

UNIVERSITY OF TORONTO AT MISSISSAUGA
DEPARTMENT OF ECONOMICS

ECONOMICS 336Y5Y – FALL/WINTER 2016

PUBLIC ECONOMICS –Fall Term Test Solutions

November 2, 2016

Question 1 (worth 4 points)

1a) If the government chose to guarantee the debt of a very large financial institution, how might that affect the lending behaviour of the financial institution, and why? [Two sentences.] (2 points)

By guaranteeing the financial institution's debt, the government may inadvertently cause a moral hazard problem, whereby the bank makes riskier loans than it otherwise would. The bank would have an incentive to do this, knowing that if the loans went bad, the government would bail the institution out, while if the loans were repaid, the bank would have made higher profits, given that more risky loans tend to yield a higher return.

1b) Building on your answer to part 1a), what implications might this behaviour by the very large financial institution have today for government expenditure as a proportion of GDP, if the guarantee were announced today? [Two sentences.] (2 points)

If the guarantee were announced today, the cost of government borrowing might rise, depending on how large the financial institution was, and depending on whether the extra risk could be hedged. This could raise debt service costs, raising government spending as a percent of GDP. (Note: occasionally, governments have their credit ratings adjusted downwards because they are deemed to have taken on too much undiversifiable risk.)

Question 2 (worth 2 points)

In 2006, which spending category accounted for the largest share of government expenditures, and how much was it, to the nearest percent? (2 points)

Social welfare accounted for the largest proportion of government expenditure, at 23.3 percent.

Question 3 (worth 17 points)

3a) You are being offered a choice of \$90 today or \$100 in one year's time, knowing that the rate of inflation will be 10 percent over the course of the year. Which choice should you take, assuming that the prevailing nominal interest rate is zero? Please show your calculations. (3 points)

You would take the \$100 in one year's time, knowing that the real value today of the 'future' \$100 = $100/1.1$, which is approximately equal to $\$91 > \90 .

3b) Would your answer to part 3a) change if the nominal interest rate were 3 percent? Why? Please explain. (3 points)

Now you can invest the \$90 and obtain a positive return. If the nominal interest rate were 3 percent, then it would be worth choosing the \$90 today, on the basis that the interest would amount to \$2.70 in a year (3 percent of 90 is \$2.70), which would have a real value today of $2.70/1.1$, which is approximately \$2.45. So when around \$2.45 is added to the \$90 today, it now exceeds the real value today of \$100, received in one year's time.

3c) Suppose that the government objective can be represented by the following payoff function:

$$R = G + a S,$$

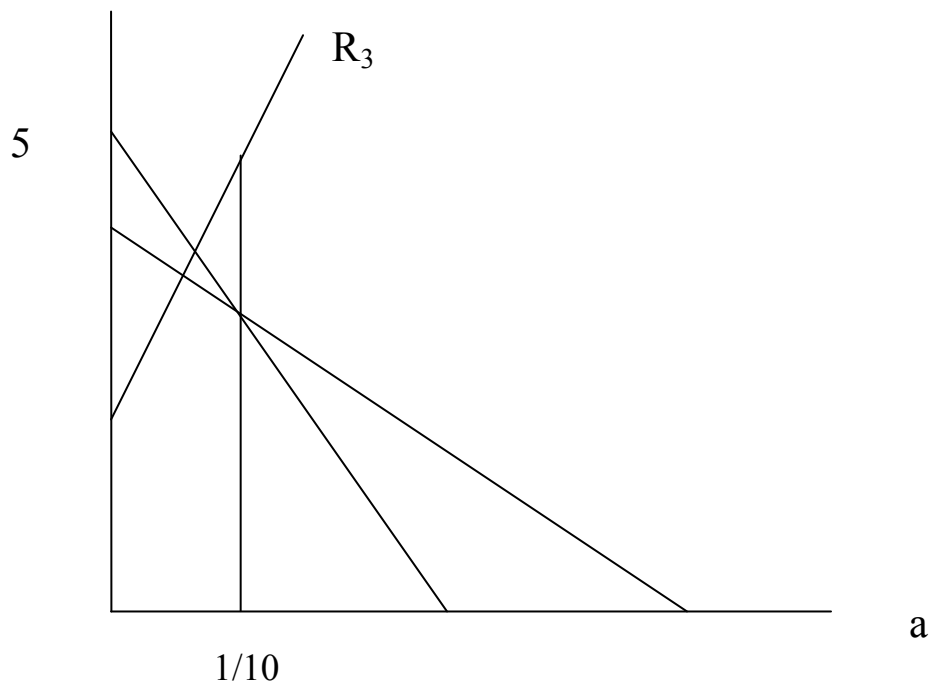
where R measures overall government utility, G is the private payoff to the government, S represents the welfare of the general public, and a is a parameter measuring how much weight the government attaches to the general public's interests.

