Answers to Practice Questions for Parts I and II, Chapters 1-6

Section 1. Multiple Choice Questions

1.C); 2 D); 3 C); 4 B); 5 A); 6 D); 7 B); 8 D); 9 B); 10 A); 11 C); 12 A); 13 C); 14 D); 15 D); 16 C); 17 B); 18 C); 19 B); 20 A); 21 C); 22 A); 23 C); 24 D); 25 D).

Section 2. Problems

Chapter 2

2.1

	2002 (Base Year)	***2009 (Current Year)***
Quantity of Apples	4	5
Price of Apples	$0.50	$0.56
Quantity of Oranges	3	4
Price of Oranges	$1.00	$1.05
Nominal GDP	$5.00	**$7.00**
Real GDP	**$5.00**	**$6.50**
GDP Deflator	100	**107.7**

2.2

Measure	***Amounts in millions of 2005 dollars***
Gross Domestic Product (GDP)	$1,368,726
Capital Consumption Allowance (Depreciation)	181,427
Indirect Business Taxes	154,711
Net Income of Foreigners	24,518
Gross National Product (GNP)	**$1,344,208**
Net National Product (NNP)	**1,162,781**
National Income	**1,008,070**

Chapter 3.

3.1

Given:

$E = C + I + G$

$Y = \overline{Y} = F(\overline{K}, \overline{L}) = 1000$

$C = 30 + 0.75(Y - T)$

$I = 220 - 1000r$

$G = \overline{G} = 220$

$T = \overline{T} = 240$

a) i) $C = 30 + 0.75(Y - T) = 30 + 0.75(1000 - 240) = 30 + 570 = 600$

ii) Private saving = $Y - T - C$ = 1000 - 240 – 600 = 160

iii) Public saving = $T - G = 240 - 220 = 20$

iv) National Saving = Private Saving + Public Saving = 160 + 20 = 180

$= \overline{Y} - C(\overline{Y} - \overline{T}) - \overline{G}$ = 1000 – 600 – 220 = 180

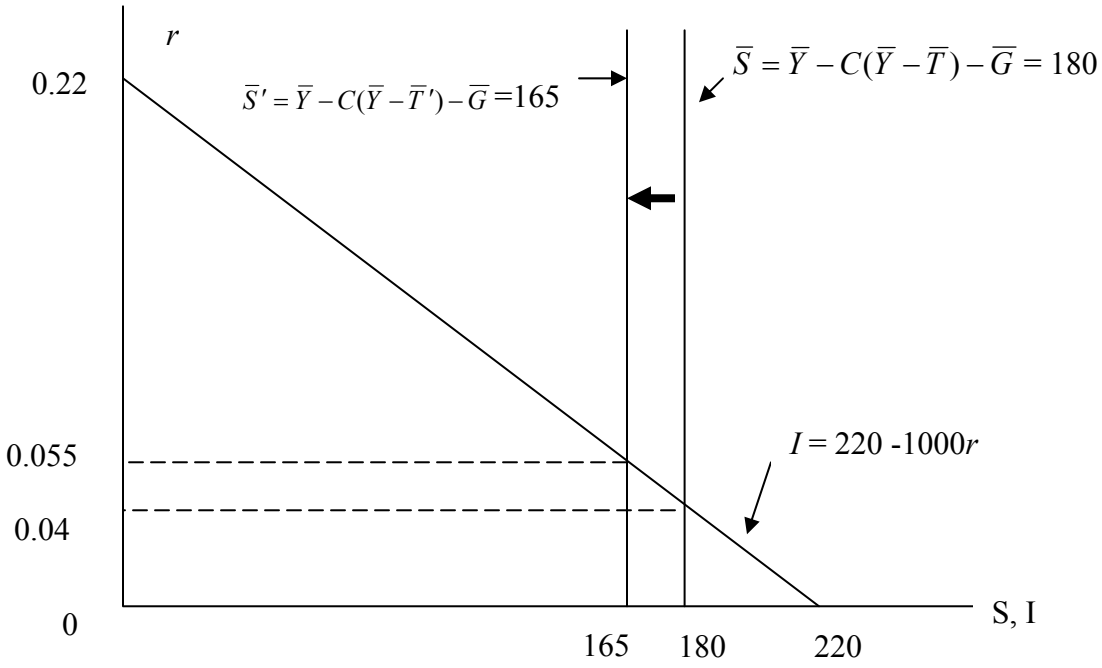
v) The equilibrium real rate of interest is the value of r for which national saving (the supply of new loans) equals investment (the demand for new loans):

