

1. The agent's dynamic programming problem is as follows. Given a current level of capital  $k$  and realization of productivity level  $z$ , the agent's value is given by the following:

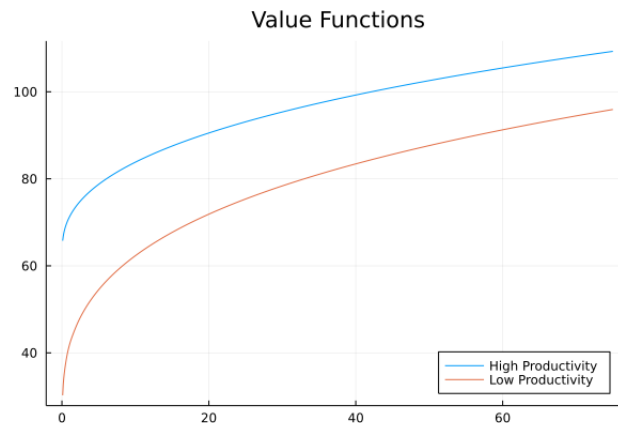
$$V(k, z) = \max_{(k', c) \in \Gamma(k, z)} u(c) + \beta \sum_{z' \in Z} V(k', z') \Pi(z', z)$$

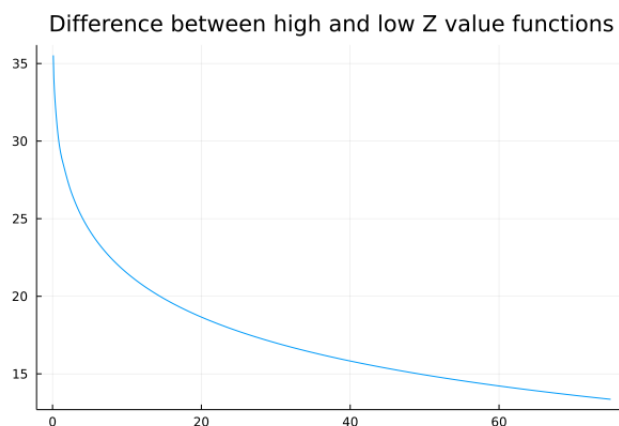
where  $\Pi(z', z)$  is the probability of transitioning to productivity  $z'$  given current state  $z$ ,  $Z = \{1.25, 0.2\}$  is the set of productivity levels, and

$$\Gamma(k, z) = \{(k', c) \in \mathbb{R}_+^2 \mid k' + c \leq zk^\theta + (1 - \delta)k\}$$

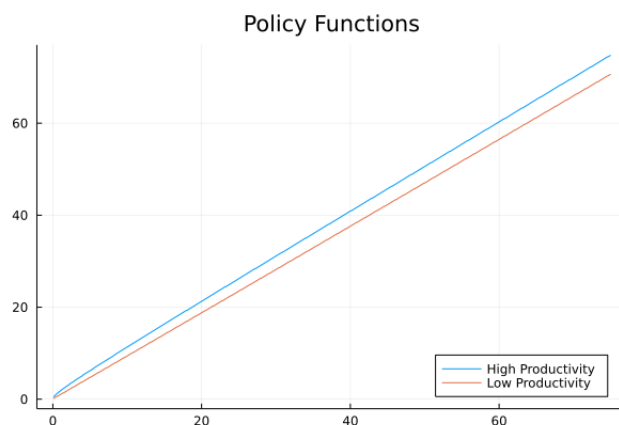
is the set of feasible choices of consumption and future capital given current capital  $k$  and productivity  $z$ .

2. Below, I plot the value function for  $K$  over each state  $Z$ . It is evident that  $V(k, z)$  is increasing in  $z$  since the high productivity function lies above the low productivity function. Furthermore, it is 'concave' in  $K$ , as the difference between the two shrinks as  $K$  grows. To more clearly see these relationships, I have plotted  $V(\cdot, Z^g) - V(\cdot, Z^b)$  for all  $K$ . It is clear that the difference is positive and decreasing in  $K$ , verifying the previous claims.

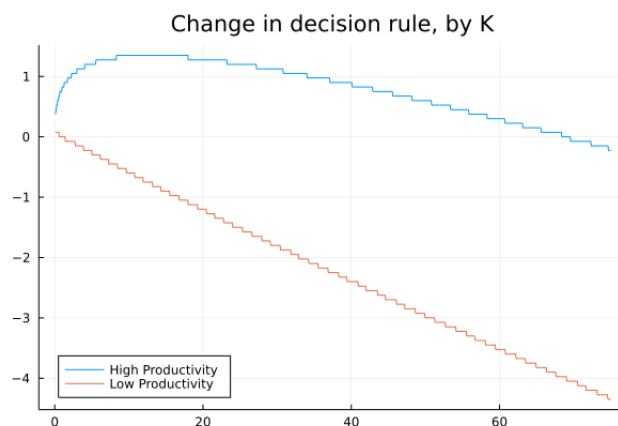




3. The decision rule is increasing in both  $K$  and  $Z$ . To see this, I plot the policy function as a function of  $K$  for both high and low productivity levels below. For both types,  $K'(k, z)$  is increasing in  $k$ . Furthermore, it is evident that the policy function for high productivity agents is higher than that of low productivity agents.



However, when we plot  $K'(K, Z) - K$  across  $K$  in the following figure to ascertain agents' savings as a function of  $K$  and  $Z$ , we can see that the relationship is somewhat more complicated.



Upon inspection, we note that high productivity agents have higher savings than low productivity agents.

Furthermore, low productivity agents' savings is decreasing in their current level of capital  $K$ .

Finally, high productivity agents' savings are increasing in  $K$  when their current level of capital is below a certain threshold (about 15 or so), and are decreasing in  $K$  when their current level of capital is higher than this threshold.