Macroeconomics and Behaviour

Problem Set 6

July 25, 2014

Question 1 (O'Donoghue and Rabin (1999))

The present-biased preferences are given by:

$$U_t = u_t + \beta \sum_{\tau=t+1}^{T} \delta^{\tau-t} u_\tau, \tag{1}$$

where the time discount factors are 1, $\beta\delta$, $\beta\delta^2$, ..., $\beta\delta^{T-t}$ with $\delta \leq 1$ and $\beta < 1$.

Suppose an agent have to take a one-period action in $\tau \in [t, T]$. This action leads to costs c_τ in this period (immediate costs). However the agent is rewarded in the last period T, i.e. his utility increases by value v.

We denote the utility function of an individual who takes the action in period τ by $\bar{U}_t(\tau)$. Normalizing $\delta = 1$, find $V_t(\tau) = \bar{U}_t(\tau) - U_t$ in the case when action is taken in period $\tau = t$ and in $\tau > t$, i.e.

$$V_t(\tau) = \begin{cases} \beta v - c_t, & \text{if } \tau = t \\ \beta v - \beta c_\tau, & \text{if } \tau > t \end{cases} \tag{2}$$