$$\overline{S} = I(r)$$
$$\overline{Y} - C(\overline{Y} - \overline{T}) - \overline{G} = I(r)$$
$$180 = 220 - 1000r$$
$$1000r = 40$$
$$r = 0.04 \ (4\%)$$

vi) Equilibrium investment spending is the value of I at the equilibrium real interest rate or the value of national saving:

$$I = 220 - 1000r = 220 - 1000(0.04) = 180 = \overline{S}$$

b)



c) i) $C = 30 + 0.75(Y - T) = 30 + 0.75(1000 - 220) = 30 + 585 = 615$ ➔ $\Delta C = +15$

ii) Private saving = $Y - T - C$ = 1000 - 220 – 615 = 165 ➔ Δ Private saving = + 5

iii) Public saving = $T - G = 220 - 220 = 0$ ➔ Δ Public saving = -20

iv) National Saving = Private Saving + Public Saving = 165 + 0 = 165

$= \bar{Y} - C(\bar{Y} - \bar{T}) - \bar{G} = 1000 - 615 - 220 = 165 \rightarrow \Delta \bar{S} = -15$

v) The equilibrium real rate of interest is the value of *r* for which national saving equals investment:

$$\bar{S} = I(r)$$
$$\bar{Y} - C(\bar{Y} - \bar{T}) - \bar{G} = I(r)$$
$$165 = 220 - 1000r$$
$$1000r = 55$$
$$r = 0.055 \ (5.5\%)$$
$$\rightarrow \Delta r = +0.015$$

vi) Equilibrium investment spending is the value of *I* at the equilibrium real interest rate or the value of national saving:

$$I = 220 - 1000r = 220 - 1000(0.055) = 165 = \bar{S} \rightarrow \Delta I = -15$$

The change in total expenditure is the sum of the changes in the 3 components of spending:

$$\Delta E = \Delta C + \Delta I + \Delta G$$
$= +15 + (-15) + 0 = 0$ (no change in overall spending; but C↑ and I↓)

d) See diagram above. See explanation on page Ch 3 Pg. 10 of the Lectures Notes. (Reverse the direction of changes for a tax **decrease** rather than a tax **increase**.)

3.2

a)

$$S = Y - C - G = 1000 - [50 + 0.75(1000 - 240) - 500r] - 220 = 1000 - 620 + 500r - 220 = 160 + 500r$$

b) In equilibrium:

$$S = I(r)$$
$$160 + 500r = 220 - 1000r$$
$$1500r = 60$$
$$r = 0.04$$

$$S = 160 + 500r = 160 + 500(0.04) = 180$$
$$I = 220 - 1000r = 220 - 1000(0.04) = 180 = S$$
$$C = 50 + 0.75\,(Y\text{-}T) - 500r = 620 - 500(0.04) = 600$$

c) When taxes are cut from 240 to 220 the new national saving function is:

