

# Quantitative Macro – Problem Set 7

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## **Question c: Brute Force Method**

I approximate the value function for the model using the brute force method and transition probabilities as produced in the MATLAB code `project2.m`. The resulting value function appears fairly well behaved, however the consumption policy is quite irregular. I suppose this may be due to problems with the grid (which for some reason I cannot increase without ruining the code) or other issues in the computation. At least it is increasing... The grid I use is generated using the same function as in the MATLAB file and I treat cash on hand as the state variable.

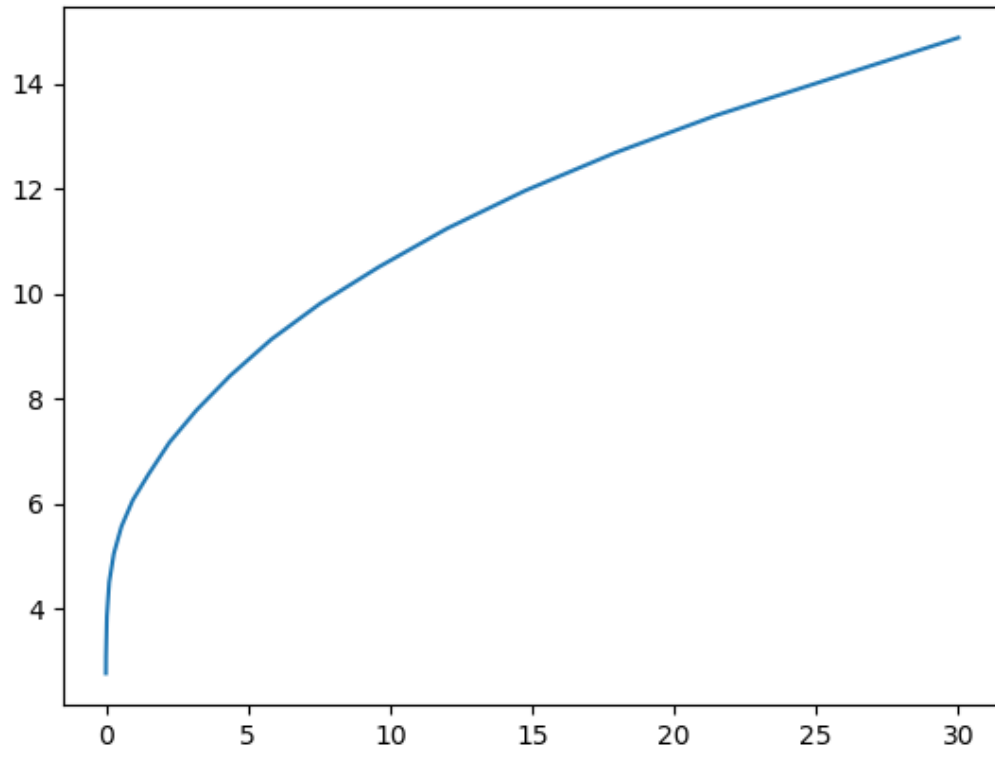


