent agent ($\beta < \hat{\beta} = 1$) and similarly derive dV_0/dw_L. (For the naive, V_0 is how the naive sees the future value, it is not the true future value function) Can you use the envelope theorem? What is the sign of dV_0/dw_L? Discuss the intuition.

j) In light of these parts, discuss a second prediction. **Prediction 2.** *Some workers may demand a commitment device (that is they prefer a low w_L).* Which workers? Under what conditions?

k) In light of your response to the above point, why is the demand for commitment device a more unique distinguishing feature than a payday cycle?

l) Suppose now that there can be three types of workers. A fraction p_{TC} is time-consistent, a fraction p_S is sophisticate, and the remaining $1 - p_{TC} - p_S$ is naive. Importantly, the three types are identical other than in their β and $\hat{\beta}$. Under what conditions the following prediction is true: **Prediction 3:** *Types who exhibit a payday cycle (that is, $e_1^* < e_2^*$) also are more likely to exhibit demand for commitment (that is, prefer a low w_L as of $t = 0$)*

m) Consider now the case $\beta = \hat{\beta} = 1$ and assume that there are two types which differ in δ. Type Low has $\delta_L < \delta_H$, the discount factor of the high type. Can you get Prediction 3?

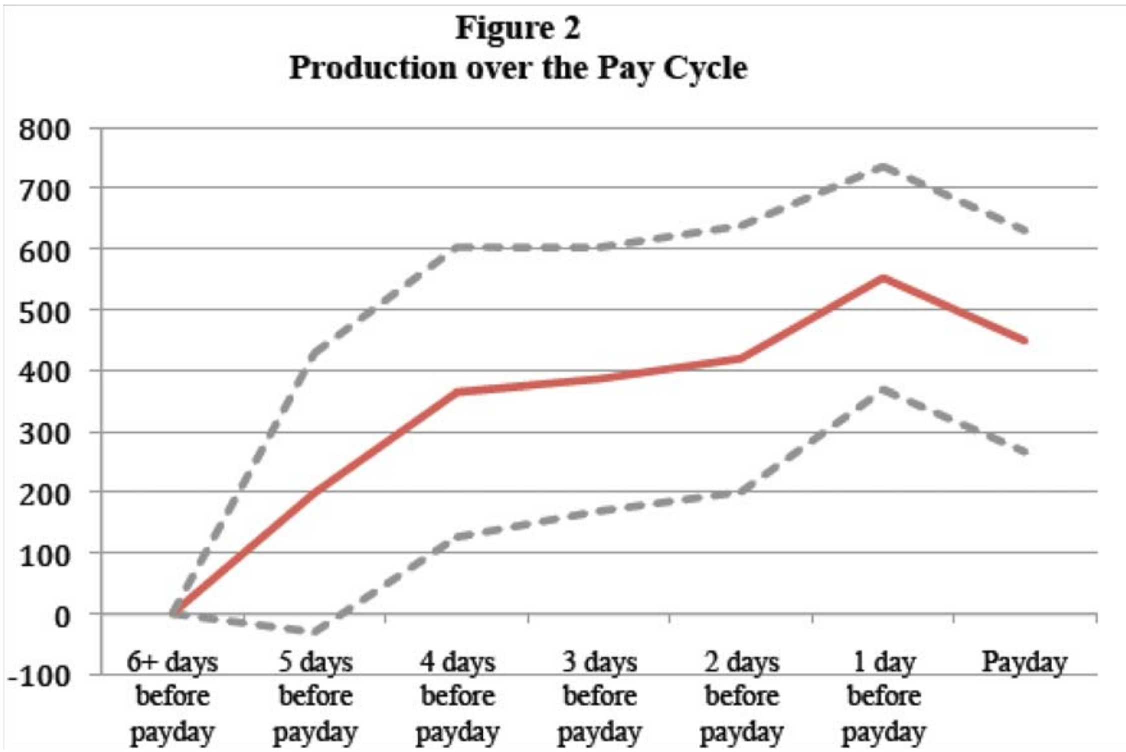
n) Going back to points (f)-(j), assume now that workers at time 0 can similarly have a commitment device to affect future effort, but this time they may decide to affect effort e_2^*, .as opposed to effort e_1^* as we considered till now. Without going through all the steps, explain as clearly as you can if this would change the derivation of the demand for commitment for the different types.

Question 3

In this question we relate field evidence to the simple model above.

