

PROBLEM SET 3

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QUESTION 1

$V(s, a) = \max_{a' \in \Gamma(s, a)} \left\{ \frac{[y(s) + a - q * a']^{1-\sigma}}{1-\sigma} + \beta * \mathbb{E}_{s'|s} V(s', a') \right\}$ where $r(s, a) = (a' \text{ such that } 0 \leq a' \leq \frac{y(s) + a}{q})$ called constraint correspondance.

State Variables: a, s

Control Variables: a', s'

Lastly, we can define the state space as following;

Assuming that there are t number of asset levels,

$A = \{a_1, a_2 \dots a_t\}$ also we know that the lowest value is assumed to be -2 and highest one is 5. So suppose we sorted assets in ascending order from subscript 1 to t. Then

$a_1 = -2$ and $a_t = 5$ Therefore, $A \in [-2, 5]$

and two types of employment

$E = \{e, u\}$

So the state space is the all possible combinations of the asset level and the employment type.