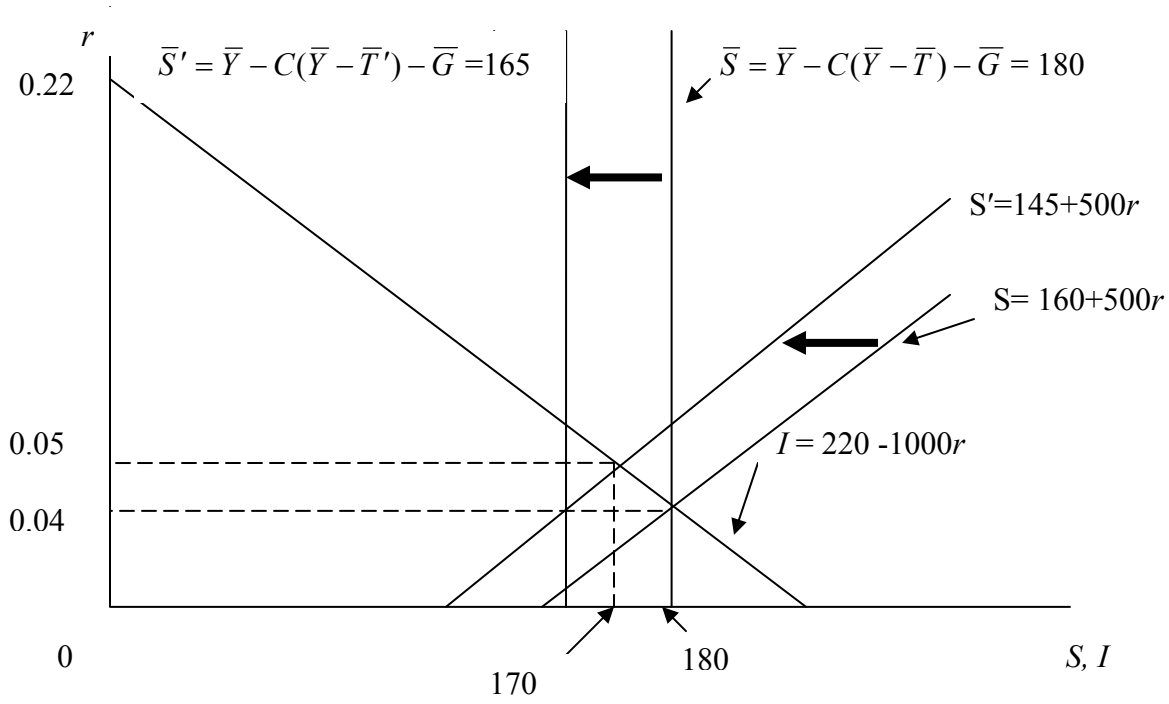
$$S = Y - C - G = 1000 - [50 + 0.75(1000 - 220) - 500r] - 220 = 1000 - 635 + 500r - 220 = 145 + 500r$$

In equilibrium:

$$S = I(r)$$
$$145 + 500r = 220 - 1000r$$
$$1500r = 75$$
$$r = 0.05$$

$$S = 145+500r = 145+ 500(0.05) = 170$$
$$I = 220 - 1000r = 220 - 1000(0.05) = 170 = S$$

Thus, in this case the cut in taxes has caused a reduction in investment spending from 180 to170 ($ billion), a decrease of $10 billion. In the case in which national saving was **independent** of the interest rate [3.1c)] the decrease in investment was $15 billion (180 to 165). There is a smaller "crowding-out" of investment when national saving is an increasing function of the interest rate because the increase in the equilibrium interest rate from 4% to 5% (caused by the leftward shift of the S curve) increases national saving, and hence investment. Thus, the overall reduction in national saving is smaller and as a result the fall in investment spending (which must equal the reduction in saving) is correspondingly smaller than in the case in which national saving is independent of the interest rate.