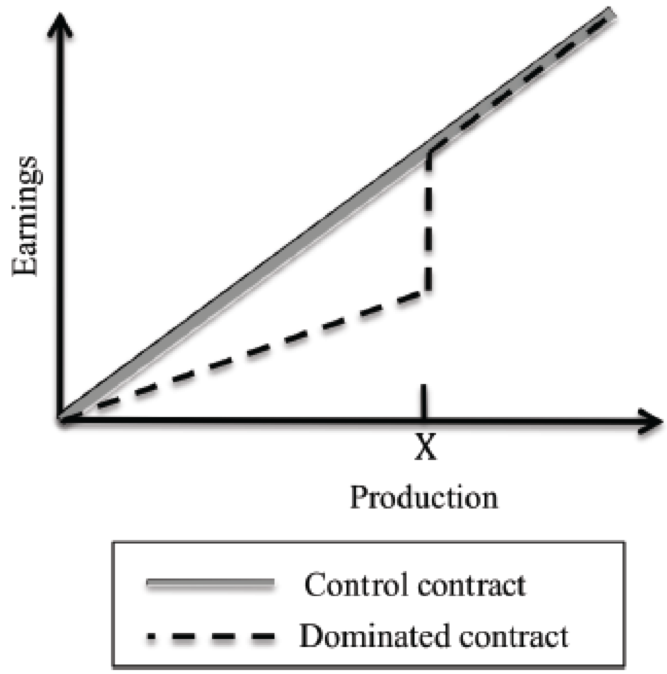
a) Summarize the setting and design of Kaur, Kremer and Mullainathan.

b) Discuss Figure 2 below and relate to Prediction 1 of a payday cycle. To what extent does the model support a present-bias model? To what extent it does not?



c) A finding in the paper is that approximately two thirds of workers choose a version of the dominated contract in the Figure below. Explain how this was implemented, and relate to Prediction 2.

Figure 1
Incentive Contracts



d) The authors also find a positive correlation between the payday effect and the demand for commitment. Relate Prediction 3 to the findings below.

Table 5
Heterogeneity in Take-up of Dominated Contracts: Correlation with Payday Impact

Dependent variable	*Target level chosen*	*Positive target indicator*
	(1)	(2)
High payday production impact	353	0.138
	(129)***	(0.044)***
Seat fixed effects	Yes	Yes
Date fixed effects	Yes	Yes
Lag production controls	Yes	Yes
Observations	4098	4098
R2	0.22	0.20
Dependent variable mean	759	0.28

e) Summarize briefly at least two more papers which examine the demand for commitment, in addition to the Kaur et al.

f) Is the demand for commitment generally as robust as in the Kaur et al. paper?

g) Discuss why the test of the demand for commitment is a one-sided test (That is, what can we conclude about present bias if we do *not* observe demand for commitment). What are reasons we may not observe demand for commitment even if individuals are present-biased (that is, $\beta < 1$).

Question 4

Consider a reference-dependent tax-filer who is deciding how much effort to expend on finding charitable receipts to lower the tax bill, as in the Alex Rees-Jones' paper. This agent has a marginal utility of money φ and thus gets a utility benefit φe for every dollar e that he saves from tax filing. Searching for receipts has a cost $c(e)$ which for simplicity we assume satisfies

$$c(e) = \frac{e^2}{2}$$

The agent also has gain-loss utility with a reference point r, which we assume to be the amount of taxes due pre-tax-elusion. So $e < r$ will indicate owing taxes, $e = r$ implies no tax due and $e > r$ indicates a tax refund. The agent thus has overall utility function

$$\begin{aligned} \max_e \varphi e + \eta\varphi [e - r] - e^2/2 \text{ for } e &\geq r \\ \max_e \varphi e + \eta\lambda\varphi [e - r] - e^2/2 \text{ for } e &< r \end{aligned} \tag{2}$$

a) Discuss briefly the various components in (2) and identify the gain and loss component.

b) Derive the first-order condition with respect to effort and plot it as a function of effort. Assume $\eta > 0$ and $\lambda > 1$. Distinguish three cases. Comment on the shape of the marginal utility of effort.

c) Derive the solution for e^*_{RD} for this reference-dependent filer. Comment on the qualitative features.

d) Plot the solution for e^*_{RD} as a function of φ (the marginal utility of money) Comment on the qualitative features.

e) Solve now for the non-loss averse standard case ($\lambda = 1$), solve for e^*_{St} and plot e^*_{St} as a function of φ. How does this differ from e^*_{RD}?

