14.127 Behavioral Economics. Lecture 10

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1 Hyperbolic discounting

- Luttmer and Mariotti (JPE 2003) hyperbolics does not make much difference/improvement over exponential discounting.

- Gruber and Koszegi – rational cigarettes behavior: exponential and hyperbolics have similar consumption behavior

- The main difference between exponentials and hyperbolics is the predilection of hyperbolics to hoard illiquid assets. This is corroborated by evidence.

2 Gul-Pesendorfer Self-Control and the Theory of Consumption

- $$W\left(\{c_t, m_t\}\right) = \sum_{t \geq 0} \delta^t \left(u\left(c_t\right) + v\left(c_t\right) - v\left(m_t\right)\right)$$

  where c_t is the actual consumption and m_t is the maximum possible consumption.

- Assumptions: $u + v$ concave, v convex

- Big gain: no dynamic inconsistency

- People don't like dynamic inconsistency because of:
  - technical difficulties involved
  - their philosophical stance
  - problems with doing welfare analysis

2.1 Preference reversals

- Start with $(c, c, c, ...)$
- At $t = 1$ you can choose between α at τ or β at $\tau + 1$ where $\beta > \alpha$.
- Does the agent prefer β?

- If $\tau = 1$ then agent chooses β iff

$$\delta\left(u\left(c\right)+v\left(c\right)-v\left(c+\alpha\right)\right)+\delta^{2}\left(u\left(c+\beta\right)+v\left(c+\beta\right)-v\left(c+\beta\right)\right)$$
$$\geq\delta\left(u\left(c+\alpha\right)+v\left(c+\alpha\right)-v\left(c+\alpha\right)\right)+\delta^{2}\left(u\left(c\right)+v\left(c\right)-v\left(c+\beta\right)\right)$$

- If I could not commit to the plan at $\tau = 2, 3, ...$ than the condition is the same except for the multiplicative factor $\delta^{\tau-1}$.

- If I can commit then there will be no temptation and the condition is

$$\delta^{\tau}u\left(c\right)+\delta^{\tau+1}u\left(c+\beta\right)\geq\delta^{\tau}u\left(c+\alpha\right)+\delta^{\tau+1}u\left(c\right)$$

- Now, if I can commit to the plan at $t = 1$ then there might be a preference reversal (we have three free parameters $v\left(c+\alpha\right), v\left(c+\beta\right), v\left(c\right)$ to fit two inequalities).

2.2 Time preferences and steady state

- Euler equation
  - If I
    - increase consumption from c_t to $c_t + d\varepsilon$
    - and offset with decrease from c_{t+1} to $c_{t+1} - (1 + r)\, d\varepsilon$
  - then
    - m_{t+1} also decreases by $(1 + r)\, d\varepsilon$
    - and I gain

$$\frac{\partial V}{\partial \varepsilon} = u'(c_t) + v'(c_t) + \delta \left(- (1 + r)\, u'(c_{t+1}) - (1 + r)\, v'(c_{t+1}) + (1 +$$

– Thus $\frac{\partial V}{\partial \varepsilon} = 0$ gives

$$1 + r = \frac{u'(c_t) + v'(c_t)}{u'(c_{t+1}) + v'(c_{t+1}) - v'(m_{t+1})} \frac{1}{\delta}$$

- Take an economy with different types $(u, \lambda; v, \delta)_{i=1,...,n}$ where λv is now temptation.

- Total endowment $w = \sum_{i=1}^{n} c_{it}$.

- Take $u(c) = \ln c$ and $v(c) = c$

- We get

$$1 + r_{t+1} = \frac{\frac{1}{c_{it}} + \lambda_i}{\frac{1}{c_{it+1}} + \lambda_i - \lambda_i} \frac{1}{\delta}$$

- In steady state $c_{it} = c_i$ and $r_t = r$,and

$$1 + r = \frac{\frac{1}{c_i} + \lambda_i}{\frac{1}{c_i} + \lambda_i - \lambda_i \delta}$$

  hence

$$c_i = \frac{\delta (1 + r) - 1}{\lambda_i}$$

- Call $\gamma_i = \frac{1}{\lambda_i}$. Then $c_i = [\delta (1 + r) - 1] \gamma_i = \alpha \gamma_i$ for appropriate α
  - Then $w = \sum c_i = \alpha \left(\sum \gamma_i \right)$

- Hence

$$c_i = \frac{\gamma_i}{\sum \gamma_i} w$$

- Gul-Pesendorfer is very unexplored model, and many people like it more than hyperbolics. Does it lead to different results than hyperbolics? It's not well understood.

