

## YLEISEN TENTIN TENTTILOMAKE - GENERAL EXAM FORM

Opiskelija täyttää / Student fills in

<b>Opiskelijan nimi / Student name:</b> Click here to enter text.	<b>Opiskelijanumero / Student number:</b> Click here to enter text.
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Opettaja täyttää / Lecturer fills in

<b>Opintojakson koodi / The code of the course:</b> 721346A	
<b>Opintojakson (tentin) nimi / The name of the course or exam:</b> Intermediate macroeconomics	
<b>Opintopistemäärä / Credit units:</b> 6  Mikäli kyseessä on välikoe, opintopistemääräksi täytetään 0 op. 0 ECTS Credits is used for mid-term exams.	
<b>Tiedekunta / Faculty:</b> Oulu Business School	
<b>Tentin pvm / Date of exam:</b> 23.8.2019	<b>Tentin kesto tunteina / Exam in hours:</b> 3 h
<b>Tentaattori(t) / Examiner(s):</b> Matti Koivuranta	<b>Sisäinen postiosoite / Internal address:</b> Matti Koivuranta, OyKKK
<b>Tentissä sallitut apuvälineet / The devices allowed in the exam:</b> <input checked="" type="checkbox"/> Funktiolaskin / Scientific calculator <input type="checkbox"/> Ohjelmoitava laskin / Programmable calculator <input type="checkbox"/> Muu tentissä sallittu materiaali tai apuvälineet. Tarkenna alla. / Other material or devices, allowed in the exam. Specify below. Click here to enter text. <input type="checkbox"/> Tentissä ei ole sallittua käyttää apuvälineitä / The devices are not allowed in the exam	
<b>Muut tenttiä koskevat ohjeet opiskelijalle (esimerkiksi kuinka moneen kysymyksen opiskelijan tulee vastata) / Other instructions for students e.g. how many questions he/she should answer:</b> All questions should be answered	

INTERMEDIATE MACROECONOMICS 721346A

Exam 23.8.2019

Matti Koivuranta

1. Assume the following Solow growth model. Savings rate is  $s$  from which it follows that investments  $I$  and consumption  $C$  are

$$\begin{aligned} I &= sY \\ C &= (1 - s)Y, \end{aligned}$$

where  $Y$  is production. Production function is of Cobb-Douglas form:

$$Y = K^\theta N^{1-\theta}.$$

In above equation  $K$  is capital stock which has law of motion

$$K' = (1 - d)K + I,$$

where  $d$  is the depreciation rate. Second argument of production function is labor force  $N$ . Labor force grows with rate  $n$ :

$$N' = (1 + n)N.$$

Parameters have following restrictions:

$$0 < s < 1$$

$$0 < \theta < 1$$

$$0 < d < 1$$

$$n \geq 0.$$

- a) Derive the law of motion for capital per capita ( $K/N$ ).
- b) Show that capital per capita ( $K/N$ ) has a strictly positive steady state which is stable.
- c) What does golden rule mean within the Solow model?
2. a) What does *neutrality of money* mean ?
- b) What does *Ricardian equivalence* mean ?
- c) What does *government expenditure multiplier* mean?

3. Following figure depicts the equilibrium of the closed economy one period model. Analyze graphically the effects of an increase in government spending  $G$ . In particular, find out what happens to employment, output, consumption and real wage.



