

Макроэкономика 1 — Совбак ВШЭ и РЭШ, 2022 demo midterm

Совбак ВШЭ и РЭШ

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PROBLEM 1

Short questions — 40 points

Each question is worth **10 points**.

(a) (10 points) By how much does GDP rise when a real-estate agent sells a house for \$200,000 that the previous owners bought 10 years earlier for \$100,000?

The agent earns a commission of \$6,000.

(b) (10 points) Consider a two-period consumption-saving problem for an individual with current and future endowments

$$y \quad \text{and} \quad y',$$

and Leontief preferences

$$u(c, c') = \min\{c, c'\}.$$

Find the conditions on y and y' under which an increase in the real interest rate strictly increases the consumer's welfare.

(c) (10 points) Suppose the central bank buys a government bond for \$100 from a private individual who has an account at Bank A.

Show how the balance sheets of the central bank and Bank A change after the transaction.

Name the balance-sheet components that change.

(d) (10 points) Does Ricardian equivalence hold in an overlapping-generations model with money and a pay-as-you-go social-security system?

No formal proof is required. Explain the intuition.

PROBLEM 2

Two-period endowment economy — 20 points

Consider a two-period endowment economy with one type of agent.

There are N agents. Each agent is endowed with y units of goods in the first period and y' units in the second period.

Agents can issue and purchase one-period bonds.

Each agent has linear utility

$$u(c, c') = c + \beta c',$$

where

$$0 < \beta < 1.$$

(a) (10 points) Suppose

$$y > 0, \quad y' > 0.$$

Is the equilibrium interest rate unique?

If it is unique, find it. Otherwise, find the full range of possible equilibrium interest rates.

(b) (10 points) Suppose

$$y > 0, \quad y' = 0.$$

Is the equilibrium interest rate unique?

If it is unique, find it. Otherwise, find the full range of possible equilibrium interest rates.

PROBLEM 3

Money and the silver shipment — 40 points

Consider an exchange economy with money representing Renaissance Europe.

There are two types of agents:

- Spanish agents;
- English agents.

There are N agents of each type, so the total population is $2N$.

Initially, every Spanish and English agent is endowed with:

- 1 unit of silver;
- 1 unit of goods.

Thus Europe initially has:

$$2N$$

units of silver and

$$2N$$

units of goods.

All agents have the same preferences over consumption c and real money balances m/p :

$$\log c + \log \left(\frac{m}{p} \right),$$

where m is the amount of silver and p is the price level.

Spanish agents expect to receive one additional unit of silver each from the Americas.

English agents can sacrifice

$$\Delta y$$

units of their goods endowment to capture the silver shipment.

If the English capture the shipment:

- every Spanish agent keeps 1 unit of silver and 1 unit of goods;
- every English agent has $1 - \Delta y$ units of goods and 2 units of silver.

If the English do not interfere:

- every Spanish agent receives 2 units of silver and 1 unit of goods;
- every English agent keeps 1 unit of silver and 1 unit of goods.

(a) (30 points) Find the maximum value of

$$\Delta y$$

for which English agents are better off capturing the shipment.

(b) (5 points) Suppose the English as a group do not attack the Spanish shipment, but one individual English agent considers attacking.

An individual agent cannot affect aggregate quantities or prices. Therefore, regardless of this agent's decision, aggregate endowments remain effectively equal to

$$2N$$

units of goods and

$$3N$$

units of silver.

Find the maximum value of

$$\Delta y$$

for which the individual English agent is better off attacking.

(c) (5 points) Do the answers to parts (a) and (b) differ?

Explain the economic intuition.