

14.06 Problem Set 4

Spring 2005

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Due: Tuesday, April 12

Question 1 *Government Policies and Endogenous Growth*

Consider the model of endogenous growth with expanding product variety covered in class (see Chapter 7 in the Lecture Notes).

1. Show that the government can ensure a first-best equilibrium if it uses a lump-sum tax to finance the appropriate subsidy of the intermediate goods. What rate of subsidy is required? In a richer model, why would it be difficult to carry out the required form of policy?
2. Can the government achieve the first-best solution using a subsidy to the production of the final goods? What assumption of the model is crucial for your answer?
3. Can the government ensure a first-best solution if it relies solely on a subsidy to R&D (financed again by a lump-sum tax)? Explain the answer. What modifications to the model would make it important for the government to subsidize research?

Question 2 *Scale Effects*

1. Why does the varieties model of technological change with expanding varieties exhibit a scale effect in the sense that the growth rate rises with the aggregate quantity of raw labor, L ?
2. If you were asked to test this implication of the model, would you use a country's population as the variable to measure L ? Explain.
3. What types of modifications to the model would eliminate the scale effects? Give one example and explain the intuition behind it.