# Problem Set 6 Solution

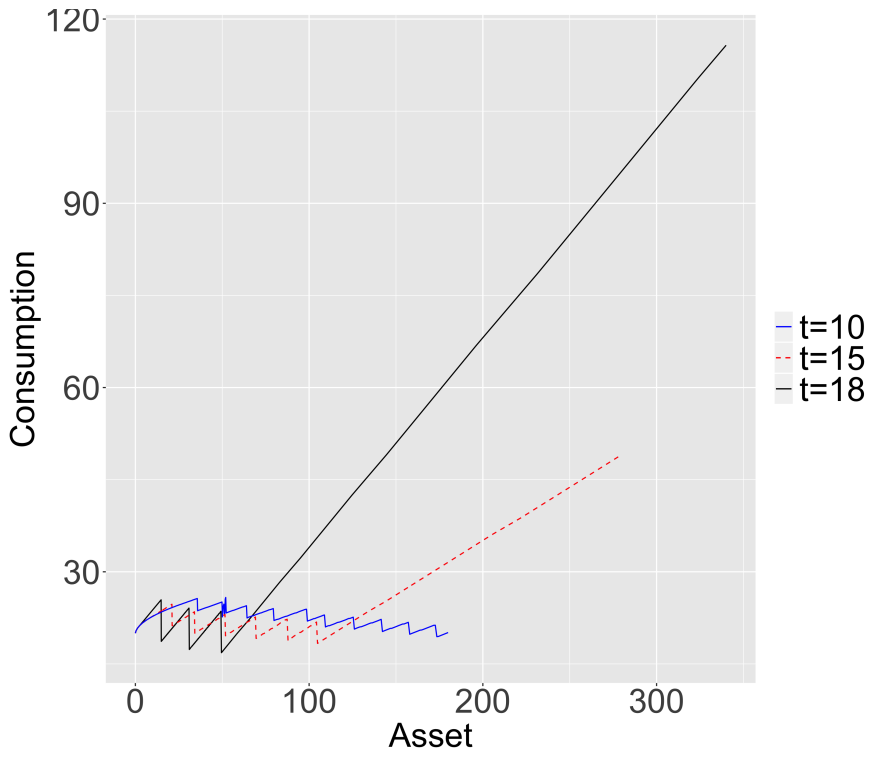
Instructor : Yujung Hwang *

February 23, 2020

**Question 1. Solving a Discrete-Continuous Problem without Uncertainty**

(a) As can be seen from Figure 1, the number of kink points increases as $t \to 1$. This is because primary kink point in the final period, at which the optimal work decision switches, propagates to previous periods, as backward induction proceeds, and creates many secondary kink points.

Figure 1: (a)

