Monetary Economics Homework

Zircon

Spring 2023

---

1. Conversion Rate

Consider an economy in which the population follows the rule $N_t = 1.1N_{t-1}$. In addition, suppose that endowments per young person grow each period according to $y_t = 1.05y_{t-1}$. Assume old people do not receive any endowments. Assume that a young person's preferences are such that they want to consume one-half of their endowment so that $c_{1,t} = 0.5y_t$. Compute the rate at which transfers by young people can be converted into transfers received when old, that is, the conversion rate for this economy.

Answer:

Budget Constraint

$$\text{Young: } c_{1,t} + \varphi_t \leq y_t$$
$$\text{Old: } c_{2,t+1} \leq \varphi_{t+1}^R$$

Conversion Rate

$$x_{t+1} = \frac{\varphi_{t+1}^R}{\varphi_t}$$

Lifelong BC

$$c_{1,t} + \frac{1}{x_{t+1}} c_{2,t+1} \leq y_t$$

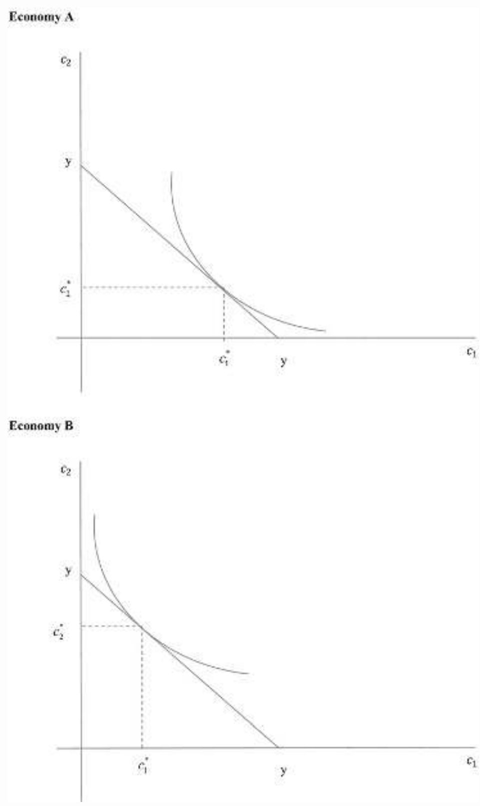
Market of money clears,

$$N_t(y_t - c_{1,t}) = N_{t-1}c_{2,t}$$
$$RHS = N_{t-1}\varphi_t^R = N_{t-1}(x_t\varphi_{t-1}) = N_{t-1}\left(x_t(y_{t-1} - c_{1,t-1})\right)$$
$$\implies x_t = \frac{N_t(y_t - c_{1.t})}{N_{t-1}(y_{t-1} - c_{1,t-1})} = \frac{N_t \cdot \frac{1}{2}y_t}{N_{t-1} \cdot \frac{1}{2}y_{t-1}} = 1.155$$

Note that under optimization, $\varphi_t = y_t - c_{1,t}, \varphi_{t+1}^R = c_{2,t+1}$. However, you should first plug in the conversion rate x_t from definition, and make equivalent transformations towards pratical meanings.

2. Value of Money

Consider two economies, A and B. Both economies have the same population, supply of fiat money, and endowments. In each economy, the number of young people born in each period is constant at N and the supply of fiat money is constant at M. Furthermore, each person is endowed with y units of the consumption good when young and zero when old. The only difference between the economies is with regard to preferences. Other things being equal, people in economy A have preferences that lean toward first-period consumption; individual preferences in economy B lean toward second-period consumption. We will also assume stationarity. More specifically, the lifetime budget constraints and typical indifference curves for people in the two economies are represented in the following diagram.



1. Will there be a difference in the rates of return of fiat money in the two economies? If so, which economy will have the higher rate of return of fiat money? Give an intuitive interpretation of your answer.
2. Will there be a difference in the value of money in the two economies? If so, which economy will have the higher value of money? Give an intuitive interpretation of your answer.

