Answer Key for Midterm
Ec 3334 - Spring 2006

1) a)

$$
\begin{aligned}
NGDP_{2005} &= Q_{Sand}^{2005}P_{Sand}^{2005} + Q_{DPC}^{2005}P_{DPC}^{2005} \\
&= 100 \times \$8 + 100 \times \$5 \\
&= \$1300
\end{aligned}
$$

$$
\begin{aligned}
NGDP_{2006} &= Q_{Sand}^{2006}P_{Sand}^{2006} + Q_{DPC}^{2006}P_{DPC}^{2006} \\
&= 150 \times \$10 + 200 \times \$8 \\
&= \$3100
\end{aligned}
$$

b)

$$
\begin{aligned}
RGDP_{2005} &= Q_{Sand}^{2005}P_{Sand}^{2005} + Q_{DPC}^{2005}P_{DPC}^{2005} \\
&= \$1300
\end{aligned}
$$

$$
\begin{aligned}
RGDP_{2006} &= Q_{Sand}^{2006}P_{Sand}^{2005} + Q_{DPC}^{2006}P_{DPC}^{2005} \\
&= 150 \times \$8 + 200 \times \$5 \\
&= \$2200
\end{aligned}
$$

c)

$$
\begin{aligned}
Deflator_{2005} &= \frac{NGDP_{2005}}{RGDP_{2005}} = \frac{\$1300}{\$1300} = 1 \\
Deflator_{2006} &= \frac{NGDP_{2006}}{RGDP_{2006}} = \frac{\$3100}{\$2200} = 1.41
\end{aligned}
$$

According to the deflator prices are rising

d)

$$
\begin{aligned}
CPI_{2005} &= \frac{Q_{Sand}^{Basket}P_{Sand}^{2005} + Q_{DPC}^{Basket}P_{DPC}^{2005}}{Q_{Sand}^{Basket}P_{Sand}^{2005} + Q_{DPC}^{Basket}P_{DPC}^{2005}} \\
&= \frac{200 \times \$8 + 150 \times \$5}{200 \times \$8 + 150 \times \$5} \\
&= 1
\end{aligned}
$$

$$
\begin{aligned}
CPI_{2006} &= \frac{Q_{Sand}^{Basket}P_{Sand}^{2006} + Q_{DPC}^{Basket}P_{DPC}^{2006}}{Q_{Sand}^{Basket}P_{Sand}^{2005} + Q_{DPC}^{Basket}P_{DPC}^{2005}} \\
&= \frac{200 \times \$10 + 150 \times \$8}{200 \times \$8 + 150 \times \$5} \\
&= 1.36
\end{aligned}
$$

1

According to the CPI prices are rising.

2. a)
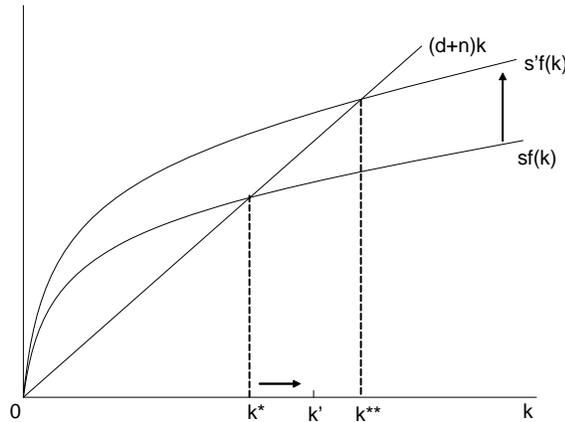
b) k' is higher than k^*, because the population has fallen. Therefore, capital per worker goes up.
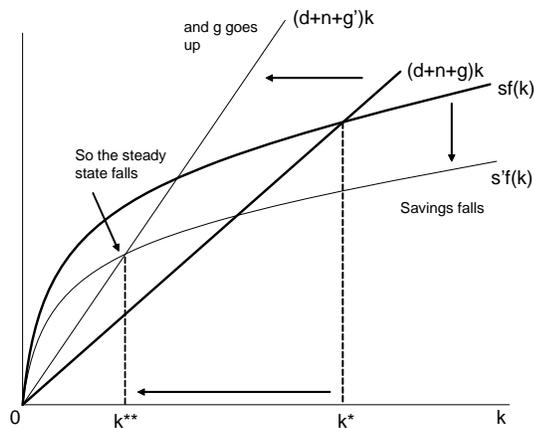
c) The level of $y = Y/L$ increases when k increases to k'. Again, because capital per worker just went up.