Chapter 4
4.1
a)

	2003	2007
Money Supply (M2) ($ millions)	581,638	754,690
Nominal GDP ($ millions)	1,213,175	1,535,646
Real GDP (millions of 2002 $)	1,174,592	1,319,680
GDP Deflator (2002 = 100)	103.3	116.4
Velocity of M2	**2.086 = Nominal GDP/M2**	**2.035**

Interpretation: In both 2003 and 2007 one dollar of M2 changed hands on average approximately twice during the year.

b) The relationship between rates of change in money supply (M), velocity (V) and nominal GDP (PY) is given by the equation:

(Rate of change of M) + (Rate of change of V) ≈ Rate of change of nominal GDP (PY)
$\%\Delta M + \%\Delta V \approx \%\,\Delta(PY)$

When velocity is constant the rate of growth of nominal GDP within a given period is equal to the rate of growth of money supply within that period. Between 2003 and 2007, however, velocity fell (by approximately 2.5%) and as a result the rate of growth of M2 (29.8%) exceeded the rate of growth of nominal GDP (26.6%).

4.2

In general,

$$\%\Delta P = \%\Delta M + \%\Delta V - \%\,\Delta Y$$

In this case, $\%\Delta V = -0.01$, and $\%\Delta Y = 0.03$. Thus, to achieve a target rate of inflation of 2% ($\%\Delta P = 0.02$), the money supply must grow by 6% ($\%\Delta M = 0.06$):

$$0.02 = 0.06 - 0.01 - 0.03$$

4.3
The general equation for calculation of the realized (*ex post*) real interest rate is:

$$(1+r) = \frac{(1+i)}{(1+\pi)}$$

In this case:

$$(1+r) = \frac{(1.06)}{(1.02)} = 1.03922$$

$$r \approx 0.04 \quad (4\%)$$

Chapter 5

5.1

Given:

$E = C + I + G + NX$

$Y = \overline{Y} = F(\overline{K}, \overline{L}) = 1000$

$C = 30 + 0.75(Y - T)$

$I = 220 - 1000r$

$G = \overline{G} = 220$

$T = \overline{T} = 240$

$r = r^* = 0.03$

a) Whether this small open economy is a net foreign borrower or a net foreign lender depends upon the relationship between domestic national saving (S) and domestic investment spending (I) at the world interest rate (r^*):

$$\begin{aligned}
\text{Net capital outflow} \quad &= \quad \overline{S} - I(r^*) \\
\text{(net foreign lending)} \quad & \\
&= [\overline{Y} - C(\overline{Y} - \overline{T}) - \overline{G}] - I(r^*) \\
&= [1000 - 30 - 0.75(1000 - 240) - 220] - [220 - 1000(0.03)] \\
&= 180 - 190 \\
&= -10
\end{aligned}$$

Thus, this economy is a net foreign **borrower** in the amount of 10 ($ billion) which is the amount by which domestic national saving falls short of domestic investment spending at the world interest rate. Thus, of the $190 billion of domestic investment spending, $180 billion is financed by the flow of domestic national saving and $10 billion is financed by net foreign borrowing.

