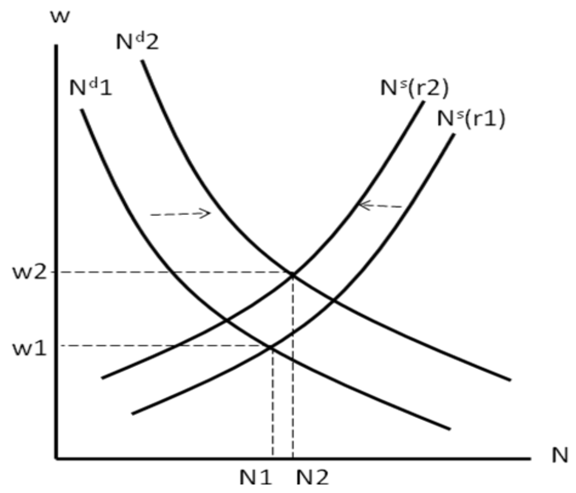
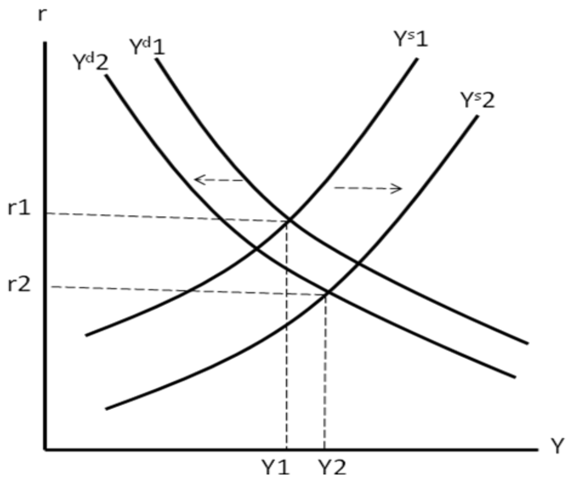
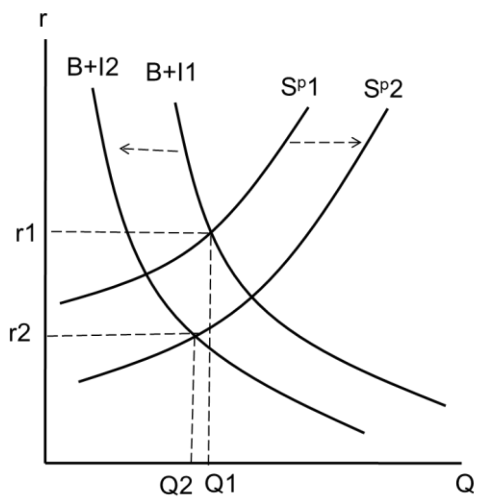
EE312 Macroeconomic Theory
Semester 1/2008
Homework II

Questions 1 Use the Intertemporal Model with Investment to analyze the effects of an increase in current capital stock (K) on employment, current output, the real interest rate, the real wage, current consumption and investment.

Answer:







An increase in current capital stock causes the marginal product of labor (MP_N) to increase. The firm demands more labor services for a given real wage. The labor demand curve shifts to the right from Nd_1 to Nd_2. The market real wage is rising, inducing the consumer to supply more labor services. Employment and output (through the production function) increase. The output supply curve shifts to the right from Y^s1 to Y^s2. Employment increases while the market real interest rate drops from r1.

The higher current capital stock also results in lower future marginal product of capital (MP'_K) and lower current investment demand, causing output demand to decrease. The output demand curve shifts to the left from Y^d1 to Y^d2. The real interest rate drops further to r2. Output decreases slightly, offsetting the initial increase in output supply (the figure assumes the dominant output supply effect so that output still increases from Y1 to Y2).

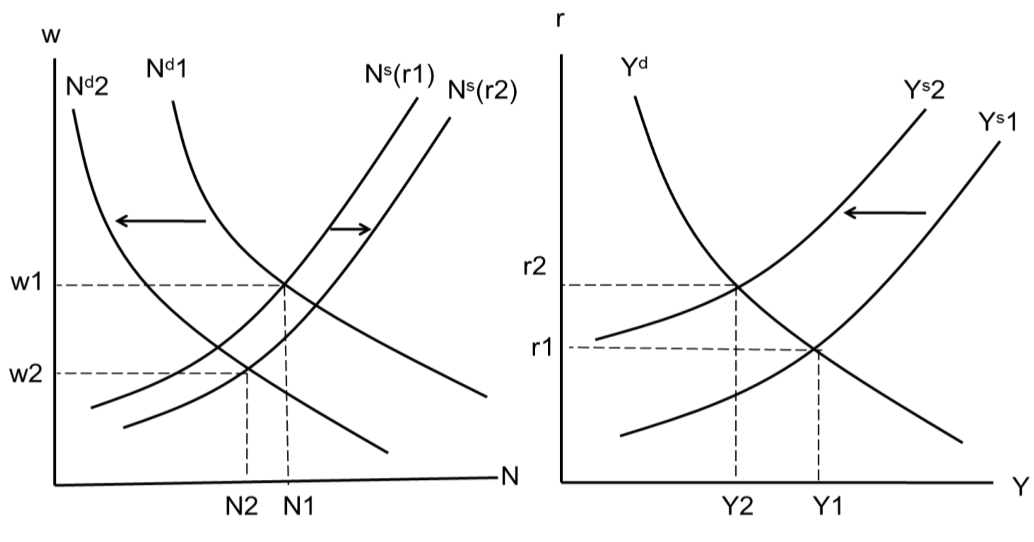
The lower real interest rate causes current leisure to increase as the opportunity cost of current leisure is lower. The consumer provides less labor services. The labor supply curve shifts to the left from $N^s(r1)$ to $N^s(r2)$. Employment drops slightly to offset the initial increase in employment (the figure assumes the dominant labor demand effect so that employment still increases from N1 to N2, corresponding to the rising output at Y2).

