

***THE UNIVERSITY OF OSLO***  
***Department of Economics***

**English**

Exam: **ECON2915 – Economic growth**

Date of the exam: 16.12.2016

**Grades will be given: 06.01.2017**

Time: 14:30 – 17:30

The problem set covers 2 pages

Resources allowed:

- No resources allowed (except if you have been granted use of a dictionary from the Faculty of Social Sciences).

The grades given: A-F, with A as the best grade and E as the weakest passing grade. F equals Fail.

## Problem 1 (40%)

Consider the following data on output, physical capital and human capital per worker.

	Output per worker, $Y/L$	Physical capital per worker, $K/L$	Human capital $h$
2000	1.00	1.00	1
2001	1.00	0.98	1
2002	1.01	0.98	1.02

Assume that the production function is

$$Y = AK^\alpha (hL)^{1-\alpha},$$

where  $Y$  is output,  $A$  is productivity,  $K$  is physical capital,  $h$  is human capital and  $L$  is employment.  $\alpha$  is assumed to be  $1/2$ .

- Derive the intensive form of the production function.
- Calculate growth rates  $\hat{y} = (y_t - y_{t-1})/y_{t-1}$ ,  $\hat{k} = (k_t - k_{t-1})/k_{t-1}$ ,  $\hat{h} = (h_t - h_{t-1})/h_{t-1}$  from (i) 2000 to 2001 and (ii) 2001 to 2002.
- Using the method of growth accounting, calculate growth in productivity,  $\hat{A}$ , from (i) 2000 to 2001 and (ii) 2001 to 2002.
- Policymakers claim that while GDP 2000-2001 growth was mainly caused by productivity improvements, 2001-2002 growth was mainly coming from factor accumulation. Evaluate this claim.
- New information reveals that schooling quality deteriorated during 2002. The statistical office therefore adjusts their estimate of  $h$  in 2002 down to 1.01. Explain in words how this would affect your answer in c) and d).

## Problem 2 (40%)

Consider a closed economy model where productivity growth is determined by the number of R&D workers in the economy:  $\hat{A} = L_A/\mu$ , where  $L_A$  is the number of R&D workers and  $\mu$  is a constant. The production function is  $Y = AL_Y$ , where  $L_Y$  is the number of manufacturing workers.

Policymakers consider to spend more on research and development (R&D) in order to increase GDP per capita. Investigate whether this is an effective policy (i) in the short run and (ii) in the long run.

## Problem 3 (20%)

U.S. president elect Donald Trump considers imposing a high import tariff on Chinese goods. Discuss the winners and losers in the U.S. of such a policy (e.g., across industries and across factors of production). Your discussion should be based on a model studied in this course with

- Two factors of production, e.g. capital and labor.
- Two goods, e.g. cars and textiles.
- One or more factors are immobile across industries.