Figure 1: Approximated value function over a grid of cash-on-hand

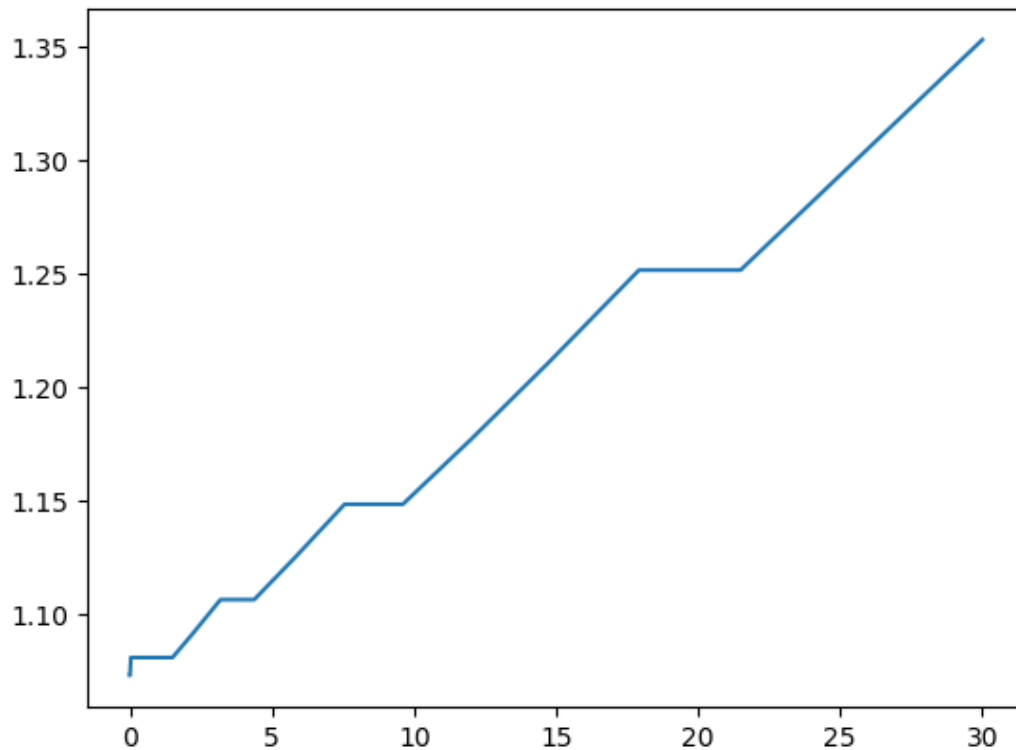


Figure 2: Policy function for consumption

The Howard method for policy function is missing.

## Question d: extension to life cycle models

I use bits of the code from PS06 and the current problem set to solve a Life Cycle model with 80 periods using the recursion on the value function with a root finding mechanism on the preceding period to obtain consumption policies. I attempt this for the regular marginal utility and also try to implement the trick below. The trick is to transform the function  $V_x$  into  $\Lambda_x$  to make interpolation easier and more accurate. This gives

