

Exercise session #1 - Macroeconomic aggregates; General Equilibrium model of GDP

Problem 1 - Components of expenditure

Place each of the transactions in one of the four components of expenditure: C, I, G, NX.

- Skoda sells car to the police department.
- Skoda sells car to taxi company.
- Skoda sells car to German company.
- Skoda sells car to Jan Novak.
- Skoda builds car to be sold next year (e.g. low demand due to crisis.)

Problem 2 - Price indexes

Marek consumes only apples. In year 2008, red apples cost \$1 each, green apples cost \$2 each, and Marek buys 10 red apples. In year 2009, red apples cost \$2 each, green apples cost \$1 each, and Marek buys 10 green apples.

- Compute a CPI for apples, assuming the year 2008 is the base year in which the consumer basket is fixed. What does it imply about the change in costs of living and why?
- Compute Marek's nominal spending on apples in each year - how does it change?
- Compute Marek's real spending on apples in each year, assuming year 2008 is the base year.
- Compute the price deflator, defined as nominal spending over real spending. What does it imply about the change in costs of living and why?
- Suppose that Marek is equally happy eating red or green apples. How much has the true cost of living increased for Marek. What does it imply about Laspeyres and Paasche price indexes?

Problem 3 - Changes in supply of production factors

Predict the impact on the real wage and the real rental price of capital

- A wave of immigration increases the labor force
- Earthquake destroys some of the capital stock
- Technological advance improves the production function

Problem 4 - Returns to scale

Little theoretical introduction: If we have initial level of capital K_1 and labor L_1 , that we can use to generate the product $Y_1 = F(K_1, L_1)$ and we multiply the inputs by the same factor z s.t. $K_2 = zK_1$, $L_2 = zL_1$ and $Y_2 = F(K_2, L_2)$ then the production function F has

- constant returns to scale if $Y_2 = zY_1$
- increasing returns to scale if $Y_2 > zY_1$
- decreasing returns to scale if $Y_2 < zY_1$

Question 1: Tell me example when we can observe increasing / decreasing returns to scale in the real world?

Question 2: Determine whether production function has CRS/IRS/DRS.

1. $F(K, L) = \sqrt{K} + \sqrt{L}$
2. $F(K, L) = \sqrt{KL}$
3. $F(K, L) = K^2 + L^2$
4. $F(K, L) = \frac{K^2}{L}$

Problem 5 - Effect of taxation on saving

Question 1: The government raises taxes by \$100 billion. If the marginal propensity to consume is 0.6, what happens to the following? Do they rise and fall, and by what amounts?

- public saving
- private saving
- national saving
- investment

Question 2: Suppose that government increases taxes and government purchases by equal amounts. What happens to the real interest rate and investment? Does the answer depend on marginal propensity to consume?

Problem 6 - Simple GE model of GDP

Consider an economy described by the following equations

$$Y = C + I + G$$

$$Y = 5000$$

$$G = 1000$$

$$T = 1000$$

$$C = 250 + 0.75(Y - T)$$

$$I = 1000 - 50r$$

- In this economy, compute private savings, public savings and national saving. Find the equilibrium interest rate.
- Now suppose that G rises to 1250. Again, compute private savings, public savings and national saving. Find the equilibrium interest rate.