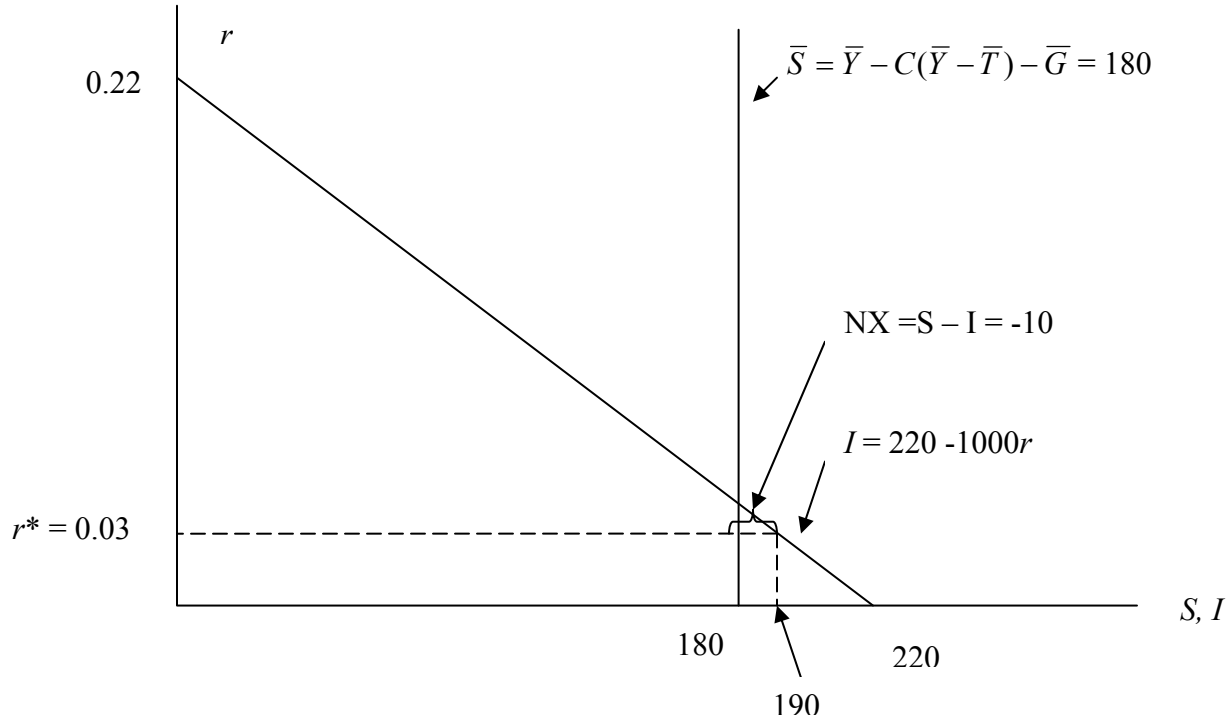
b) $NX = \overline{S} - I(r)$

$= 180 - 190$

$= -10$

There is a trade deficit of 10 ($billion).

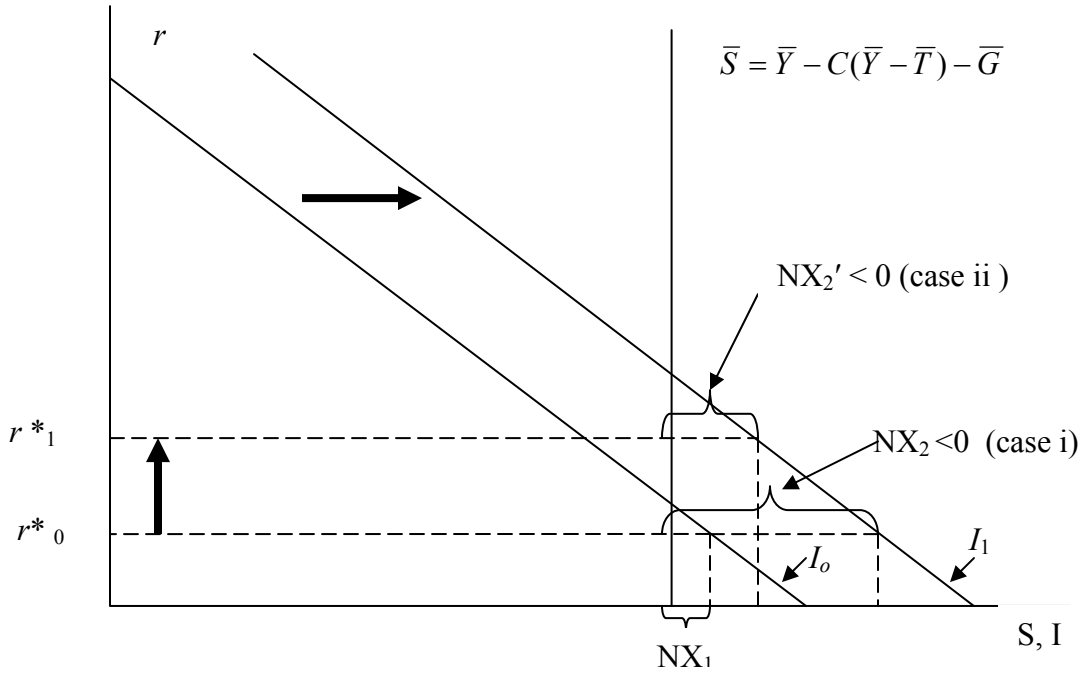
c) See diagram below.



