UNIVERSITY OF CALIFORNIA
DEPARTMENT OF ECONOMICS

Economics 202A
Fall 2010
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Problem Set 6
Due in lecture Tuesday, November 15

1. Romer, Problem 8.13.

2. Romer, Problem 9.6.

3. In the q-theory model where the initial value of K exceeds its long-run equilibrium value, as the economy moves toward the long-run equilibrium:

   A. The $\dot{q} = 0$ locus is shifting to the right and the $\dot{K} = 0$ locus is shifting down.
   B. The $\dot{q} = 0$ locus is shifting to the right and the $\dot{K} = 0$ locus is not shifting.
   C. The $\dot{K} = 0$ locus is shifting down and the $\dot{q} = 0$ locus is not shifting.
   D. None of the above.

4. Consider the basic *q*-theory model of investment. Assume the economy is in long-run equilibrium, so that $q = 1$, $\dot{q} = 0$, and $\dot{K} = 0$. At some date, which we will normalize to $t = 0$, there is news: the world will end at date T ($T > 0$). (That is, there will be no possibility of earning profits or incurring adjustment costs after $t = T$.)

   Sketch the resulting paths of *q* and *K* over time, and explain your answer.

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

5. Romer, Problem 8.14.

6. Romer, Problem 8.15.

(OVER)

7. Consider the continuous-time consumption problem discussed in lecture: an individual lives from 0 to T; has initial wealth A(0); and a path of labor income given by Y(t). The path of the instantaneous interest rate is given by r(t). There is no uncertainty.

Suppose the individual's instantaneous utility function is logarithmic. That is, lifetime utility is $\int_{t=0}^{T} e^{-\delta t} \ln[C(t)]\, dt$. Derive an expression for C(t) as a function of things the individual takes as given.

8. Consider the set-up in Problem 7. Suppose the instantaneous interest rate is constant and equal to r, and that the instantaneous utility function, instead of being logarithmic, takes the constant-relative-risk-aversion form, $u(C) = C(t)^{1-\theta}/(1-\theta)$, $\theta > 0$. Derive an expression for C(t) as a function of things the individual takes as given.

9. Consider the q-theory model where K is converging to its long-run equilibrium level from below. Over time, K is rising, and:

A. q is falling, and investment is positive but falling.

B. q is falling, and investment is positive but can be sometimes rising and sometimes falling.

C. q is falling, and investment can be sometimes positive and sometimes negative.

D. q can be sometimes rising and sometimes falling.

10. Consider the basic *q*-theory model of investment. As adjustment costs approach infinity, the saddle path:

A. Is unaffected.

B. Approaches the $\dot{K} = 0$ locus.

C. Approaches the $\dot{q} = 0$ locus.

D. Collapses to a single point.