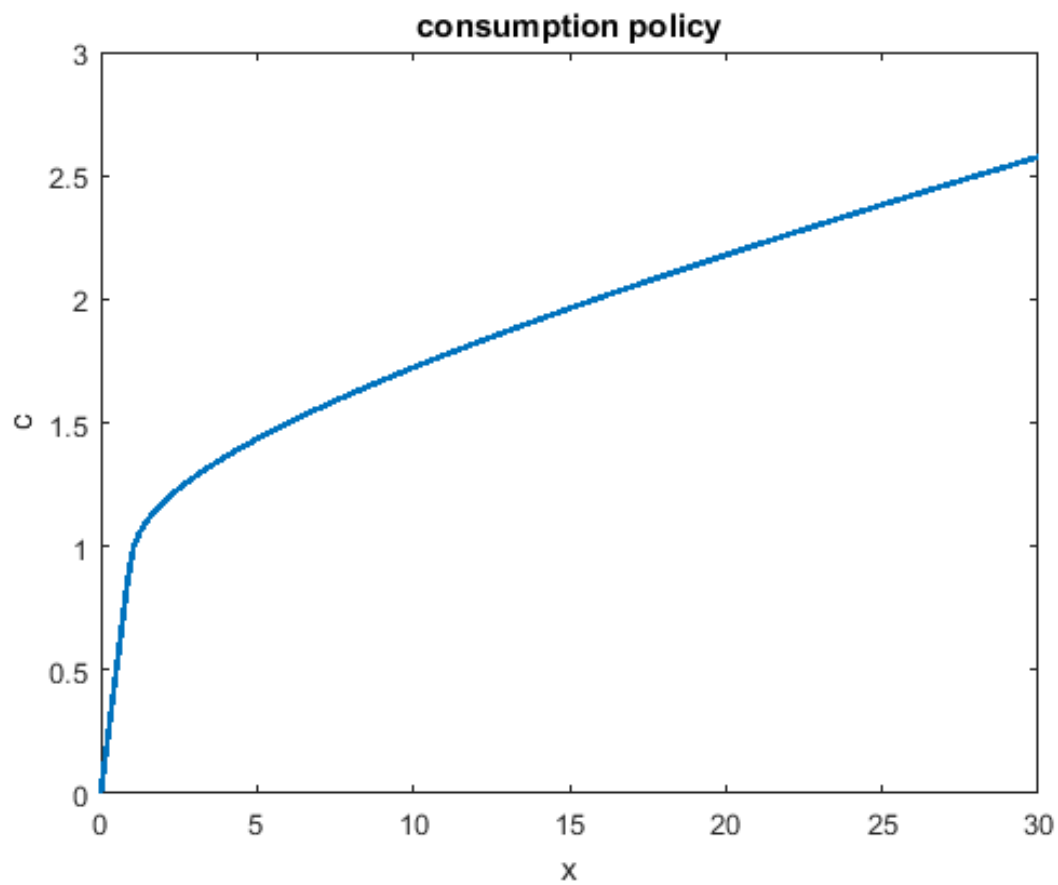


Figure 3: Policy function for consumption using regular marginal utility

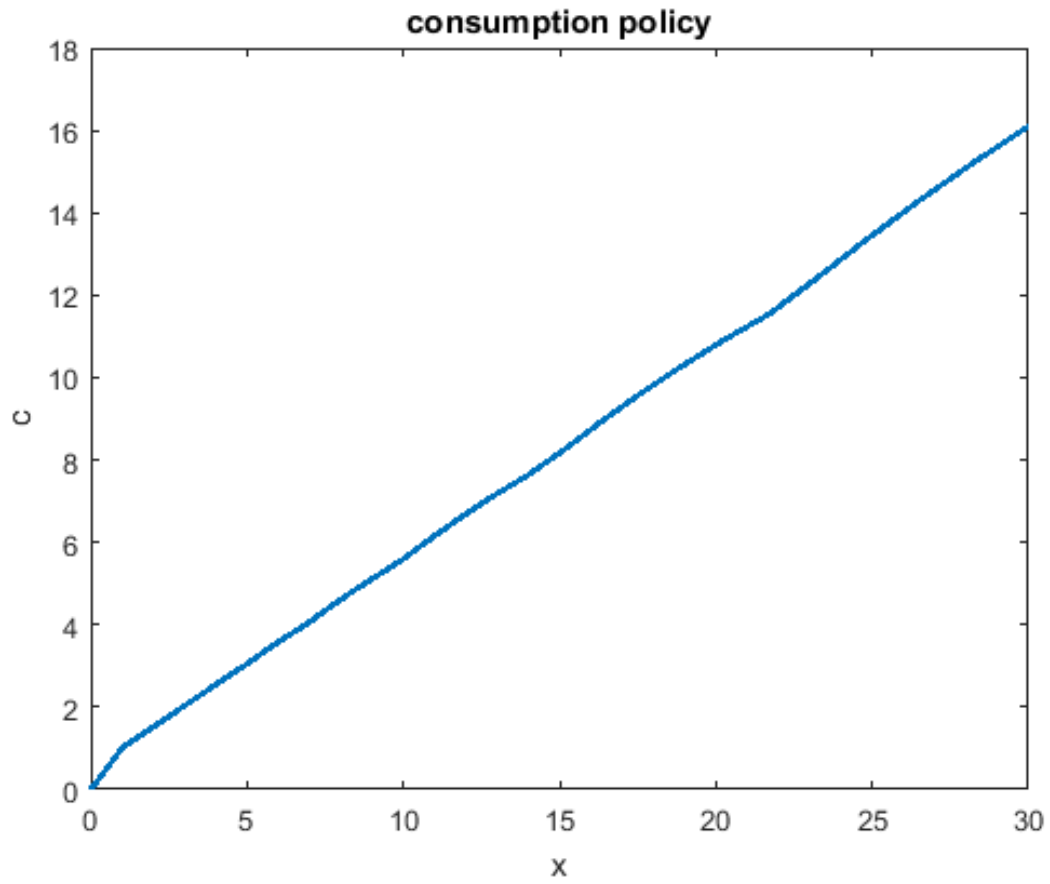


Figure 4: Policy function for consumption using transformed marginal utility

I also implement survival risk as in the preceding Problem