Coding Assignment 1

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Consumption & Investment

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(a) **Numerically solve for $V(a, y)$, $a'(a, y)$ and $c(a, y)$ for a tolerance of 10^{-9} on the norm of the difference between consecutive iterations on V.**

Found in coded1.m file, lines $1 - 111$.

(b) **Graph the converged value function in (a, V) space for all y.**

Found in coded1.m file, lines $114 - 120$.

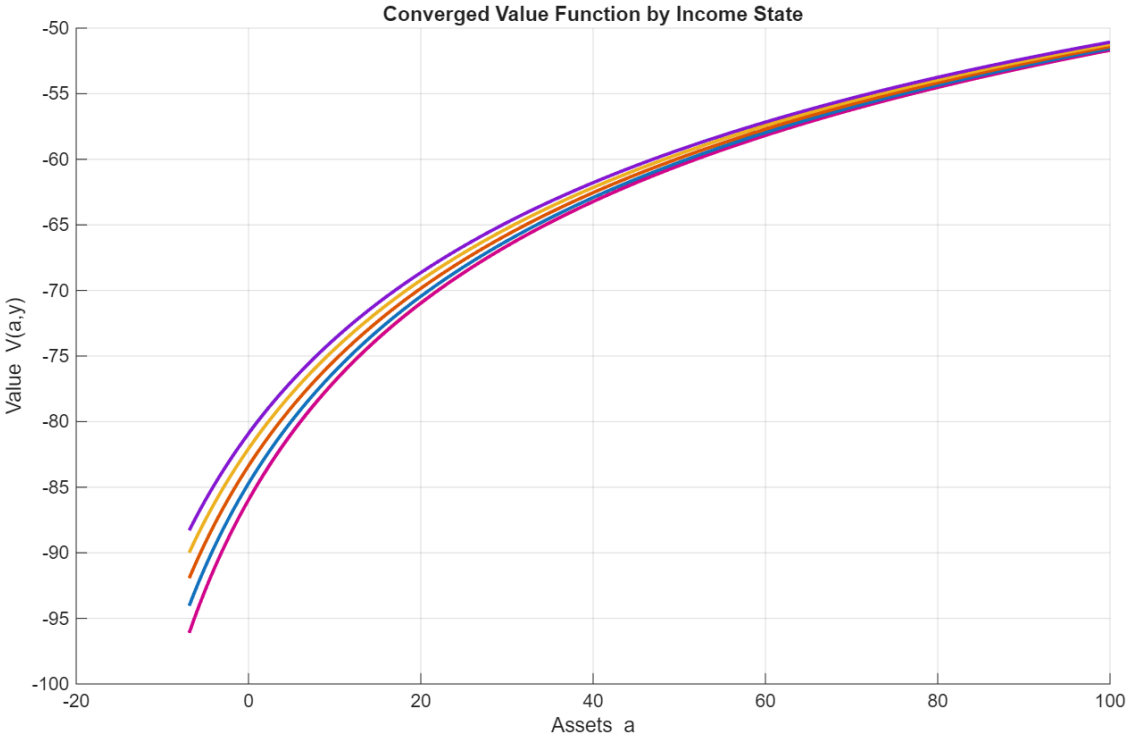

Figure 1: Converged Value Function by Income State

(c) **Generate a series of 1000 simulated income innovations for the given normal distribution and simulate the model for 1000 periods. Discard the first 500 simulations. Create a *tileplot* of simulated y or $exp(y)$, a' and c.**

Found in coded1.m file, lines 132 − 163.

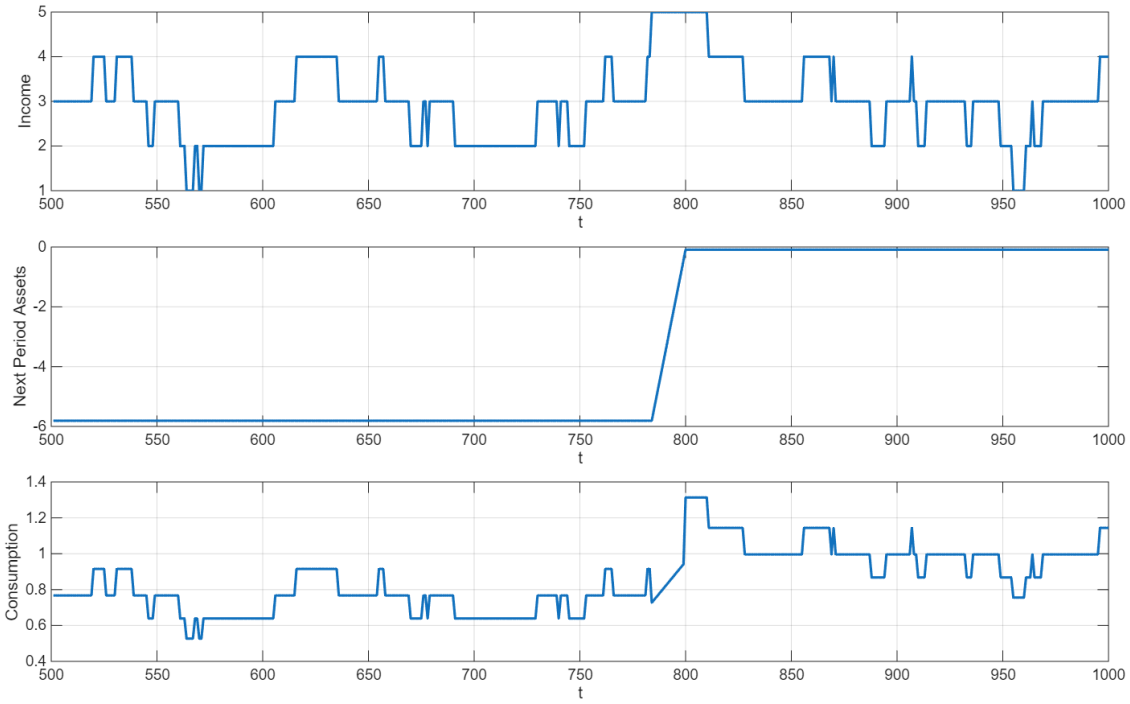

Figure 2: Simulations

(d) **Calculate the standard deviation of simulated c. Explain what you would qualitatively expect would occur to the standard deviation of c in the following cases.**

Found in coded1.m file, line 167.

Standard deviation = 0.1694

(a) **The borrowing constraint were zero.**

A more restrictive borrowing restraint (ie. no borrowing) would make it more difficult for households to smooth consumption. As such, consumption would experience more variation relative to before as it tracks income more closely. Standard deviation would therefore be quantitatively higher.

(b) **The relative risk aversion parameter doubled.**

A greater RRA parameter would increase households desire to smooth consumption as they are more sensitive to consumption changes. As such, standard deviation is expected to be quantitatively smaller.

(c) **The natural rate of interest doubled.**

A higher natural rate of return is expected to make it easier for households to smooth consumption as they receive a larger return on investment. Standard deviation is thus expected to be lower.

(d) **Income volatility doubled.**

Higher income volatility makes it more challenging for households to maintain a steady level of consumption, regardless of buffer-savings. As such, standard deviation of consumption is expected to rise.