- Frederick, Loewenstein, and O'Donoghue (JEL 2002) – review of time discounting.

3 Macro

3.1 Inflation

3.1.1 Nominal illusion

- Fact. Most people don't master the difference between nominal and real quantities

- Modigliani-Cohn hypothesis. Impact of nominal illusions on stock market prices

  - Take a rational model when dividend is discounted at rate $r+\pi$ (where r is interest rate and π is risk premium).

  - Gordon formula

$$\frac{p}{D} = \frac{1}{r+\pi-g}$$

    where g is rate of growth of dividends. Take $g = 0$.

  - If people have nominal illusions then they compare dividend yield $\frac{D}{p}$ to the nominal interest rate $r+i$ (where i is inflation). [note that bond yield usually includes inflation]

- If the representative agent is victim of this illusion, then the required premium on stocks will be $r + \pi = r + i + \beta$ where β is some rule of thumb risk premium

- So an econometrician measures $\pi = i + \beta$ and obtain risk premium/excess return that is increasing with inflation.

- If all agents are rational the measured π is independent of inflation.

- If some agents are boundedly rational then you expect

$$\pi = \gamma i + \alpha$$

  for some $\gamma \in (0, 1)$.

  - Thus stock market is down when inflation is high.

  - Other explanations: high inflation may mean other things going badly in the economy.

- Does the Modigliani-Cohn hypothesis hold?

  - Evidence is inconclusive

  - The latest attempt (Campbell and Vuolteenaho 2003) suggest that the MC hypothesis does hold.

- Irving Fisher effects?
  - If the Fisher hypothesis holds then nominal interest rates $R_t = r + i_t$ for some constant real productivity r and the real interest rate is independent of inflation.
  - In a very behavioral world with nominal illusion we can have 0 coefficient on inflation, or

    $$R_t = \alpha + \gamma i_t$$

    and the real interest rate equals

    $$r_t = \alpha - (1 - \gamma)\, i_t$$

  - Thus r_t is low when inflation is high.
  - Empirically, mixed evidence.

3.1.2 Other behavioral dimensions of inflation

- Aversion to *nominal* wage cuts (Akerlof, Dickens, and Perry, Brookings 1996).
  - They show a histogram of nominal wage changes: big mass at 0%, 1%, 2%, etc. You also have some firms at -4% or -5% but you very little mass immediately below 0. Thus, firms really don't like small nominal wage cuts.
  - This is an argument against 0 inflation. Unemployment rate is will be higher at 0% inflation, as we hit the constraint of (almost) no nominal wage cuts.
  - There is also some evidence: Switzerland used to have 0% inflation and many things were going badly.

– Akerlof, Dickens, and Perry, Brookings 1996 model that, and provide evidence.

- Real costs of inflation, for lowish inflation (between 0 and 10%)

- Many of the traditional costs are likely to be small:
  - Allais Baumol Tobin shoe-leather cost of going to bank: They are likely to be small. cf Calibration by Lucas (*Econometrica*, 2000).
  - Menu cost of changing prices and producing new menus.
  - Price distorsions induced by inflation volatility (e.g. Bénabou)

- Some costs due to bounded rationality are likely to be bigger:
  - Thinking costs: It's a hassle to have to handle inflation all the time.

- If people are victims of money illusion, then very important prices are distored (e.g. stocks: Modigliani Cohn, and bonds: if the Fisher hypothesis doesn't hold)

- For very low inflation ($<1\%$): The aversion to nominal wage cut becomes a very big issue, and probably the major cost of inflation.