Problem Set 2

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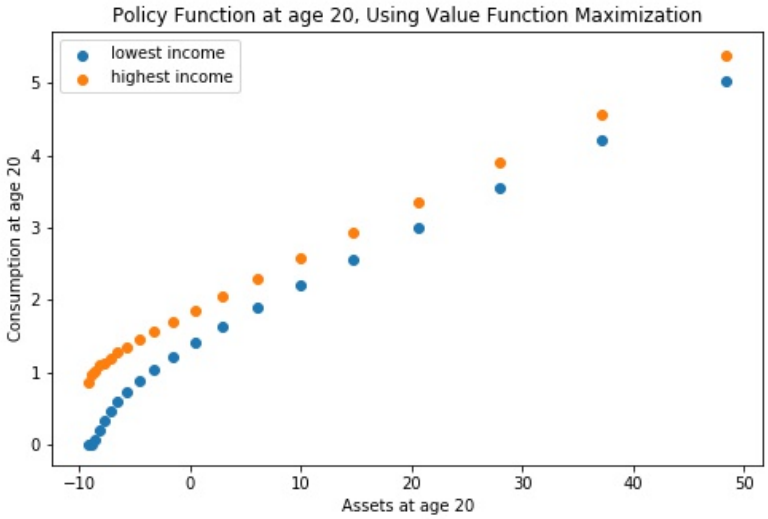
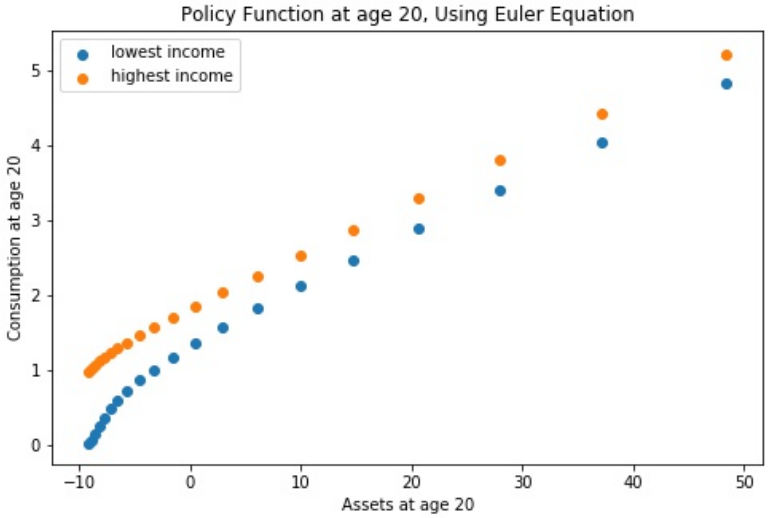
Code is also posted on my GitHub page: https://github.com/zhuang13atJHU/Numeric-Analysis/tree/master

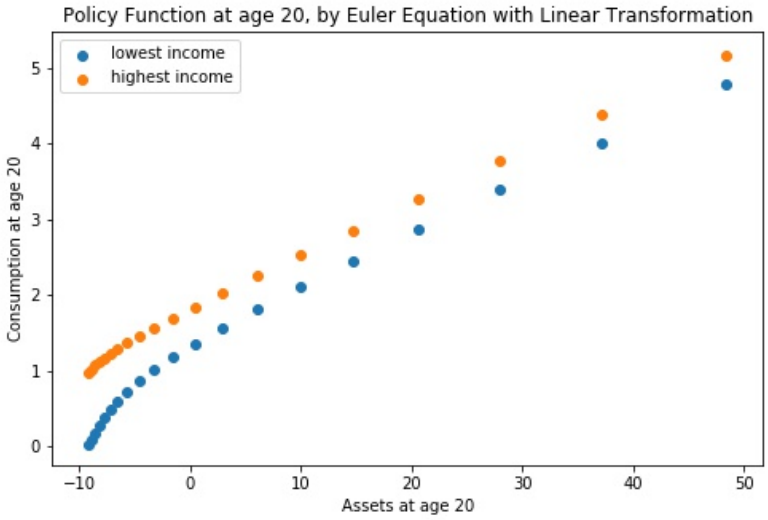
1 discretizing the AR(1) income process

Using equations in the lecture notes, we can construct the transition matrix with five states of income. See code for details.

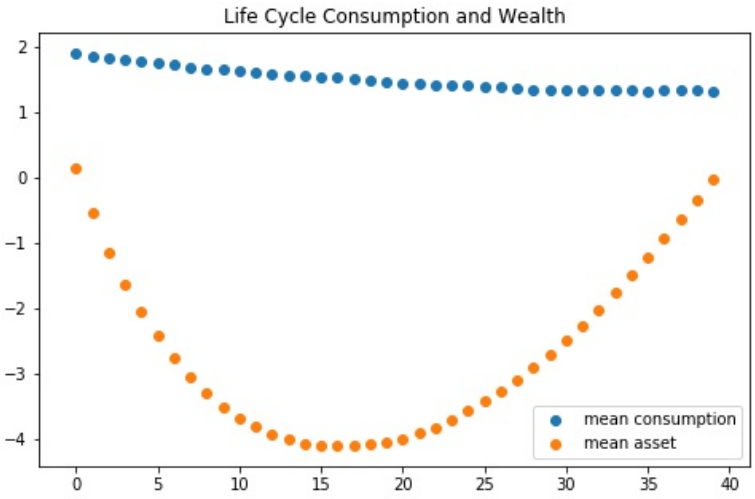
2 cake-eating problem with uncertain income







3 computing simulated moments on consumption and asset



Comments on Q2 and Q3:

- Over time
  - Consumption smoothness: since households are allowed to borrow,

they would like to smooth consumption due to impatience

  - Saving: in order to smooth consumption, households borrow at the early stage of their life, and accumulate wealth when they are getting old.
  - Concavity of consumption function: due to precautionary motive, marginal propensity to consume is larger when they are poor than when they are rich. This provides policy implications for government when redistributing wealth across different groups of people.

- Across income shocks
  - Level of income: people with the same wealth level behave differently when receiving different incomes.
  - Expectation: the fact that people who earns more consume more is not just because they receive more, but also because they expect to earn more in the future due to the AR process. That is, in the world of uncertainty, expectation does play a significant role in influencing behaviors and decision making.

- Representative and heterogenous agent
  - Heterogeneity: the model is heterogenous in the sense that households receive idiosyncratic income shocks and thus have different wealth level.
  - Representativity: however, all individuals have the same homothetic preference(homogenous utility function, and they share the same beta), so the economy as a whole behaves like a representative agent.