The lower real interest rate also induces more demand for current consumption goods. So consumption increases. Investment decreases from the lower MP'_K but increases from the lower real interest rate. Here we assume that the MP'_K has a stronger effect, so investment decreases.

In the credit market, the higher real income (and output) causes private saving to increase. The credit supply curve shifts to the right from S^P1 to S^P2. The decrease in investment demand causes the credit demand curve to shift to the left from B+I1 to B+I2. The real interest rate drops from r1 to r2.

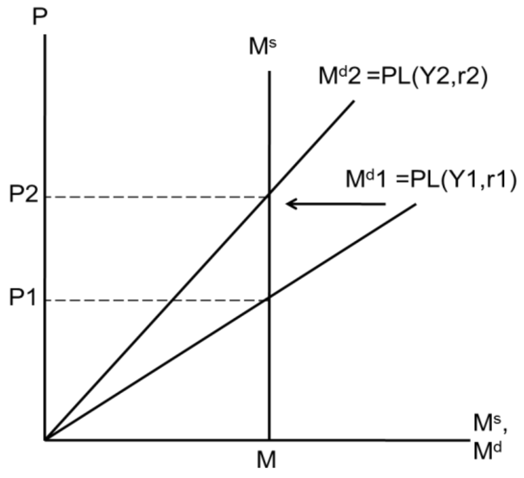
In conclusion, an increase in current capital stock results in a higher real wage, higher employment and output, a lower real interest rate, and higher consumption. The change in investment is unclear.

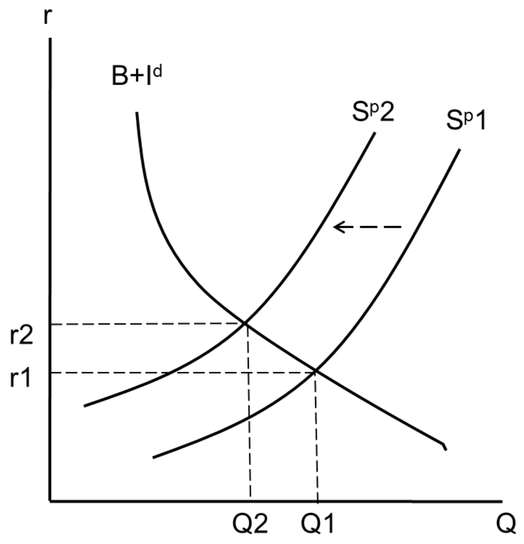
Question 2 Use the Monetary Intertemporal Model to analyze the effects of a temporary decrease in total factor productivity on employment, the real wage, current output, the real interest rate, current consumption, investment and the price level.



Answer: A decrease in current total factor productivity (z) causes the marginal production of labor (MP_N) to decrease. The firm demands less labor services for a given real wage. The labor demand curve shifts to the left (from N^d1 to N^d2). The real wage is falling, inducing the consumer to supply less labor services. Employment and output (through the production function) decrease.

The output supply curve shifts to the left from Y^s1 to Y^s2. The real output level falls from Y1 to Y2 while the real interest rate increases from r1 to r2. A higher real interest rate causes the demands for investment and consumption goods to decrease. The lower output (and income) also reduces the demand for consumption goods. Lower investment and consumption cause output demand to decrease to match the lower output supply.





The higher real interest rate causes current leisure to be more costly. The consumer reduces current leisure and provides more labor services. The labor supply curve shifts rightwards from $N^s(r1)$ to $N^s(r2)$. The real wage drops further from w1 to w2. Employment finally decreases from N1 to N2, corresponding to the lower level of output at Y2.

Consumption drops as a result of lower real income and the higher real interest rate. Investment is also lower because of the higher real interest rate.

In the money market, the lower real income causes the demand for money to decrease. The higher real interest rate means higher opportunity cost of holding money which also causes money demand to decrease. The money demand curve rotates to the left from M^d1 to M^d2 and the price level increases from P1 to P2.

In the credit market, the falling real income causes private saving to decrease. The credit supply curve shifts leftwards from S^P1 to S^P2. The real interest rate increases from r1 to r2.

In conclusion, a decrease in current total factor productivity results in a lower real wage, lower employment and output, a higher real interest rate, and lower consumption and investment demand.

Submission date: Friday 29 March 2013; 14:00 hr.