Econ 455 Discussion Section-Handout 2

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1 Present-Bias and Self Control:

1. **The Mortgage Problem:** As you may remember 2008, is known as the year of the Great recession, the year of the Suprime Mortgage Crisis, and the year of the Financial Crisis. Like most of the crisis it is unfair to blame just one side of the market. Today we are going to focus in why people stop paying their mortgages, and as a result, all the financial instruments that were issued regarding mortgages faced a high risk (That almost no one foresight). For simplicity consider a model with three periods, $t = 1, 2, 3$. In the first period the agent obtains his house. In the second period the agent has to choose between pay or default. Finally in the third period he could loose his home if he previously defaulted. Consider the two options of defaulting or not.

   - Paying the obligation. The agent gets a zero in his utility at $t = 2$ (since he has to pay) $u_2^p = 0$, at $t = 3$ $u_3^p = 18$
   - Default: At $t = 2$ $u_2^d = 6$, but then at $t = 3 u_3 = 0$
   - Consider two cases, the exponential discounter with $\delta = 2/3$, and the quasihyperbolic discounter with $\delta = 1$ and $\beta = 1/6$

   (a) In the standard model, is it irrational to default?
   If δ is low enough it is rational to defaul.

   (b) At $t = 1$, what are the present values for the exponential discounter ?
   Note that at $t = 1$, $PV = \delta u_2 + \delta^2 u_3$, so
   $PV^P = \frac{2}{3}(0) + \frac{4}{9}(18) = 8$, $PV^d = \frac{2}{3}(6) + \frac{4}{3}(0) = 4$

   (c) At $t = 2$ what are the present values for the exponential discounter?
   Note that at $t = 2$, $PV = u_2 + \delta^2 u_3$, so
   $PV^P = (0) + \frac{2}{3}(18) = 12$, $PV^d = (6) + \frac{4}{3}(0) = 6$

   (d) At $t = 1$ what are the present values for the quasihyperbolic discounter?
   Note that at $t = 1$, $PV = \beta\delta u_2 + \beta\delta^2 u_3$, so
   $PV^P = \frac{1}{6}(1)(0) + \frac{1}{6}(1)^2(18) = 3$, $PV^d = (1)(\frac{1}{6})(6) + (1)^2(\frac{1}{6})(0) = 1$

   (e) At $t = 2$ what are the present values for the quasihyperbolic discounter?
   Note that at $t = 2$, $PV = u_2 + \beta\delta u_3$, so
   $PV^P = (0) + \frac{1}{6}(1)(18) = 3$, $PV^d = (6) + (1)^2(\frac{1}{6})(0) = 6$

   (f) What will happen in the end with the exponential discounter?
   Since at $t = 1$ he sees that his benefit is greater by paying, he will take the mortgage and pay. Note that his desicion will not change, in fact this is always true since exponential discounting implies being time consistent

(g) What will happen in the end with the quasihyperbolic discounter if she is sophisticated? What if she is naive?

If she is sophisticated, she will see at $t = 2$ that she will default, which in $t = 1$ will make her do not want have the mortagage. For the Naif, she will think that she will not default in $t = 1$, so she takes the mortgage, however at the $t = 2$, she will default.

(h) Regulation, suppose that the government mandates that if someone defaults people will go to jail, leaving $u_3^d = -10$, will someone default?

Even fot the Naive at $t = 2$, the preent value of default isgreater than the one for paying, so the naive will end up in jail

2. **On Waiting:** Henry VIII, was a Quasihyperbolic discounter, with $\beta, \delta \in (0, 1)$ and he was indifferent between the folowing three alternatives: Get married twice in his early years, Get married 5 times in his adulthood years, or get married 10 times in his elderly years. (Henry VIII had 6 wives during his lifetime), obtain his true values of δ and β?

   Note that, when he has $u(2) = \delta\beta u(5) = \beta\delta^2 u(10)$. , so $\beta = \frac{u(2)}{\delta u(5)}$, which means that $u(2) = \frac{u(2)\delta}{u(5)} u(10)$, or $\delta = \frac{u(5)}{u(10)}$, and hence $\beta = \frac{u(2)u(10)}{u(5)u(5)}$.