f) Now assume that we live in a world in which φ_j is uniformly distributed across tax-payers between 0 and 10: $\phi \sim U[0, 10]$. Also assume $\eta = 1$. We are interested in what the distribution of tax-filing would look like to an econometrician who cannot observe the ϕ_j, but can observe the ultimate distribution of e (since it determines the tax payment). Assume first no loss aversion ($\lambda = 1$) and plot the distribution of e^*_{St} observed by the econometrician.

g) Now, we turn to the reference-dependent case. Assume $\lambda = 2$, keeping $\eta = 1$ and $\phi \sim U[0, 10]$. Also assume that the reference point r equals 10 ($r = 10$). Plot the distribution of e^*_{RD} which the econometrician would observe. If you do not fully solve this through, use your intuition to go as far as you can. In doing this, remember that $e < r$ is the case in which the person owes taxes and $e > r$ is the case of getting a refund. Provide intuition.

h) Without necessarily solving for the exact levels, assume that the loss aversion increases to $\lambda = 3$. Plot how the observed distribution of e^*_{RD} that the econometrician sees would change.

i) Relate what you found to the 'bunching' test and 'shifting' test which Alex describes in his paper.

j) In which sense is it true that the 'bunching' and 'shifting' have to be of the same magnitude? Discuss.

k) Assume now a model with no loss aversion ($\lambda = 1$). However, there is a fixed utility gain V for meeting the utility target r. That is, the utility maximization is

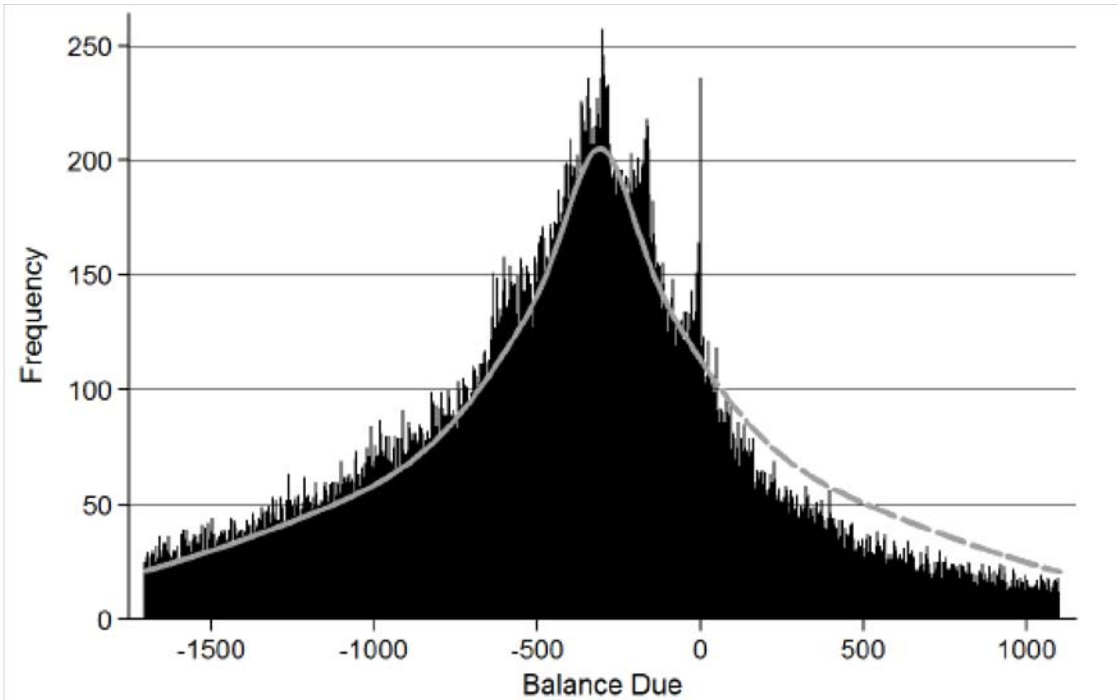
$$\max_e \varphi e + V \mathbf{1}_{\{e \geq r\}} - e^2/2.$$

What is the solution for e^*_{FU}?

l) Can you conjecture what the observed distribution of tax filing e^*_{FU} would look like to an econometrician, still assuming $r = 10$ but now with $\phi \sim U[0, 20]$. (This is just to make things look nicer) Make the needed assumptions about the size of V.

m) In light of this discussion, comment on the key finding in Alex Rees-Jones paper of the distribution of tax returns relative to the amount withheld (see Figure in next page).

n) Does it looks like the 'bunching' and 'shifting' have the same size? Does this look more like the reference-dependent model or the model with fixed utility gain?


250
200
150
100
50
0
Frequency
-1500
-1000
-500
0
500
1000
Balance Due