UNIVERSITY OF CALIFORNIA
DEPARTMENT OF ECONOMICS

Economics 202A
Fall 2010
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Problem Set 6
Due in lecture, Tuesday, November 23, 2010

1. (A variable investment subsidy in the q theory model.) Consider the q theory model of investment considered in lecture and in the book. Assume that initially K and q are at their long-run equilibrium values. Now suppose the government (unexpectedly and permanently) adopts a policy of subsidizing investment. Specifically, the government pays each firm φ for each unit of investment it undertakes (and firms pay the government φ for each unit of disinvestment they undertake). The subsidy paid at a point in time depends on the aggregate capital stock at that time: $\varphi = \varphi(K(t))$, with $\varphi(\bullet) > 0$, $\varphi'(\bullet) < 0$.

a. How, if at all, does the $\dot{K} = 0$ locus change when the government adopts the subsidy?

b. How, if at all, does the $\dot{q} = 0$ locus change when the government adopts the subsidy?

c. How, if at all, does the capital stock change at the moment the government adopts the subsidy?

2. Romer, Problem 8.6.

3. Romer, Problem 8.11.

4. Consider the q-theory model of investment. Assume, however, that adjustment costs are kinked. Let $c^+ > 0$ denote the marginal adjustment cost for the first unit of positive investment and $c^- > 0$ denote the marginal adjustment cost for the first unit of disinvestment.

Assume that initially the economy is in long-run equilibrium at the point where $q = 1 + c^+$ and $\pi(K) = r(1 + c^+)$.

Suppose that at some time, which we will call time 0, there is an unexpected upward shift of the $\pi(\bullet)$ function that is known to be temporary: it is known that the $\pi(\bullet)$ function will switch back to the original function at time $T > 0$.

(OVER)

a. i. How, if at all, is the set of points such that $\dot{q} = 0$ different from time 0 to time T than it is before and after time 0 and after time T?

ii. How, if at all, is the set of points such that $\dot{K} = 0$ different from time 0 to time T than it is before and after time 0 and after time T?

b. Describe qualitatively the behavior of q and K over time. (Note: Assume that the upward shift of the profit function is sufficiently small and/or short-lived that K never exceeds the value that implies $\pi^A(K) = r(1 - c^-)$, where $\pi^A(\bullet)$ is the original profit function.)

EXTRA PROBLEMS (NOT TO BE HANDED IN/ONLY SKETCHES OF ANSWERS WILL BE PROVIDED)

5. Romer, Problem 8.8.

6. Romer, Problem 7.9.

7. Romer, Problem 7.10.