

PROBLEM SET 1
14.02 Principles of Macroeconomics
February 9, 2005
Due February 16, 2005

I. Answer each as True, False, or Uncertain, providing a few sentences of explanation for your choice.

1. If taxes and government spending were both proportional (to income), then the government budget would improve during a recession (where a recession is defined as a decline in output).

2. A decrease in the inflation rate is unambiguously better for an economy since it reduces the erosion of real incomes in that economy.

3. The performance of a country's economy is often tied to the performance of its stock market.

4. If the unemployment rate in a country drops, while the number of people of working age remains the same, then this must mean an increase in the number of people employed in that country.

5. Between 2003 and 2004, inflation as measured by the consumer price index increased due to a substantial increase in the price at which the government bought defense equipment for the war in Iraq.

6. The rich spend more than the poor since they have more income to spend, therefore a tax cut designed to revive the economy from a recession should be targeted towards the rich.

II. Short questions

1. Consider an economy with three companies A, B, C. Company A produces cardboard, which is used by Company B to produce boards and cards, which is used by Company C to produce board games. Company A's revenues (from sales to Company B) amount to \$100, and its expenses on labor amount to \$30. Company B's revenues amount to \$ 250, and its expenses on labor amount to \$ 80. Company C's revenues amount to \$ 400, and its expenses on labor amount to \$ 90.

a. Show three different ways to compute this economy's GDP

b. Now introduce a government into this economy and also a fourth company, call it D, which produces exclusively for the government. The government buys goods from D, and pays for them by taxing the profits of Companies A, B and C at the rate of 25%. The government also chooses to run a budget deficit equal to 10% of GDP. Compute this new economy's GDP and company D's revenues (Assume that company D produces at zero cost).

2. Consider an economy which only makes cars. In 1991, the economy produced 10 cars at \$10,000 each. In 1992, it produced 12 cars at \$12,000 each, and in 1993, it produced 13 cars at \$13,000 each. Assume that real GDP is always calculated at 1992 prices.

- a. Compute the rate of growth of real GDP from 1991 to 1992 and from 1992 and 1993
 - b. Compute the rate of inflation from 1991 to 1992 and from 1992 to 1993
3. Consider an economy whose GDP of \$100 can be decomposed as follows : Private consumption = \$40, Government consumption = \$30, Private investment = \$30
- a. Show that in this economy, savings = investment
 - b. Now assume that the government of this economy embarks on a war effort, for which it requires military equipment, but such equipment is not produced at home, and must be imported from abroad. Suppose the amount of imports is \$ 20, all of which is consumed by the government, and that the government spends an additional \$ 20 to pay its soldiers. What is the economy's GDP now? Show the decomposition. Is savings=investment?

III. Long question

Suppose an economy is described as follows :

The consumption function is : $C = c_0 + c_1Y$

The investment function is : $I = \bar{I}$ (a constant)

Government spending is : $G = \bar{G}$ (a constant)

Assume that the government is running a deficit equal to \bar{G} .

1. Write the equilibrium condition for the goods market. What is the equilibrium output?
2. Find an expression for the goods market multiplier.
Assume for parts 3 and 4 that the government pays for its expenses by raising taxes, which are a constant fraction t of income.
3. Redo 1. and 2. Provide some intuition for why the multiplier is different.
4. Assume that the economy begins trading with the rest of the world, and that imports are a constant fraction m of income (assume no exports). Find an expression for the multiplier. Is it greater or less than the closed economy multiplier (the one you calculated in part 2.)? Explain the difference.
5. Return to the original setup of a closed economy. Assume that taxes are lump sum, i.e., not proportional (denote as T). Also assume that the government starts with a balanced budget. Then it increases spending, but also taxes, so that the budget remains balanced. Compute the impact of this spending increase on equilibrium output, i.e., derive an expression for $\partial Y^*/\partial G$ (or equivalently, $\Delta Y^*/\Delta G$) where Y^* is the equilibrium output. What is the multiplier? Why is the multiplier what it is?