3. **About weekend plans and being a sophisticated person:** This semester these are your possible options for weekends

   - Weekend 1: Go to Sundance and watch The Big Short $u_0 = 3$
   - Weekend 2: Go to the econ department party $u_1 = 5$
   - Weekend 3: Go to your T.A.'s birthday party $u_2 = 8$
   - Weekend 4: Go to the Madison's with your buddies $u_3 = 13$

- For all below questions assume that $\delta = 1$ and $\beta = 1/2$

  1. If you are an exponential discounter and can go to three events, which do you skip?

     Since the $\delta = 1$, the best alternative is to skip the one that has lower payoff, thus you skip the big short

  2. If you are a naive QH discounter and can go to three events, which do you skip?

     At the first weekend you see that $PV(The\,Big\,Short) = 3$ $PV =$ (Econ Party)$5\beta\delta = 2.5$ PV(T.A.) $= 8\beta\delta^2 = 4$, and PV(Madison's) $= 13\beta\delta^3 = 6.5$

     So as naive you plant to skip the econ deparment party, however on the following weekend, PV(Econ Party) $= 5$ PV(T.A.) $= 8\beta\delta = 4$, and PV(Madison's) $= 13\beta\delta^2 = 6.5$

     So you change your mind and go to the econ department party and you plan to skip my birthday, however on the following weekend PV(T.A.) $= 8, and PV$(Madison's) $= 13\beta\delta = 6.5$

     so you end up going to my birthday, you change your plans all weekends, so you now cannot go to Madisons, which was your faviorite option the first weekend

  3. If you are a sophisticated QH discounter and can go to three events, which do you skip?

     Remember we solve these backwards. Obviously, on weekend 4, you will go to madisons if and only if you have not already gone to three events.

     As for weekend 3. If you have already skipped an event, obviously you're going to all subsequent events.

     If you haven't already skipped an event, however, you will face the same decision as the naif at this moment, PV(T.A.) $= 8, and PV$(Madison's) $= 13\beta\delta = 6.5$

     so you would choose to go to my birthday. So you have selected to skip Madisons,

     In weekend 2, you know that if you haven't already skipped an event and you don't skip one today, then you will end up going to my birthday.

     If you do skip today, then you will go to Madisons and my Birthday, so you check PV(Madison's) $= 13\beta\delta^2 = 6.5$ vs $PV(Econ\,Party) = 5$.

Hence you decide that it would be better to skip the econ party, In the first weekend , you know that if you do not skip today, you will skip tomorrow. Since $PV(The\,Big\,Short) = 3PV =$ (Econ Party)$5\beta\delta = 2.5$, you go to the movie this weekend. Conclusion you skip the Econ department party

4. If you are an exponential discounter and can go to one event, which do you go to?

   You will choose Madisons since it has the highest payoff

5. If you are a naive QH discounter and can go to one event, which do you go to?

   Now in $t = 1$ you will like to go to Madisons, this fact also holds in $t = 2$, then on $t = 3$, $PV(\text{T.A.}) = 8, and PV(\text{Madison's}) = 13\beta\delta = 6.5$ so you go to my birthday

6. If you are a sophisticated QH discounter and can go to one event, which do you go to?

   By appying backwards induction you see that in $t = 4$ yo go to Madisons, but in $t = 3$ you preefer to go to my birthday, however in $t = 2$, the econ party sounds better, and finally on $t = 1$ you decide to go to the Big Short.

7. If you are the sophisticate in (3) and could, today, whack yourself in the head to make yourself a naif, would you have incentive to do so?

   No. Check $PV_{t=1}$ of the naif's consumption plan versus the sophisticates. You'll see that the sophisticate in t = 1 prefers his consumption plan to that of the naif.

8. If you are the sophisticate in (6) and could, today, whack yourself in the head to make yourself a naif, would you have incentive to do so?

   Yes, the sophisticated you would benefit from being naif. Since $PV_{t=1}(T.A.) > PV_{t=1}(Big\,short)$Apparently this is called preproperation, kinda the opposite of procrastination. A sophisticated type succumbs to temptation early because he knows that he will inevitably succumb in the next period even if he is able to avoid it today.