Answer:

1. No. Rate of return is constant at 1.

$$N(y - c_1) = v_t M \Longrightarrow v_t = \frac{N(y - c_1)}{M} \Longrightarrow \frac{v_{t+1}}{v_t} = 1$$

2. Value of money is higher in country B.

$$c_1^B \leq c_1^A \Longrightarrow v_t^b \geq v_t^A$$

3. Increasing Endowment

We have modeled growth in an economy by a growing population. We could also achieve a growing economy by having an endowment that increases over time. To see this, consider the following economy: Let the number of young people born in each period be constant at N. There is a constant stock of fiat money, M. Each young person born in period t is endowed with y_t units of the consumption good when young and nothing when old. The person's endowment grows over time so that $y_t = \alpha y_{t-1}$ where $\alpha > 1$. For simplicity, assume that in each period t, people desire to hold real money balances equal to one-half of their endowment, so that $v_t m_t = \frac{y_t}{2}$.

1. Write down equations that represent the constraints on first- and second-period consumption for a typical person. Combine these constraints into a lifetime budget constraint.
2. Write down the condition that represents the clearing of the money market in an arbitrary period . Use this condition to find the real rate of return of fiat money in a monetary equilibrium. Explain the path over time of the value of fiat money.

Answer:

1.

$$\begin{aligned} \text{Young: } & c_{1,t} + v_t m_t \leq y_t \\ \text{Old: } & c_{2,t+1} \leq v_{t+1} m_t \\ \implies & c_{1,t} + \frac{v_t}{v_{t+1}} c_{2,t+1} \leq y_t \end{aligned}$$

2.

$$N_t(y_t - c_{1,t}) = v_t M_t$$

$$\implies v_t = \frac{N_t(y_t - c_{1,t})}{M_t} = \frac{N_t \cdot (v_t m_t)}{M_t} = \frac{N_t \cdot \frac{y_t}{2}}{M_t}$$

$$\implies \frac{v_{t+1}}{v_t} = \frac{y_{t+1}}{y_t} = \alpha$$

With a growing endownment, the economy is booming with more consumption goods. However, the stock of money is unchanged, meaning that a relatively small amount of money is bidding for more goods. Therefore, the value of money is growing with a rate of return $\alpha, \alpha > 1$.

4. Barter

Consider a fiat money/barter system like that portrayed in chapter of Barter. Suppose the number of goods is 100. Each search for a trading partner costs a person 2 units of utility.

1. What is the probability that a given random encounter between people of separate islands will result in a successful barter?
2. What are the average lifetime search costs for a person who relies strictly on barter?
3. What are the average lifetime search costs for a person who uses money to make exchanges?

Now let us consider exchange costs. Suppose it costs 4 units of utility to verify the quality of goods accepted in exchange and 1 unit of utility to verify that money accepted in exchange is not counterfeit.

4. What are the total exchange costs of someone utilizing barter?
5. What are the total exchange costs of someone utilizing money?

Answer:

1. $\frac{1}{J^2-J}$
2. $\alpha(J^2 - J)$
3. $2\alpha J$
4. 4
5. $5(= 4 + 1)$

where $\alpha = 2, J = 100$.

5. Commodity Money

Consider a commodity money model economy like the one described in this chapter but with the following features: There are 100 identical people in every generation. Each person is endowed with 10 units of the consumption good when young and nothing when old. To keep things simple, let us assume that each young person wished to acquire money balances worth half of his endowment, regardless of the rate of return. The initial old own a total of 100 units of gold. Assume that people are indifferent between consuming 1 unit of gold and consuming 2 units of the consumption good.

1. Suppose the initial old choose to sell their gold for consumption goods rather than consume the gold. Write an equation that represents the equality of supply and demand for gold. Use it to find the number of units of gold purchased by each person, m_t^g, and the price of gold, v_t^g.
2. At this price of gold, will the initial old actually choose to consume any of their gold?
3. Would the initial old choose to consume any of their gold if the total initial stock of gold were 800? In this case, what would be the price of gold and the stock of gold after the initial old consumed some of their gold? Compare your answer in this part with your answer in part 1. Does the quantity theory of money hold?
4. Suppose it is learned that a gold discovery will increase the stock of gold from 100 units to 200 units in period t^*. Assume the government uses the newly discovered gold to buy bread that will not be given back to its citizens. Find the price of gold at $t^* - 1$ and at t^*, Also find the rate of return of gold acquired at $t^* - 1$.

Suppose there is a second storable good, silver. Silver is as easy to exchange and store as gold. The initial old own a total of 50 units of silver. There can be no additions to the stock of silver. People are indifferent between consuming 1 unit of silver and 1 unit of the consumption good. Let v_t^s denote the trading value of a unit of silver.