d) The growth rate of income per person right after k jumps to k' is negative. $\Delta y/y < 0$, because k is now higher than the steady state k^*.

e) Savings shifts up, so the steady state goes up to k^{**}. See the diagram.

f) After savings shifts up, $k' < k^{**}$. Therefore, the growth rate of incomer per person is $\Delta y/y > 0$ because now the economy is below the steady state. So when a large number of people emigrate and send back remittances, its possible that not only will domestic income levels increase, but domestic growth could increase as well.

3. a)

The figure contains the following labels: "and g goes up", "(d+n+g')k", "(d+n+g)k", "sf(k)", "So the steady state falls", "s'f(k)", "Savings falls", "0", "k**", "k*", "k".

b) The growth rate of output per person at the steady state is g.

c) Two things happen here. First, savings falls. So the $sf(k)$ curve shifts down. Second, g goes up to g'. So the depreciation line rotates UP. The combination

of these changes means that the steady state falls to k^{**}. See the diagram.

d) Immediately after this change, the growth rate of output per person falls below g'. $\Delta y/y < g'$ because we are now above the steady state. Remember, the actual capital stock per effective worker did not change in this problem, only the steady state.

e) Because the actual capital stock per effective worker did not change, the level of output per worker did not change immediately because of this change in savings and g.

f) In the long run, you're better off with the low savings and high g'. Why? Because given enough time, the fact that $g' > g$ means that output per worker is growing faster in the new regime and thus will eventually overtake output per person in the old regime.

4. a)

3

r

S=Y-C-G'   S=Y-C-G

r**

r*

I(r)

S,I

I**=S   I*=S

b)

P

AS

P**

P*

M/P=L(r**+p,Y)

M/P=L(r*+p,Y)

Y*   Y
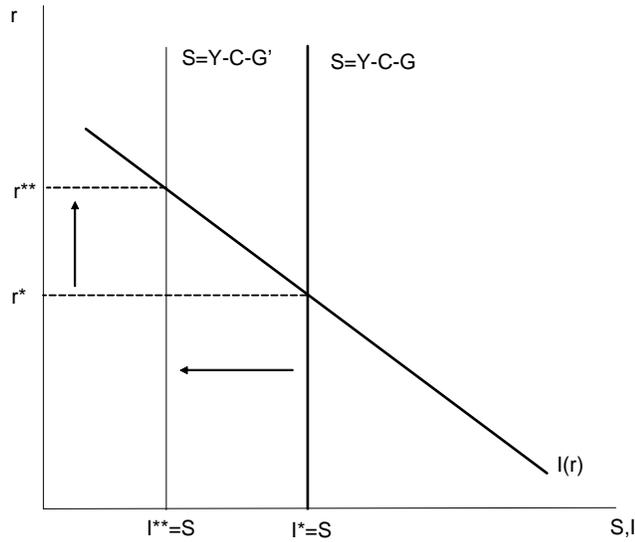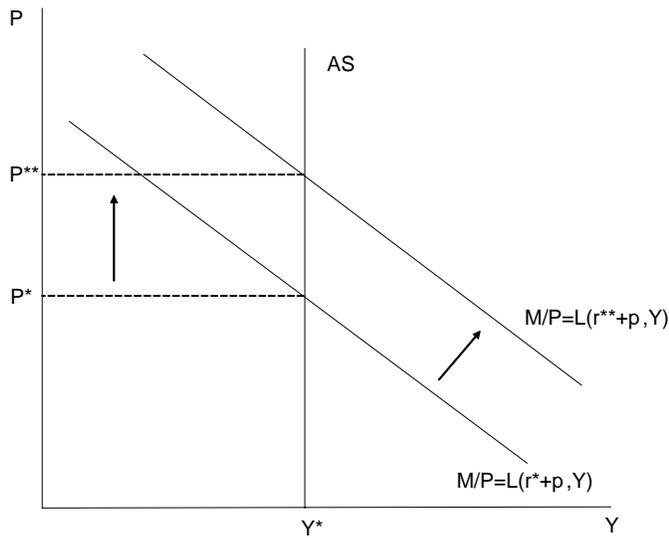
c) When G goes up, the S line shifts to the left (savings goes down). So the real interest rate goes up. See diagram
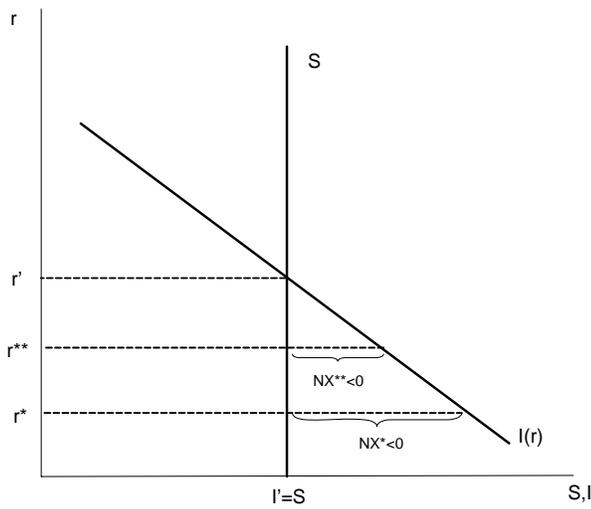
d) If the real interest rate goes up, then the nominal interest rate goes up as well. An increase in i means implies that money demand (L) goes down, so that P must increase to keep the $M/P = L(i, Y)$ equation in equilibrium. This also can be seen as a shift up of the AD curve.

