

Economics 222
Exercise A
due Friday 30 September

1. A discount bond is described by its value at maturity. Consider a one-year discount bond that delivers \$1000 one year from now and costs p_b today.
 - (a) Suppose that the prevailing nominal interest rate is 4%. What price would you expect for the bond?
 - (b) If the expected inflation rate is $\pi^e = 2\%$ then what is the real rate of interest?
 - (c) Suppose the prevailing nominal interest rate rises to 5%. What is the new value of p_b ?
2. Suppose that GDP per capita in Ontario is 90% of the value of GDP per capita in Alberta. Suppose that GDP per capita in Ontario grows by 2% per year.
 - (a) If Ontario population grows at 2% per year then how fast must GDP grow for this growth in GDP per capita to occur?
 - (b) How many years will pass before GDP per capita in Ontario reaches the current Alberta level? (Round your answer to two decimal places.)
3. Explain whether these comments on national accounts are true or false and why:
 - (a) Newsprint production does not count as part of GDP.
 - (b) A low private saving rate means there will be a current account deficit.
 - (c) The CPI inflation rate summarizes changes in the cost of living.
4. This question looks at one measure of productivity growth – output per worker – in Canada from 1995 to 2005. 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 the first month of 1995, 2000, and 2005 for employment (v2064890) and for the first quarter of 1995, 2000, and 2005 for chain-weighted real GDP (v1992067).
 - (a) Record these six numbers in a table.
 - (b) Find growth in each series for 1995-2000 and for 2000-2005.
 - (c) Using the approximation formulas for growth rates, estimate the growth in average labour productivity (output per worker) for each period.
 - (d) Check your answer using the underlying levels of real GDP per worker.
 - (e) Explain how you could use a growth rate over 5 years to find the average growth rate per year.

5. To do growth accounting, suppose we use a production function:

$$Y = K^{0.5}N^{0.5}.$$

- (a) Use calculus to find an expression for the marginal product of labour.
- (b) Write an expression for the aggregate demand for labour.
- (c) Suppose that capital and labour both grow by 3% per year. What will be the growth rate of output?
- (d) What will be the growth rate of the real wage?

6. Suppose that statisticians estimate that the production function is:

$$Y = A(100N - N^2),$$

where A is a measure of productivity. Meanwhile, labour supply follows this pattern:

$$N^s = 40 + 2w,$$

where w is the real wage.

- (a) Use the production function to find the marginal product of labour and hence the labour demand curve.
- (b) If $A = 1$ then find w^* and N^* .
- (c) For economies that import energy, a rise in energy prices acts like a fall in A . To see the effects, imagine that A falls to 0.8. Find the long-run effects on w^* and N^* .
- (d) Keynesian economists argue that wages are sticky in the short run. In that case, what will be the impact of the fall in A on employment?