5. Find the market-clearing condition if both silver and gold are used as money. Can there be an equilibrium in which both silver and gold are used only as money (are not consumed) and $v_t^s = 1.5$? $v_t^s = 2$?. In each case, use the market-clearing condition to find the corresponding trading value of gold. For what range of values of v_t^s is there an equilibrium in which both silver and gold are used only as money (are not consumed)?
6. What would happen to the value of silver if the government passed a law banning the use of gold as money?
7. If one member of the initial old owned the entire stock of silver, would that person prefer that gold alone, silver alone, or both gold and silver be used as money? Explain.
8. If each member of the initial old owned $1/2$ unit of silver and 2 units of gold, would the initial old prefer that gold alone, silver alone, or both gold and silver be used as money? Explain.

Answer:

1.

$$N_t(y_t - c_{1,t}) = v_t^g M_t^g$$
$$\text{where } y_t - c_{1,t} = v_t m_t = \frac{y_t}{2}$$
$$\Longrightarrow v_t^g = 5$$
$$\Longrightarrow m_t^g = 1$$

2.

According to the description, intrinsic value of the gold is

$$\tilde{v}^g = 2$$

Since $v_t^g = 5 > \tilde{v}^g = 2$, the gold will circulate as medium of exchange, instead of being consumed by the initial old.

3.

$$N_t(y_t - c_{1,t}) = v_t^g M_t^g \Longrightarrow v_t^g = \frac{5}{8} < \tilde{v}^g = 2$$

Therefore, the initial old will first consume the gold until $v_t^g = \tilde{v}^g = 2$. The gold will play as medium of exchange thereafter.

$$N_t(y_t - c_{1,t}) = \tilde{v}^g M_t^g \Longrightarrow M_t^g = 250$$

The value of gold does react proportionally to its stock change. Quantity theory of money does not hold here.

4.

No change in period $t^* - 1$, then

$$v_{t^*-1} = 5$$

The demand for money has not changed, and 200 units gold are now bidding for it.

$$N_t(y_t - c_{1,t}) = \tilde{v}_{t^*} M_{t^*}^g \Longrightarrow v_{t^*} = \frac{5}{2} \Longrightarrow$$

The rate of return of gold is then

$$\frac{v_{t^*}}{v_{t^*-1}} = \frac{1}{2}$$

5.

According to the description, intrinsic value of the silver is

$$\tilde{v}^s = 1$$

Stock of silver is

$$M^s = 50$$

The market for commodity money clears when

$$\begin{gathered} v_t^s M^s + v_t^g M^g = N(y_t - c_{1,t}) = N(v_t^g m_t^g + v_t^s m_t^s) \\ \Longrightarrow v_t^s + 2v_t^g = 10 \end{gathered}$$

with

$$\begin{gathered} v_t^s \geq \tilde{v}^s = 1 \\ v_t^g \geq \tilde{v}^g = 2 \end{gathered}$$

when both gold and silver are used as money.

This is an issue of linear programming, with

$$
\begin{gathered}
v_t^s + 2v_t^g = 10 \\
v_t^s \geq \tilde{v}^s = 1 \\
v_t^g \geq \tilde{v}^g = 2 \\
\implies v_t^s \in [1, 6], v_t^g \in \left[2, \frac{9}{2}\right]
\end{gathered}
$$

6.

Rewrite the market-clearing condition as

$$
\begin{gathered}
v_t^s M^s = N(y_t - c_{1,t}) = N(v_t^s m_t^s) \\
\implies v_t^s = 10 > \tilde{v}^s, m_t^s = \frac{1}{2}
\end{gathered}
$$

7.

- Gold alone: $v_t^g = 5$
- Silver alone: $v_t^s = 10$
- Gold and silver: $v_t^s + 2v_t^g = 10, v_t^s \in (1, 6), v_t^g \in \left(2, \frac{9}{2}\right)$

Suppose the person has G units of gold,

- Gold alone: $\text{consumption} = 50 + 5G$
- Silver alone: $\text{consumption} = 500 + 2G$
- Gold and silver: $\text{consumption} = 50v_t^s + Gv_t^g$

$$
\begin{gathered}
50 + 5G < 500 + 2G \\
50v_t^s + Gv_t^g = 500 + (G - 100)v_t^g < 500 < 500 + 2G
\end{gathered}
$$

The person will surely prefer silver alone to be used as money.