See the diagram.

e) If G actually is like investment, then in the future Y^* will increase. If Y^* goes up, this does two things. First, savings increase. So the S line shifts right in the loanable funds market and the real interest rate falls. Second, in the AD/AS diagram, as the LRAS curve shifts right, the price level must fall. What is going on? If Y increases, then our money demand goes up (L increases), to keep the $M/P = L(i, Y)$ equation in equilibrium, the price level must fall.
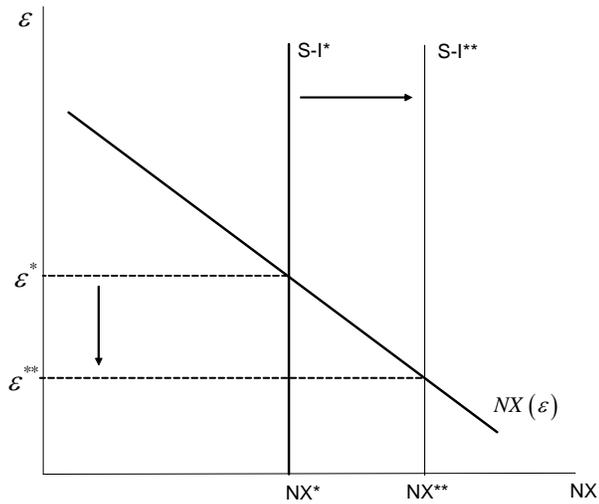
f) Yes. If Y^* goes up by a lot, then any increase in r or P induced by the increase in G can be offset by the subsequent decline in r and P when Y^* goes up. So it's possible that there are permanent decreases in r and P when government spending goes up. But that requires G to be spent on real investments.

5. a)

b) If $r^* < r'$ then we have that $NX^* < 0$., or a trade deficit because $I > S$

c)

ε

S-I* S-I**

ε^{*}

ε^{**}

$NX(\varepsilon)$

NX* NX** NX

d) If the world interest rate goes up, then NX must go up. It doesn't matter how much the world interest rate goes up, or if the world interest rate ends up higher than r' or not. If the world interest rate goes up, NX goes up.

e) This increase in NX, which is because I goes down (and so $S - I$ goes up). means that the real exchange rate goes down.

f) The government wants to keep the exchange rate high. So they want to push the $S - I$ curve back to the left. They can do this by lowering savings, which they do by raising government spending.