

Economics 222
Exercise A
due Friday 1 October

1. An investor has a sum of \$10,000 to invest. Her bank offers to invest her money and pay her a total of \$11,025 after a period of two years. The expected inflation rate is 2% per year.

- (a) What is the nominal interest rate on this investment?
- (b) What is the expected real interest rate?
- (c) Suppose that the inflation rate turns out to be 1.8% per year. How much (in today's dollars) does the investor gain or lose as a result of this surprise?

2. Economists track production and employment at an auto plant over time. They graph their findings and summarize them with a function:

$$Y = F(N) = N^{0.6},$$

that relates the value of cars, Y , to the number of hours worked by employees, N .

- (a) What is the elasticity of this function?
- (b) If hours grow by 5% this year, what growth in output will the economists predict?
- (c) Using some calculus can greatly simplify our study of the demand for labour. What is the marginal product of labour?
- (d) Write an expression for the firm's demand for labour.

3. Explain whether these comments on national accounts are true or false:

- (a) If the U.S. has a large current account deficit and a large government budget deficit, then its national wealth cannot be growing.
- (b) Production is never exactly equal to expenditure, due to the presence of inventories.
- (c) If a country persistently runs a current account surplus then its GNP will exceed its GDP.
- (d) An increase in transfers from the government to the general public automatically reduces national saving.

4. This question looks at economic growth in Canada from 1993 to 2003. From the 'data sources' link on the 222 pages, go to 'Cansim' then 'Cansim II' and learn how to retrieve data. (If you are trying to do this from off campus, first go to the main library web page and read 'help with off-campus access.')

Find the values for 1993:IV and 2003:IV of the following series: nominal GDP (v498086), chain-weighted real GDP (v1992067), and

population (v1). Population is a stock, while GDP is a flow. But GDP flows are recorded at annual rates by convention, so you do not need to multiply the quarterly value by four.

- (a) Record these six numbers in a table.
 - (b) Find the total growth in each series over this decade.
 - (c) Using the approximation formulas for growth rates, estimate the growth in real GDP per capita.
 - (d) Check your answer using the underlying levels of real GDP per capita.
- 5.** Briefly predict the effects of the following events on the average real wage and on employment.
- (a) a computer virus that disrupts production
 - (b) a crash in the stock market
 - (c) a reduction in social assistance benefits
 - (d) an announcement that income taxes will be lower than expected next year.
- 6.** This question looks at the effect of one type of tax on labour income. Suppose that aggregate labour demand can be described by:

$$N^D = 29 - w,$$

while aggregate labour supply is given by:

$$N^S = 12 + 3w(1 - \tau),$$

where τ is the tax rate.

- (a) If $\tau = 0.20$ find the equilibrium real wage and employment.
- (b) How do the real wage and employment change if τ rises to 0.40?
- (c) What are the marginal tax and average tax rates in these examples?
- (d) Are there any disadvantages to a flat tax?

Economics 222: Exercise A Answer Guide

1. (a) The nominal interest rate is 5 percent per year. Use the formula $10(1+x)^2 = 11.025$.
(b) The expected real interest rate is 3 percent per year
(c) The surprisingly low inflation rate benefits the investor. Her original gain was \$609 but now it is \$650.24 so she gains \$41.24 in today's dollars.

2. (a) The elasticity is 0.6.
(b) They predict output growth of 3 percent.
(c) The marginal product is $F'(N) = 0.6N^{-0.4}$.
(d) The labour demand curve is:

$$w = \frac{W}{P} = 0.6N^{-0.4}$$

3. (a) False. Its wealth could be growing if I is positive and large enough so that $I + CA$ is positive. And this is possible if S_{pvt} is large enough.
(b) False. Investment in inventory holdings is a form of investment expenditure by the firm itself.
(c) False. It will build NFA and so that will boost NFP. But NFP also depends on net labour income.
(d) False. A change in transfers does not automatically affect S .

4. (a) (b) The table (with added row and column of results) is:

	Nominal GDP	Real GDP	Population	Real GDP/Capita
1993	739048	782489	28783938	27.185
2003	1233724	1104391	31714637	34.823
growth	66.93%	41.14%	10.18%	28.1 %

[We also accept the annual growth rates that are consistent with these decade-long growth rates. Those are 5.26, 3.51, and 0.097.]

- (c) The approximation gives $41.14 - 10.18 = 31\%$
(d) The exact result is given in the last column: 28.1%

5. (a) This negative productivity shock reduces labour demand, so w and N fall.
(b) The fall in wealth raises labour supply, so w falls and N rises.
(c) This has the same effect as in (b).
(d) This change raises expected future wages, so reducing current labour supply. Thus w rises and N falls.
6. (a) $w = 5$ and $N = 24$
(b) $w = 6$ and $N = 23$
(c) Both the marginal and average tax rates are simply τ . This is sometimes called a flat tax.
(d) The main criticism of a flat tax of this form is that it is not progressive enough. Thus most flat tax proposals include an exemption for labour income up to a certain threshold.