8.

Since the population keeps constant, the old will pass on their holdings of balance to the young in the period to come. This simple thought experiment can replace the step of listing the demand and supply for money and make them meet.

$$
\frac{1}{2}v_t^s + 2v_t^g = \frac{1}{2}y = 5
$$

which is the amount of consumption good each individual can consume if both commodity monies are used.

It is simple that

$$
\begin{gathered}
\text{Gold only: consumption} = \frac{1}{2} \cdot 1 + 2 \cdot 2 = \frac{9}{2} \\
\text{Silver only: consumption} = \frac{1}{2} \cdot 10 + 2 \cdot 2 = 9
\end{gathered}
$$

Therefore, the initial old will prefer silver alone.

6. Inflation

Let $M_t = zM_{t-1}, N_t = N_{t-1}$ for every period t, where z and n are both greater than 1. The money created each period is used to finance a lump-sum subsidy of a_t^* goods to each young person.

1. Find the equation for the budget set of an individual in the monetary equilibrium. Graph it. Show an arbitrary indifference curve tangent to the set and indicate the levels of c_1 and c_2 that would be chosen by an individual in this equilibrium.
2. On the graph you drew in part a, draw the feasible set. Take advantage of the fact that the feasible set line goes through the monetary equilibrium (c_1^*, c_2^*). Label your graph carefully, distinguishing between the budget and feasible sets.
3. Prove that the monetary equilibrium does not maximize the utility of the future generations. Support your assertion with references to the graph you drew of the budget and feasible sets.

Answer:

Budget constraint

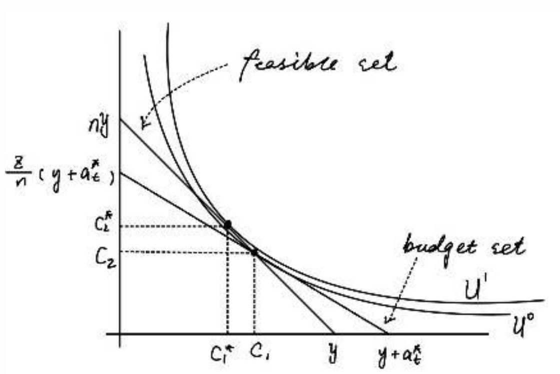
$$\begin{aligned} \text{Young: } & c_{1,t} + v_t m_t \le y + a_t^* \\ \text{Old: } & c_{2,t+1} \le v_{t+1} m_t \\ \implies & c_{1,t} + \frac{v_t}{v_{t+1}} c_{2,t+1} \le y + a_t^* \end{aligned}$$

Market of money clears,

$$N_t(y + a_t^* - c_{1,t}) = v_t M_t \implies v_t = \frac{N_t(y + a_t^* - c_{1,t})}{M_t}$$

$$\overset{\text{Stationarity}}{\implies} \frac{v_{t+1}}{v_t} = \frac{n}{z}$$

$$\implies \text{Lifelong BC: } c_1 + \frac{z}{n} c_2 \le y + a^*$$



7. Shrinking Stock of Money

Consider an economy with a shrinking stock of fiat money. Let $N_t = N$, a constant, and $M_t = zM_{t-1}$ for every period t, where z is positive and less than 1. The government taxes each old person τ goods in each period, payable in fiat money. It destroys the money it collects.

1. Find and explain the rate of return in a monetary equilibrium.
2. Prove that the monetary equilibrium does not maximize the utility of the future generations.

   Hint: Follow the steps of the equilibrium with a subsidy, noting that a tax is like a negative subsidy.
3. Do the initial old prefer this policy to the policy that maintains a constant stock of fiat money? Explain.

Answer:

1.

Budget constraint

$$\begin{aligned} \text{Young: } & c_{1,t} + v_t m_t \le y \\ \text{Old: } & c_{2,t+1} \le v_{t+1} m_t - \tau \\ \implies & c_{1,t} + \frac{v_t}{v_{t+1}} c_{2,t+1} \le y - \frac{v_t}{v_{t+1}} \tau \end{aligned}$$

Market of money clears,

$$\begin{aligned} N_t(y_t - c_{1,t}) &= v_t M_t \\ \implies v_t &= \frac{N_t(y_t - c_{1,t})}{M_t} \\ \overset{\text{Stationarity}}{\implies} \frac{v_{t+1}}{v_t} &= \frac{1}{z} > 1 \end{aligned}$$

In an economy with shrinking stock of money, less money are pegged to relatively more consumption goods. Therefore, the value of money will go up as time goes by.

