Fall 2019 - ECON 634 - Advance Macroeconomics - Problem Set 2

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1. Since the Resource constraint (Social Planner Problem) is $c_t = A_t k_t^\alpha + (1-\delta)k_t - k_{t+1}$ we can write the budget constraint in recursive form as $c = Ak^\alpha + (1-\delta)k - k'$

   - **State variable**: k, A

   - **Control variable**: k'

   Therefore, the Bellman equation:

   $$V(k, A) = \underset{k'}{\text{Max}} \left\{ \frac{(Ak^\alpha + (1-\delta)k - k')^{1-\sigma}}{1-\sigma} + \beta \sum_{A' \in A} \Pi(A'|A)V(k', A') \right\}$$
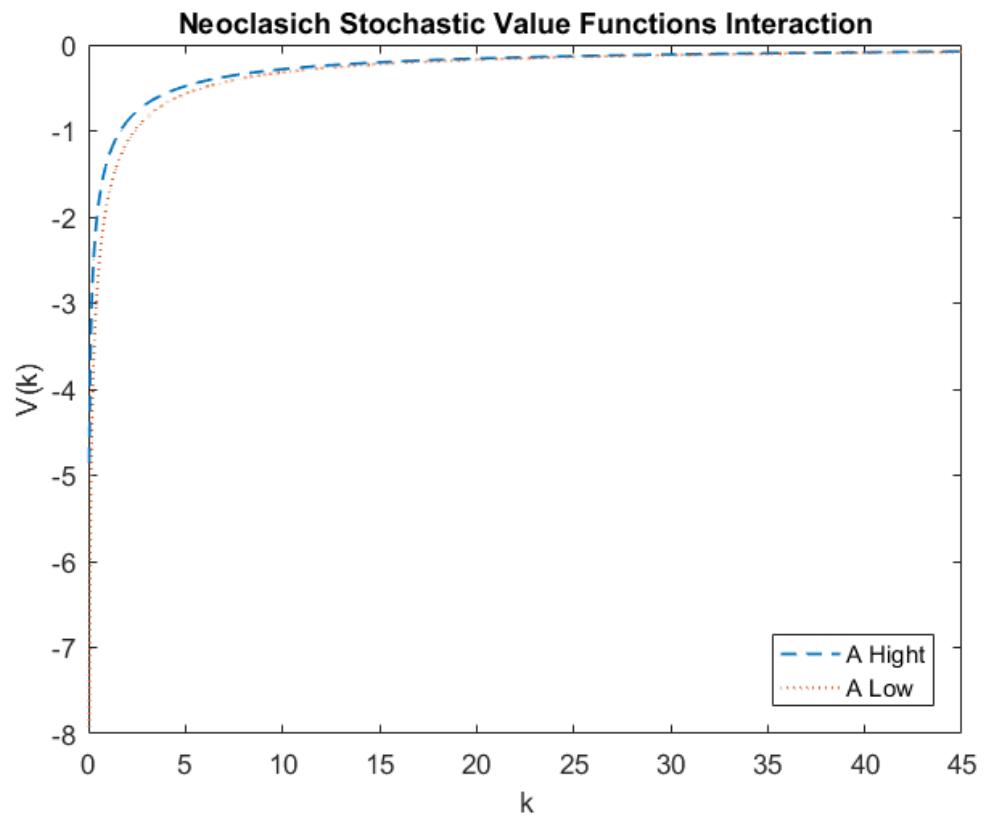
   subject to

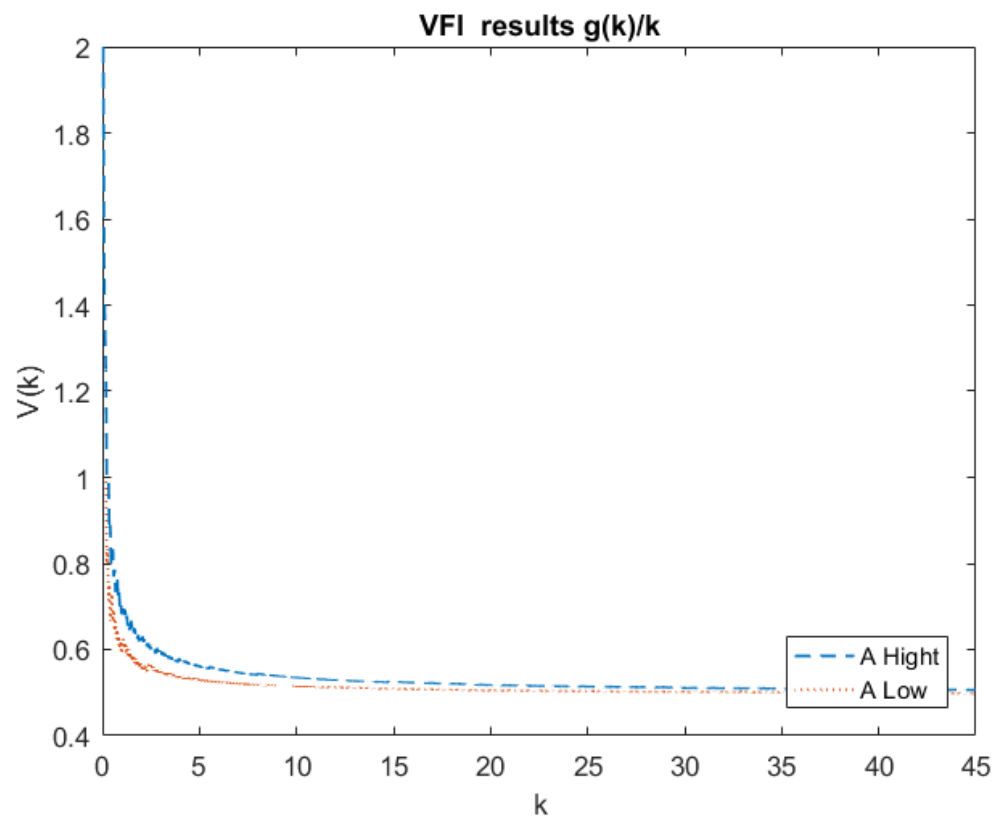 $$c \in [0, f(k)] \tag{1}$$
   $$k' \in [0, f(k)] \tag{2}$$

2. Using the VFI, the Graphs are like follows:

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Neoclasich Stochastic Value Functions Interaction

As we can see, both are increasing and concave functions.

3. The Policy function over k looks as follows:

VFI results g(k)/k

The Saving over k looks as follows:

4. In the Long run, for the NGM,