

Homework 1
Answers to Problems

Chapter 2

1. Given data: $I = 40$, $G = 30$, $GNP = 200$, $CA = -20 = NX + NFP$, $T = 60$, $TR = 25$, $INT = 15$, $NFP = 7 - 9 = -2$. Since $GDP = GNP - NFP$, $GDP = 200 - (-2) = 202 = Y$. Since $NX + NFP = CA$, $NX = CA - NFP = -20 - (-2) = -18$. Since $Y = C + I + G + NX$, $C = Y - (I + G + NX) = 202 - (40 + 30 + (-18)) = 150$.
- $S_{pvt} = (Y + NFP - T + TR + INT) - C = (202 + (-2) - 60 + 25 + 15) - 150 = 30$. $S_{govt} = (T - TR - INT) - G = (60 - 25 - 15) - 30 = -10$. $S = S_{pvt} + S_{govt} = 30 + (-10) = 20$.
- (a) Consumption = 150
 (b) Net exports = -18
 (c) GDP = 202
 (d) Net factor payments from abroad = -2
 (e) Private saving = 30
 (f) Government saving = -10
 (g) National saving = 20
2. The nominal interest rate is $[(545/500) - 1] \times 100\% = 9\%$. The inflation rate is $[(214/200) - 1] \times 100\% = 7\%$. So the real interest rate is 2% (9% nominal rate - 7% inflation rate). Expected inflation was only $[(210/200) - 1] \times 100\% = 5\%$, so the expected real interest rate was 4% (9% nominal rate - 5% expected inflation rate).

Chapter 3

3. (a) To find the growth of total factor productivity, you must first calculate the value of A in the production function. This is given by $A = Y/(K^3N^7)$. The growth rate of A can then be calculated as

$[(A_{year 2} - A_{year 1})/A_{year 1}] \times 100\%$. The result is:

	A	% increase in A
1960	12.484	—
1970	14.701	17.8%
1980	15.319	4.2%
1990	17.057	11.3%
2000	19.565	14.7%

- (b) Calculate the marginal product of labor by seeing what happens to output when you add 1.0 to N ; call this Y_2 , and the original level of output Y_1 . [A more precise method is to take the derivative of output with respect to N ; $dY/dN = 0.7A(K/N)^3$. The result is the same (rounded).]

Y_1	Y_2	MPN
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1960	2502	2529	27
1970	3772	3805	33
1980	5162	5198	36
1990	7113	7155	42
2000	9817	9867	50

4. (a) An increase in the number of immigrants increases the labor force, increasing employment and increasing full-employment output.
- (b) If energy supplies become depleted, this is likely to reduce productivity, because energy is a factor of production. So the reduction in energy supplies reduces full-employment output.
- (c) Better education raises future productivity and output, but has no effect on current full-employment output.
- (d) This reduction in the capital stock reduces full-employment output (although it may very well increase welfare).
5. (a) The increased value of Helena's home increases her wealth. The rise in wealth leads to an income effect that leads Helena to reduce her labor supply.
- (b) The permanent rise in Helena's real wage gives rise to offsetting income and substitution effects. The income effect of the higher wage reduces Helena's labor supply, but the substitution effect increases it. So the result is theoretically ambiguous. Empirically, women tend to increase labor supply in response to a permanent increase in the real wage, and men tend to reduce labor supply in response to a permanent increase in the real wage.
- (c) The temporary income tax surcharge is equivalent to a temporary reduction in the real wage, which reduces current labor supply, assuming that the income effect is smaller than the substitution effect.
6. The tax reduces the marginal product of labor by 6%, since that portion of output goes to the government rather than to the firm. Thus labor demand is reduced. With labor supply unchanged, the downward shift in labor demand reduces the real wage and employment, as shown in Figure 3.18.