2.

From the rate of return of money, the lifelong BC is then

$$c_1 + zc_2 \le y - z\tau$$

The feasible set for the society is

$$c_1 + c_2 \le y$$

note that the feasible set has nothing to do with tax, which is an internal friction.

3.

This policy is welcomed by the initial old. With a shrinking stock of money, individuals in the economy will consume less when young and more when old. The initial old's consumption will then be higher than without such policy. (Their consumptions are supported by the young's money demand, or equivalently, the future generations' consumption decision.)

8. Non-Distorting Tax

Consider the following economy: Individuals are endowed with y units of the consumption good when young and nothing when old. The fiat money stock is constant. The population grows at rate n. In each period, the government taxes each young person τ goods. The total proceeds of the tax are then distributed equally among the old who are alive in that period.

1. Write down the first- and second-period budget constraints facing a typical individual at time t. (Hint: Be careful; remember that more young people than old people are alive at time t.) Combine the constraints into a lifetime budget constraint.
2. Find the rate of return on fiat money in a stationary monetary equilibrium.
3. Does the monetary equilibrium maximize the utility of future generations?
4. Does this government policy have any effect on an individual's welfare?
5. Does your answer to part 4 change if the tax is larger than the real balances people would choose to hold in the absence of the tax?
6. Suppose that tax collection and redistribution are (very) costly, so that, for every unit of tax collected from the young, only 0.5 unit is available to distribute to the old. How does your answer to part d change?

Answer:

1.

At period $t+1$, transfer to each old people is

$$\frac{N_{t+1}\tau}{N_t} = n\tau$$

Therefore, at any time period, transfer to the old per capita is $n\tau$.

Budget constraint

$$\begin{aligned} \text{Young: } & c_{1,t} + v_t m_t \leq y - \tau \\ \text{Old: } & c_{2,t+1} \leq v_{t+1} m_t + n\tau \\ \implies & c_{1,t} + \frac{v_t}{v_{t+1}} c_{2,t+1} \leq y - \tau + \frac{v_t}{v_{t+1}} n\tau \end{aligned}$$

2.

Market of money clears,

$$\begin{aligned} N_t(y_t - c_{1,t} - \tau) &= v_t M_t \\ \implies v_t &= \frac{N_t(y_t - c_{1,t} - \tau)}{M_t} \\ \overset{\text{Stationarity}}{\implies} \frac{v_{t+1}}{v_t} &= n \end{aligned}$$

3 & 4 & 5.

Lifetime budget constraint is then

$$c_1 + \frac{1}{n} c_2 \leq y$$

Feasible set is

$$\begin{aligned} & N_t c_1 + N_{t-1} c_2 \leq N_t y \\ \Leftrightarrow \quad & c_1 + \frac{1}{n} c_2 \leq y \end{aligned}$$

Lifetime budget constraint coincides with feasible set, if τ is not "that large". Then, the monetary equilibrium maximizes the utility of future generations. If τ is so large that it exceeds the real balances people would choose to hold in the absense of tax, then this will impose a distorting "hurt" on consumption bundles, and then the utility.

6.

Frictions will cause inefficiency.

Budget constraints are

$$\begin{aligned} \text{Young: } & c_{1,t} + v_t m_t \leq y - \tau \\ \text{Old: } & c_{2,t+1} \leq v_{t+1} m_t + \frac{1}{2} n\tau \\ \implies & c_{1,t} + \frac{1}{2} c_{2,t+1} \leq y - \frac{1}{2}\tau \end{aligned}$$

which is different from the feasible set under stationarity.

9. Tax & Inflation

Assume that people face a lump-sum tax of τ goods when old and a rate of expansion of the fiat money supply of $z > 1$. The tax and the expansion of the fiat money stock are used to finance government purchases of g goods per young person in every period. There are N people in every generation. Assume that the utility function of people in the economy is $\log(c_{1,t}) + \log(c_{2,t+1})$.