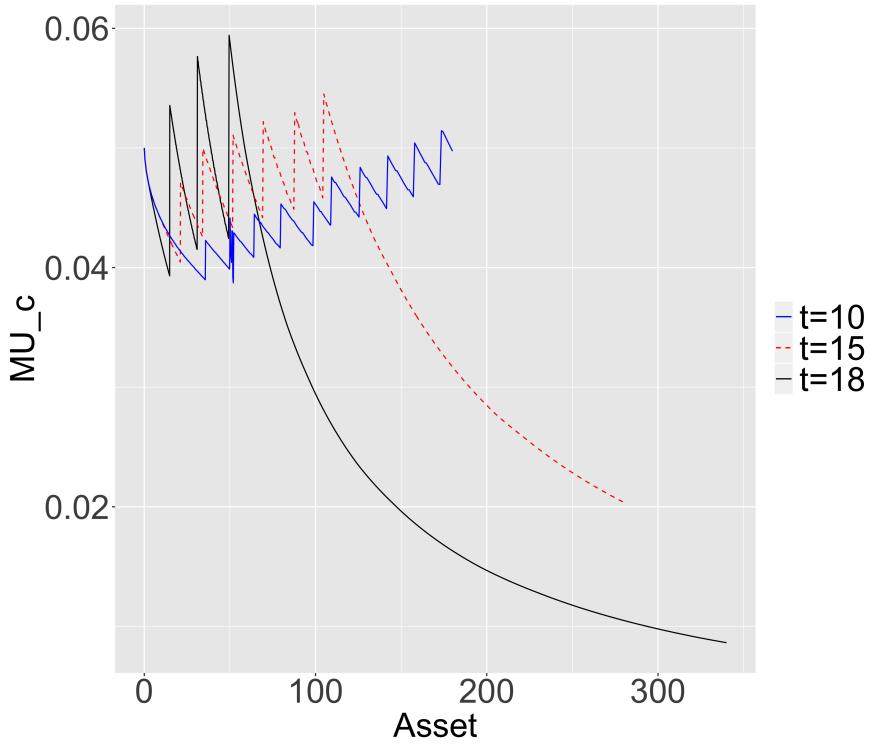



(b) The figure 2 shows the marginal utility of consumption, as a function of asset, is not a monotonic function. Therefore, there can be multiple solutions for Euler equation, and the Euler equation may not provide a sufficient

*yujungghwang@gmail.com

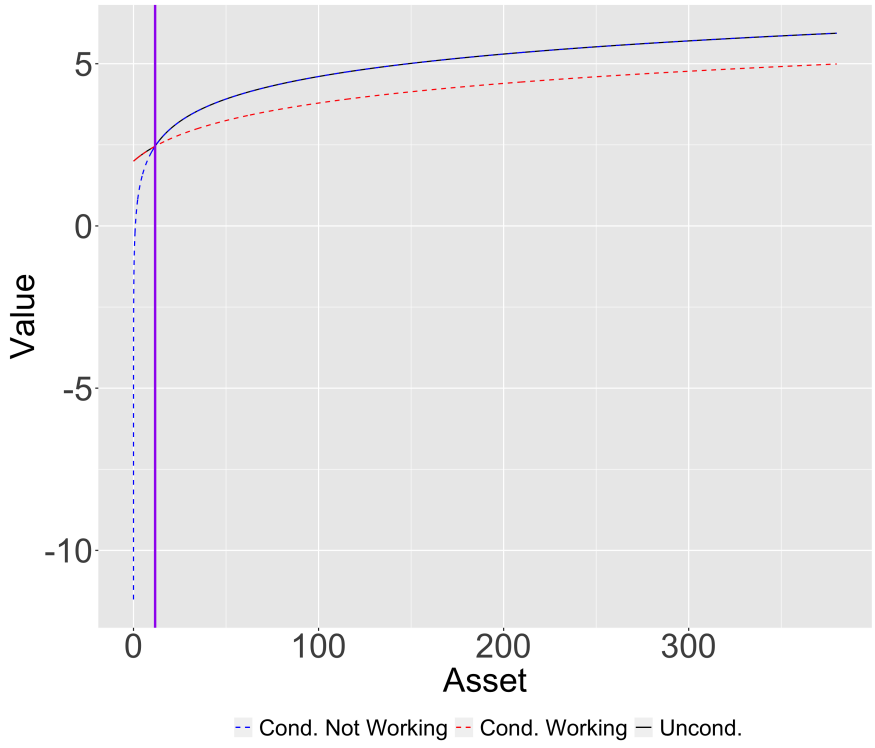
condition for optimality.

Figure 2: (b)




(c) The unconditional value function is non-differentiable at the primary kink point and non-concave around the kink point. Until the primary kink point, the unconditional value function follows the conditional value function, conditional on working, and after the primary kink point, the unconditional value function follows the conditional value function, conditional on not working.

Figure 3: (c)




```
> print(paste0("primary_kink_point_(of_asset)_is_",Agrid[20,prkink]))
[1] "primary_kink_point_(of_asset)_is_11.6811447636864"
```