d) In case i) domestic investment spending will rise at each interest rate shifting the investment curve to the right. Because this increase in investment demand is confined to the domestic economy which is a **small** open economy, there is no impact on the world interest rate which is exogenous with respect to the domestic economy. Hence, there is a large in increase in domestic investment and a large decrease in net exports (NX = S-I.)

In case ii) there is the same increase in domestic investment spending at each interest rate (same-size shift to the right of the investment curve.) But, in this case there will also be a rise in the world interest rate as the world-wide increase in investment demand leads to an increase in the world demand for loanable funds creating a excess world demand for loanable funds driving up the world interest rate to a new equilibrium level at which world investment spending (I^*) is equal to world saving (S^*). The increase in the world interest rate reduces the expansion of domestic investment spending. Thus, the increase in domestic investment spending will be smaller in this case and the decrease in net exports will be correspondingly smaller.

As seen in the diagram below, in case i) there is a large increase in the trade deficit to NX_2 while in case ii) the trade deficit increases by a smaller amount to NX_2'.



Exchange rates

ER1.

According to the Fisher equation:

$$i_A = r_A + \pi_A^e \text{ and } i_B = r_B + \pi_B^e$$

But, we are told that: i) in both countries inflation is perfectly anticipated; and ii) real interest rates are equal across the two countries.

Thus, $i_B - i_A = \pi_B - \pi_A = 0.10 - 0.06 = 0.04$

The rate of inflation is 4 percentage points higher in economy B than in economy A. According to the hypothesis of relative purchasing power parity, the nominal exchange rate, defined to be the value of one unit of Country A's currency in units of Country B's currency, will change at a rate equal to the difference between the rate of inflation in Country B and the rate of inflation in Country A:

$$\%\Delta e = \frac{\Delta e}{e} = \pi_B - \pi_A = 0.04$$

In other words, Country A's currency will appreciate by 4% per year (while Country B's currency will depreciate by 4% per year) thus keeping the **real** exchange rate (ε) between A and B constant.

Recall: $\varepsilon = \frac{eP_A}{P_B}$

If e rises by 4 percentage points while P_A increases by x percentage points then the numerator in the above ratio will increase by $x + 4$ percentage points which is the rate of increase in P_B , the denominator in the above ratio. The real exchange rate thus remains constant – relative purchasing power parity is maintained.

ER2.

Interest rate parity prevails when:

$$1 + i = \frac{e(1 + i^*)}{e^E_{+1}}$$

$$1.02 = \frac{1.03e}{0.95}$$

Thus, $e = (1.02)(0.95)/1.03 = 0.9408$.

Interest rate parity will prevail if the current (spot) exchange rate is 0.9408 (US$ per C$).

Chapter 6.

6.1 a)

MONTH	Number Employed (millions)	Number Unemployed (millions)	Labour Force	Unemployment Rate
January 2009	19.00	1.00	**20.0**	**0.05**
February 2009	**18.92**	**1.08**	**20.0**	**0.054**
March 2009	**18.8656**	**1.1344**	**20.0**	**0.05672**

b) The natural rate of unemployment (u^*) is determined by the rates of job separation (s) and job finding (f) as follows:

$$u^* = \frac{s}{s + f} = \frac{0.02}{0.32} = 0.0625$$

Thus the natural rate of unemployment is 6.25%. In the steady-state there will be 1.25 million workers unemployed and 18.75 million workers employed. Each month 375,000 (0.375 million) previously-employed workers separate from employment and 375,000 previously-unemployed workers find employment. Thus, the flow into unemployment (= sE = 375,000) is just matched by the flow out of unemployment (=fU = 375,000).