1. Find the real demand for money $(q = v_t m_t)$ as a function of z and τ.
2. Find the government budget constraint in a stationary equilibrium. Solve it for τ as a function of z. (The expression will also involve y and g.)
3. Substitute your expression for τ from the government budget constraint (part 2) into the demand for money (part 1). Use this to represent seigniorage as a function of z alone. Graph seigniorage as a function of z. For the graph, use the following parameter values: $N = 1000$, $y = 100$, and $g = 10$.

Answer:

1.

Feasible set

$$\begin{aligned} Nc_{1,t} + Nc_{2,t} &\leq Ny - Ng \\ \Leftrightarrow c_{1,t} + c_{2,t} + g &\leq y \end{aligned}$$

Budget constraint

$$\begin{aligned} \text{Young: } & c_{1,t} + v_t m_t \leq y \\ \text{Old: } & c_{2,t+1} \leq v_{t+1} m_t - \tau \end{aligned}$$

Market of money clears,

$$v_t M_t = N(y - c_{1,t}) \Longrightarrow v_t = \frac{N(y - c_{1,t})}{M_t} \Longrightarrow \frac{v_{t+1}}{v_t} = \frac{M_{t+1}}{M_t} = \frac{1}{2}$$

Lifelong budget constraint

$$\begin{aligned} & c_{1,t} + \frac{v_t}{v_{t+1}} c_{2,t+1} \leq y - \frac{v_t}{v_{t+1}} \tau \\ \Leftrightarrow \quad & c_{1,t} + z c_{2,t+1} \leq y - z\tau \end{aligned}$$

Let Lagrange function be

$$\begin{aligned} & \mathcal{L}(c_{1,t}, c_{2,t+1}, \lambda) = \log c_{1,t} + \log c_{2,t+1} + \lambda(y - z\tau - c_{1,t} - c_{2,t+1}) \\ \stackrel{\text{F.O.C.}}{\Longrightarrow} \quad & \frac{\partial \mathcal{L}}{\partial c_{1,t}} = 0, \frac{\partial \mathcal{L}}{\partial c_{2,t+1}} = 0, \frac{\partial \mathcal{L}}{\partial \lambda} = 0 \\ \Longrightarrow \quad & c_{1,t}^* = z c_{2,t+1}^* \\ \Longrightarrow \quad & \begin{cases} c_{2,t+1}^* = \frac{1}{2z}(y - z\tau) \\ c_{1,t}^* = \frac{1}{2}(y - z\tau) \end{cases} \\ \Longrightarrow \quad & q = v_t m_t = y - c_{1,t}^* = \frac{1}{2}(y + z\tau) \end{aligned}$$

2.

In stationary equilibrium, government's budget constraint is

$$\begin{aligned}
&Ng = N\tau + (M_t - M_{t-1})v_t \\
\Leftrightarrow\ & Ng = N\tau + M_t\left(1 - \frac{1}{z}\right)v_t \\
\Leftrightarrow\ & g = \tau + \left(1 - \frac{1}{z}\right)m_t v_t = \tau + \left(1 - \frac{1}{z}\right)q = \tau + \frac{1}{2}\left(1 - \frac{1}{z}\right)(y + z\tau) \\
\Longrightarrow\ & \tau = \frac{2g - \left(1 - \frac{1}{z}\right)y}{z+1}
\end{aligned}$$

3.

Plug in the expression of τ,

$$q = \frac{1}{2}(y + z\tau) = \frac{y + zg}{z+1}$$

Denote T as seigniorage,

$$\begin{aligned}
T_t &= v_t(M_t - M_{t-1}) = v_t M_t\left(1 - \frac{1}{z}\right) = N(v_t m_t)\left(1 - \frac{1}{z}\right) \\
&= Nq\left(1 - \frac{1}{z}\right) \\
&= N \cdot \frac{(y + zg)(z-1)}{z(z+1)}
\end{aligned}$$

10. International Trade

Consider two identical countries, a and b, in our standard overlapping generations model. In each country the population of every generation is 200 and each young person wants money balances worth 50 goods. Assume that the money of country a is the only currency that currently circulates in the two countries. There are $800 of country a money split equally among the initial old of both countries.

1. Find the value of a country a dollar and the consumption of the initial old.
2. Suppose country b issues its own money, giving £10 to each of the initial old of country b. To ensure a demand for this currency, country b imposes foreign exchange controls. Find the value of a pound and the value of a dollar. Find the consumption of the initial old in country a and in country b. Who has been made better off by this policy switch?

Answer:

1.

