Final Exam Solutions
Economics 101 - Fall 2006

Multiple Choice
Versions A, C:  1) c  2) b  3) c  4) b  5) d  6) d  7) c  8) a  9) c  10) a
Versions B, D:  1) b  2) c  3) b  4) d  5) c  6) c  7) a  8) d  9) c  10) b

Problem 1: Growth:

a) Steady state condition: \( s f(k) = (\delta + n)k \), \( s \ 4k^{1/2} = (\delta + n)k \), \( k^{1/2} = 4s / (\delta + n) \),
so \( k^* = (4s / (\delta + n))^2 = (4*0.4 / (0.10+0.10))^2 = (1.6 / 0.20)^2 = 64 \).
So \( y^* = 4k^{1/2} = 32 \).

b) golden rule condition:
\[ MPK = \delta + n \]
\[ 2k^{1/2} = 0.20 \]
\[ k^{1/2} = 0.10 \]
\[ k^* = 10 \]
\[ k^*_{gold} = 100 \]
put into the steady state condition:
\[ s f(k) = (\delta + n)k \] so
\[ s = (\delta + n)k / f(k^*) = (0.10 + 0.10)k^* / (4k^{1/2}) = (0.2/4)k^{1/2} = 0.2 * 8 / 4 = 0.5 \]
A lower saving rate would not be able to maintain a sufficiently high capital stock. A higher saving rate would mean that the capital stock costs more to maintain than it is worth in terms of extra productivity.

Since the economy here would need to raise the saving rate, this means it would need to suffer a fall in consumption in the short run, until the economy converges in the very long run to the new better steady state. This would be politically unpopular with consumers.

c) With a lower population growth rate: \( y^* \) rises, \( c^* \) rises, no effect on steady state growth in person terms (still at 0), fall in steady state growth in total output
Versions A,C: (a,a,c,b)
Versions B,D: (b,b,c,a)

Problem 2: Neoclassical Model

a) \( Y^* = 20 \times 100^{1/2} \times 100^{1/2} = 20 \times 100 \)
\( Y^d = C + I + G = [200 + 0.5(2000 - 200)] + [800 - 1000r] + 400 \)
setting \( Y^* = Y^d \): \( 2000 = 2300 - 1000r \) so \( -300 = -1000r \) so \( r = 0.30 \) or 30%
Real wage = MPL = 10(K/L)^{1/3} = 5(100/100)^{1/3} \( W/P = 10 \)
\( M*5 = P*Y \), so \( P = M*5/Y = 800*5/2000 \)
\( P = 2 \)
Nominal GDP = \( P*Y = 2*2000 = 4000 \)
Nominal wage = \( W/P * P = 10 * 2 = 20 \)
The key equilibrium condition in the goods/financial are supply of goods equals demand \( (Y = C + I + G) \) or saving = investment. The interest rate adjusts so that the demand for loanable funds (for investment) in the financial market equals the supply (saving).

b) A rise in M will cause P to rise, real GDP not to change, nominal GDP to rise. Versions A,C: (a,c,a); versions B,D: (b,c,b)

c) A fall in labor causes a fall in real output and a rise the real interest rate needed to clear the goods market. The MPL rises and hence so does the real wage rate. Nominal GDP is constant since it equals M\*V which are constant, a rise in the price level which equals MV/Y.

Versions A,C: (b,a,a,a,c); Versions B,D: (a,b,b,b,c)

d) The classical dichotomy says that changes in nominal variables do not affect real variables, but only other nominal variables (like price level, nominal GDP, nominal rental rate). This is true above. In part b, the change in money supply only affects nominal variables. Note that section c does not violate this property: although this section shows that a change in real variables is affecting nominal variables, effects going from real to nominal are consistent with the classical dichotomy. It just rules out effects going the one direction, from nominal to real.

**Problem 3: Short Run and Long Run**

The fall in consumption lowers total expenditure and output for a given level of interest rate and price level. This is a leftward shift in the IS curve and AD curve. In the long run, the price falls and raises the real money supply. This requires a rise in Y or a fall in r to maintain equilibrium in the money market. This is a rightward shift in the LM curve.

b) Short run: Y falls, r falls, I rises.

Versions A,C: (b,b,a); Versions B,D: (a,a,b)

c) Long run: Y at initial level, r lower, I higher, P lower, M/P is higher. Versions A,C: (a,c,b,c,b); Versions B,D: (a,b,c,b,c)

d) This characteristic would mean the LM curve is fairly flat: when income falls, the fact that money demand falls only a little means that the interest rate does not have to fall very much to keep money demand equal to the constant money supply. As a result the leftward shift the IS curve would imply a larger fall in output. This is because a fall in income normally would lower the interest rate in the money market, which stimulates investment and cushions the fall in demand and hence the recession. If money demand does not fall with the fall in income, there is less reason for the interest rate to fall.
Problem 4: IS/LM

a) 

A rise in money supply will force the interest rate down to maintain equilibrium in the money market – to raise money demand to equal the higher money supply. A fall in \( r \) for a given \( Y \) is a downward or rightward shift in the LM curve.

b) \( Y \) rises, \( r \) falls, \( C \) rises, \( I \) rises, national saving rises (we know that saving equals investment in equilibrium) Versions A,C: (a,b,a,a,a); Versions B,D: (b,a,b,b,b)

c) When interest rate falls, output now goes up because it stimulates both investment and consumption demand. So the IS curve is flatter. So \( Y \) rises more, \( r \) falls less, and \( C \) rises more. Versions A,C: (a,b,a); Versions B,D: (b,a,b)

d) Acceptable reasons: (should also provide explanation for each) 
   lags (both inside and outside) 
   forecasts are not accurate (both leading indicators and models) 
   Lucas Critique 
   Distrust policy maker intentions or capability 
   Time inconsistency / credibility

(12/12/06)