1 Money demand and the velocity of money

ABC Ch. 7 NP #2

Money demand in an economy in which no interest is paid on money is \( M^d = 500 + 0.2Y - 1000i \).

a. Suppose that \( P = 100, Y = 1000, \) and \( i = 0.10 \). Find real money demand, nominal money demand, and the velocity of money.

b. The price level doubles from \( P = 100 \) to \( P = 200 \). Find real money demand, nominal money demand, and the velocity of money.

c. Starting from the values of the variables given in Part (a) and assuming that the money demand function written holds, determine how velocity is affected by an increase in real income, by an increase in the nominal interest rate, and by an increase in the price level.

2 Log-linearization and elasticities

Log-linearize the consumption Euler equation you derived in HW #1 Question 5.b. 

\[
\left( \text{for the utility form } U(c_t, c_{t+1}) = \frac{1-\frac{1}{\sigma}c_t^{\frac{1}{\sigma}}}{1-\frac{1}{\sigma}} + \beta \frac{1-\frac{1}{\sigma}c_{t+1}^{\frac{1}{\sigma}}}{1-\frac{1}{\sigma}} \right)
\]

After log-linearization, one of the percentage deviation terms should have a coefficient. What is the interpretation of this coefficient as an elasticity?

3 The Solow model: shocks to the steady state

ABC Ch. 6 AP #1

According to the Solow model, how would each of the following affect consumption per worker in the long run (i.e., in the steady state)? Explain.

a. The destruction of a portion of the nation’s capital stock in a war.

b. A permanent increase in the rate of immigration (which raises the overall population growth rate).

c. A permanent increase in energy prices.

d. A temporary rise in the saving rate.

e. A permanent increase in the fraction of the population in the labor force (the population growth rate in unchanged).

4 Per-worker production function

Based on ABC Ch. 6 NP #5

An economy has the per-worker production function \( y_t = 3k_t^{0.5} \) where \( y_t \) is output per worker and \( k_t \) is the capital-labor ratio. The depreciation rate is 0.1, and the population growth rate is 0.05. Savings is \( S_t = 0.3Y_t \), where \( S_t \) is total national savings and \( Y_t \) is total output.

a. What are the steady state values of the capital-labor ratio, output per worker, and consumption per worker?

   The rest of the problem shows the effects of changes in the three fundamental determinants of long-run standards of living.
b. Repeat Part (a) for a savings rate of 0.4 instead of 0.3. *Explain why the steady state capital-labor ratio is changing the way it is.*

c. Repeat Part (a) for a population growth rate of 0.08 (with a saving rate of 0.3). *Explain why the steady state capital-labor ratio is changing the way it is.*

d. Repeat Part (a) for a per-worker production function $y_t = 4k_t^{0.5}$. Assume the saving rate and population rate are at their original values. *Explain why the steady state capital-labor ratio is changing the way it is.*

*Can you back out the original Cobb-Douglas production function from the given per-worker production function $y_t$?*