Set which gives a linear consumption policy.

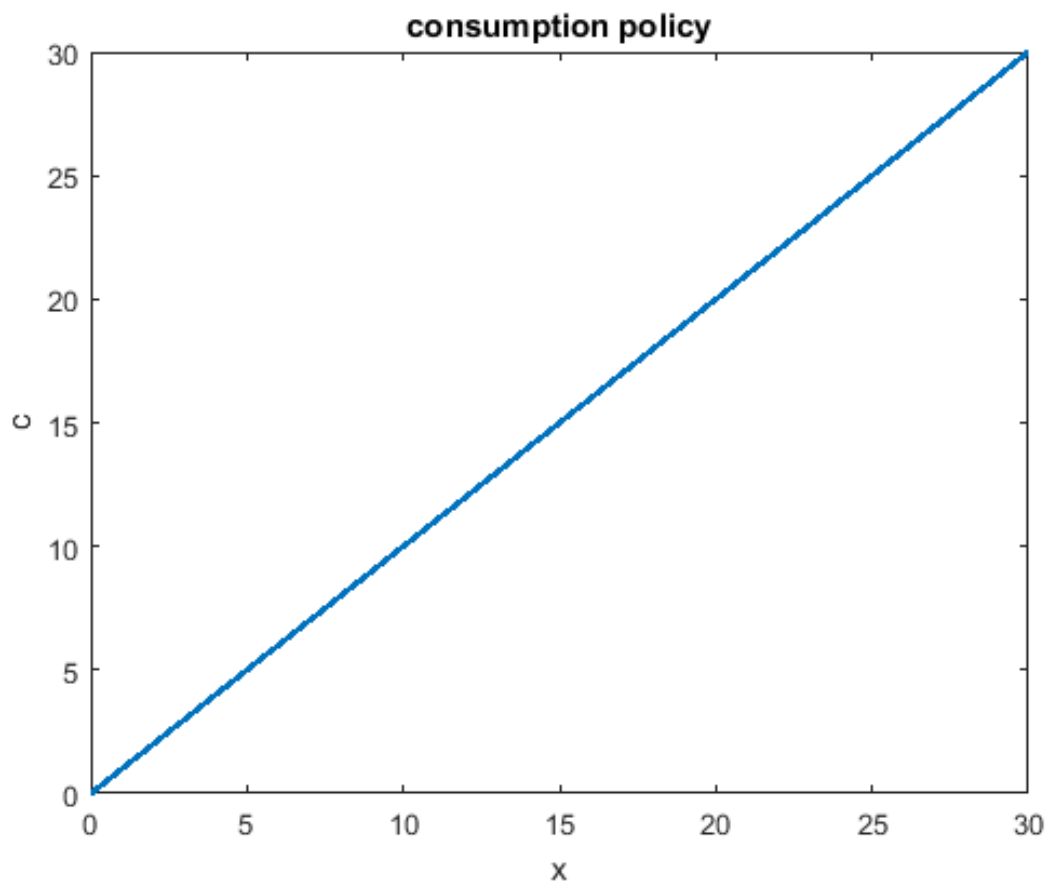


Figure 5: Policy function for consumption with survival risk

### Question e: Some tricks

For this part I only upload the function that basically just transforms the function  $V_x$  into  $\Lambda_x$ .