Consider three alternative options:

- i. Option 1 involves the government issuing nominal debt, then subsequently inflating the economy a lot. This yields a private payoff to the government of $G_1 = 5$ and a payoff to society, $S_1 = -20$;
- ii. Option 2 involves the government issuing nominal debt, then subsequently inflating the economy a moderate amount. This yields a private payoff to the government of $G_2 = 4$ and a payoff to society, $S_2 = -10$;
- iii. Option 3 involves the government issuing indexed debt, then subsequently keeping inflation low. This yields a private payoff to the government of $G_3 = 2$ and a payoff to society of $S_3 = 25$.

If the parameter a were equal to $1/10$, would the government choose the best course of action for society? Please explain, showing any relevant calculations. (6 points)

To determine the right answer, we need to compute the values of the three possible choices, denoted R_1 , R_2 , and R_3 , each evaluated at $a = 1/10$. Note that the payoff associated with each choice can be represented by a straight line, with parameter a on the horizontal axis (see diagram below). At $a = 1/10$, $R_3 = 4.5 > R_1 = R_2 = 3$. Thus, given this weight, the government will choose the course of action that maximizes society's welfare.



Question 4 (worth 3 points)

What is the break-even inflation rate (or BEIR)? (3 points)

The BEIR is that rate of inflation that would equate the yields on nominal versus indexed bonds of the same maturity at today's prices, and so make investors indifferent between them.

Question 5 (worth 2 points)

What is a Giffen good? (2 points)

A Giffen good is one for which an increase in the price increases the demand for the good.

Question 6 (worth 14 points)

6a) Define competitive equilibrium in the pure exchange economy precisely. (4 points)

Competitive equilibrium in the pure exchange economy is a set of prices and an allocation of goods to people such that all markets clear, and all agents maximize utility subject to the budget constraint.

6b) What is a necessary condition for Pareto efficiency in an economy with both consumers and firms. Please be precise. (4 points)

In an economy with both consumers and firms, a necessary condition for Pareto efficiency is that the marginal rate of substitution of good A for good B is equal across all consumers, and equal to the marginal rate of transformation of good A for good B, for any pair of goods A and B. Mathematically, the condition can be written:

$$MRS_{AB}^i = MRS_{AB}^j \text{ for all agents } i \text{ and } j, \text{ and this is equal to } MRT_{AB}.$$

6c) Demonstrate the First Welfare Theorem in an economy with both consumers and firms. Please explain clearly. (6 points)

In a competitive equilibrium, all consumers maximize utility, given prices, and all producers maximize profits, given the same prices. Specifically, consumers will set the marginal rate of transformation of good A for good B equal to the relative price ratio, for any pair of goods, A and B, taking prices as given. Thus we have

$$MRS_{AB}^i = MRS_{AB}^j = P_A / P_B.$$

In turn, profit-maximizing firms under perfect competition will equate the marginal cost for a given good equal to its price. Thus we have

$$MC_A = P_A \text{ and } MC_B = P_B.$$

Dividing, we get

$$MC_A / MC_B = P_A / P_B, \text{ noting also that}$$

$$MRT_{AB} = MC_A / MC_B.$$

Inspection of these two conditions, for price-taking optimizing consumers and producers makes clear that, at equilibrium prices,

$$MRS_{AB}^i = MRS_{AB}^j = P_A / P_B = MRT_{AB}$$

But this is just the condition for Pareto efficiency, which demonstrates the First Welfare Theorem.