Market of country a money clears,

$$v_t^a M_t^a = N^a(y_t^a - c_{1,t}^a) + N^b(y_t^b - c_{1,t}^b)$$
$$\Longrightarrow v_t^a = 25, c_t^a = c_t^b = 2 \cdot v_t^a = 50$$

Note that country a money circulates among the two countries!

2.

Since country b imposes foreign exchange controls, consumption goods from country b can only exchange for country b money. However, it is possible that country b money circulates in country a, which is denoted as $(1-\lambda), \lambda \in (0,1]$.

The market of monies should clear for both countries,

$$\begin{cases} N^a(y^a - c_1^a) = v_t^a M_t^a + (1-\lambda) v_t^b M_t^b \\ N^b(y^b - c_1^b) = \lambda v_t^b M_t^b \end{cases} \Longrightarrow \begin{cases} v_t^a = 25 - \frac{25}{2\lambda} \\ v_t^b = \frac{5}{\lambda} \end{cases}$$

Therefore, consumptions in both countries are

$$c^a = v_t^a m_t^a = 25(2 - \frac{1}{\lambda}) < 50$$
$$c^b = v_t^b m_t^b + v_t^a m_t^a = 50 + \frac{25}{\lambda} > 50$$

11. Independence of CB

On the independence of the Fed. Reserve Bank of the U.S.:

1. How is the president of the United States able to exert influence over the Federal Reserve?
2. In what way does the Federal Reserve have a high degree of instrument independence? If it has a specific mandate from Congress to achieve “maximum employment and low, stable prices,” then how does the Fed have goal independence?

Answer:

1.

- The president can influence Congress, which has in the past threatened legislation to reduce independence of the Fed in various ways.
- It is not uncommon for a president to appoint several members to the Board of Governors, so the president has the opportunity to pick people who may have particular economic ideologies.
- The president can appoint a new chair of the Board of Governors every four years; although the previous chair can fill out his or her term on the Board, tradition dictates that they are usually expected to resign.

2.

- The Fed has high degree of tool independence, as it can choose any desired method to achieve a given policy goal. In the past, this took the form of adjusting the money supply, but the Federal Reserve now (like most other central banks) chooses to use short-term interest rates as its primary policy tool.
- Although the Fed's goals are "maximum employment" and "low, stable prices," it has a considerable degree of goal independence because it has significant latitude in accurately interpreting the practical meaning of "maximum employment" and "high, stable prices." In many other countries, goal independence is much lower, especially for countries with formal inflation targets, which may be authorized by the government.

12. Monetary Policy

1. Why might inflation targeting increase support for the independence of the central bank in conducting monetary policy?
2. "The zero lower bound on short-term interest rates is not a problem, since the central bank can just use quantitative easing to lower intermediate and longer-term interest rates instead." Is this statement true, false, or uncertain? Explain.
3. Why might macroprudential regulation be more effective in managing asset price bubbles than monetary policy?

Answer:

1. **Because of greater transparency in policymaking, increased accountability, and, most importantly, public support**, the central bank pursues an inflation-targeting monetary policy on its own.
2. Incorrect. While it is true that quantitative easing and other types of unconventional policies can be used once short-term interest rates reach the zero lower bound, this is not a panacea.
   - In particular, when the economy reaches the zero lower bound, this is often accompanied by deflationary conditions, which can make it difficult to design effective policies because the outcomes of such policies are typically more uncertain than traditional interest rate policies under typical conditions.
   - Additionally, the implementation of unconventional policies such as quantitative easing is more complex, and therefore it may be more difficult to effectively utilize these programs to push the economy out of the zero lower bound.

3.

- The main reason why monetary policy may not be effective in eliminating asset price bubbles is that asset price bubbles are extremely difficult to identify in real-time; in many cases, by the time policymakers and the public reach a consensus on the existence of a bubble, implementing effective policies to contain the bubble is often too late.
- Even if asset price bubbles are identified in a timely manner, monetary policy is often seen as a tool that is too blunt to effectively address most asset price bubbles.
- In particular, changes in interest rates may have some mild short-term effects in reducing asset price bubbles, but interest rate changes may have a greater impact on real economic activity and cause more serious collateral damage.
- Therefore, due to the limitations of monetary policy, proactively identifying potential issues and implementing safeguards within the banking and financial system can be more targeted and effective in resisting bubbles than monetary policy.