Final Exam Solutions  
Economics 101  -  Fall 1999

Multiple Choice

1) a  3) d  5) c  7) c  9) b  
2) d  4) c  6) c  8) b  10) d

Problem 1: Growth

a) in per worker form, the production function is: \( y = 3 k^{1/3} \), so using \( sf(k) = \delta k \):
\[
0.10 \times 3 k^{1/3} = 0.30 k, \quad \text{so} \quad k^{1/3} = 1, \quad k^* = 1 \\
c^* = (1 - 0.1) y^* = 0.9 \times 3 k^{4/3} = 2.7 \\
gross investment = \delta k^* = \frac{2}{3} \\
real wage = MPL = 2k^{4/3} = 2 \\
real rental rate = MPK = k^{1-2/3} = 1
\]

b) A higher saving rate raises the level of steady state capital per person. The golden rule level of saving makes the level of consumption per person the highest possible. The higher level of capital per person raises the MPL but lowers the MPK. So:
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Lower consumption means that people are actually worse off with the very high saving rate.

Problem 2: IS-LM in the Short Run

a) It must be a fall in autonomous investment, shifting the IS curve left.
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A shock to consumption that lowers \( r \) would make investment rise.
b) Increasing the money supply would shift the IS curve right, until output is restored to its original level. This works by lowering the interest rate further in order to stimulate investment demand. Given that income returns to its original level, and given that consumption is just a function of income and taxes, it must be that consumption must return to its original level. Given that income equals the sum of consumption plus investment and government purchases, if the other three variables are back at their original levels, investment must also be back at its original level.

interest rate is farther from its original level
consumption returns to its original level
investment returns to its original level

c) Reasons to avoid active stabilization policy: (need 4 of 5)
   1) lags: There are lags in policy having the desired effect on the economy (outside lag)
   2) incompetence: Policy makers do not always know what they are doing.
   3) opportunism: Policy makers may act in their own interests, such as reelection, rather than the interests of the public.
   4) Lucas Critique: existing forecasting models may be inaccurate ways of predicting the effects of policies, because of the role of people’s expectations.
   5) Time inconsistency: Rational expectations of policy makers’ actions may worsen the tradeoff between inflation and unemployment/output.

Problem 3: Short Run and Long Run

The cut in taxes raises disposable income and raises consumption demand. This shifts the IS and AD curves right. In the long run, prices rise. This lowers the real money supply and shifts the LM curve left, enough to restore output to its original level.

b) Short run: Y rises, r rises, S_p rises, S falls, M/P no change.
(We know total saving falls because total saving must equal investment, which falls as r rises.)

c) Long run: Y returns to original level, r higher, S_p higher, S lower, M/P lower

With money demand more responsive to changes in the interest rate, the LM curve is flatter:

Y changes more in the short run
r changes less
S_p changes more (because Y rises more)
S changes less (we know this because r and I change less)
M/P still no change: same

e) Reasons why investment may be a positive function of GDP: (need 2 of 3)
1) **Borrowing constraints** on business investment: extra cash flow allows firms to carry out the investment projects for which they could not get bank financing.

2) **Inventories are usually increased** when sales rise: need more spare parts, want to avoid stock outs, more products in intermediate stages.

3) **Demand for housing rises** when people have more income and can afford a larger house.

If investment rises with income, the multiplier is larger. A tax cut that raises consumption then has a bigger multiplied effect on output, which rises more. This raises money demand more in the money market, which makes the interest rate rise more. While this rise in the interest rate will discourage some investment, the net effect must be more investment demand, or else there could not be a bigger rise in Y or r in the first place.

\[ Y \text{ changes more in the short run} \]
\[ r \text{ changes more} \]
\[ S_g \text{ changes more (because } Y \text{ rises more)} \]
\[ S \text{ falls less or it even may rise some (we know this because } I \text{ falls less or may even rise)} \]
\[ M/P \text{ still no change: same} \]

### Problem 4: Consumption Theory

a) The intertemporal budget constraint is:

\[ C_1 + C_2/(1+r) = (Y_1 - T_1) + (Y_2 - T_2)/(1+r) \]
\[ $21,000 + $21,000/(1+r) = $41,000 + $0 \]
\[ r = 0.05 \text{ or } 5\% \]

A rise in interest rate has two effects. Since you are a saver, it makes you, which makes you consume more this year and next year. But it also makes consumption this year more expensive in terms of future consumption foregone, so this makes you consume less this year and more next year. The net effect is:

Consumption this year is impossible to tell.
Consumption next year unambiguously rises.

![Graph](image)

b) The tax cut this year matched with the tax rise next year with interest has no effect on your intertemporal budget constraint. So you do not change your consumption in either period. So you save the extra disposable income this period arising from the tax cut, and this rise in private saving exactly equals the fall in government saving.

Private saving: rises
Total saving: no change.

This is a very different result from that than in problem (3b). First, total saving falls in (3b) because the rise in private saving is smaller than the fall in government saving. Further, saving rose in (3b) in part because GDP rose. This is not true here. With no rise in consumption, there is no extra demand to raise GDP.

(12/15/99)