

Written Exam at the Department of Economics summer 2020

Economic Growth

Final Exam

3 June 2020

(3-hour open book exam)

Answers only in English.

The paper must be uploaded as one PDF document. The PDF document must be named with exam number only (e.g. '127.pdf') and uploaded to Digital Exam.

This exam question consists of 5 pages in total

This exam has been changed from a written Peter Bangsvej exam to a take-home exam with helping aids. Please read the following text carefully in order to avoid exam cheating.

Be careful not to cheat at exams!

You cheat at an exam, if you during the exam:

- Copy other people's texts without making use of quotation marks and source referencing, so that it may appear to be your own text. This also applies to text from old grading instructions.
- Make your exam answers available for other students to use during the exam
- Communicate with or otherwise receive help from other people
- Use the ideas or thoughts of others without making use of source referencing, so it may appear to be your own idea or your thoughts
- Use parts of a paper/exam answer that you have submitted before and received a passed grade for without making use of source referencing (self plagiarism)

You can read more about the rules on exam cheating on the study information pages in KUnet and in the common part of the curriculum section 4.12.

Exam cheating is always sanctioned with a warning and dispassing from the exam. In most cases, the student is also expelled from the university for one semester.

1 Short essay questions

Question 1.a

Suppose that AI suddenly makes it profitable to replace some tasks previously undertaken by skilled workers. Use the task-based model with three skill levels to explain what happens to the ranges of tasks performed by the three types of workers, and their relative wage rate. What is the intuition?

Question 1.b

In their paper “Beyond GDP? Welfare across Countries and Time”, Jones and Klenow assume that life expectancy is determined at country level, and does not vary across individuals within each country. Would relaxing that assumption lead to higher or lower differences in welfare across countries? Would the US look better or worse compared to countries in Western Europe? Discuss.

Question 1.c

Suppose that the economy contains a continuum of firms with identical O-ring production functions, and a continuum of workers with different levels of human capital. Assume further that economic growth manifests itself through increased complexity of the products of each firm (i.e., in a higher n). What happens to wage inequality in the economy? Explain.

2 Trade and the labor market

Consider the regression in Autor, Dorn, and Hanson (2015):

$$\Delta Y_{jkt} = \gamma_t + \beta_1 \Delta IPW_{jt}^{China-US} + \beta_2 RSH_{jt} + X'_{jt} \beta_2 + \delta_k + e_{jkt} \quad (1)$$

Y_{jkt} is the outcome of interest, such as the employment-to-population ratio, in commuting zone j , census region k , at time t . $IPW^{China-US}$ captures import from China, RSH_{jt} is the share of the workforce employed in routine jobs, and X_{jt} is a vector of control variables. The Δ 's signify changes over the sample period 1990-2007. First differencing takes care of time-invariant characteristics of the commuting zones. γ_t represents time fixed effects, and δ_k represents possible differential time trends in the census regions (which are more aggregate

entities than commuting zones). The parameters of interest are β_1 and β_2 , which capture the effects of trade and computerization, respectively.

Question 2.a

Suppose now $IPW_t^{China-US}$ is a measure of actual imports from China into commuting zone j . In this case, explain why β_1 might be a biased estimate of the true causal effect of import competition from China. Explain in which direction potential sources of endogeneity might bias the estimate.

Question 2.b

How does Autor, Dorn and Hanson (2015) try to solve such endogeneity problems? What are the identifying assumptions? Are the problems you have mentioned in your answer to the previous question solved? Explain.

Question 2.c

The 2SLS results of Autor, Dorn and Hanson (2015) unambiguously show that import competition from China have reduced the employment rate in affected commuting zones. Explain why the effect on the national employment rate nevertheless are ambiguous. Would you consider an increase or a decrease in the national employment rate a more likely consequence of Chinese import competition? Does your answer depend on the time horizon?

Question 2.d

Suppose that you re-estimate the regression using data from 1990-2017 instead. Would you expect the estimate of β_1 to change? If so, in what direction? Explain.

3 Population growth and decline

Global population growth has been slowing down for decades, and the number of people in the world may even start to decline sometime in the future (see Figure 1 at the end of the exam question). In this part of the exam, you are asked to discuss potential consequences of this trend in light of the models considered in the course.

Question 3.a

What is the likely consequence of a smaller global population (i.e., negative population growth) for global productivity growth according to Paul Romer's R&D based endogenous growth model ("growth through expanding variety")? Explain why it makes a difference whether declining population manifests itself in fewer skilled or unskilled workers.

Question 3.b

How and why would your answer change if you use Charles I. Jones modification of the Romer model to form your expectations? Which of the two frameworks appears empirically most relevant?

Question 3.c

The real rate of interest on safe assets, such as government bonds, has declined over the last three decades. More specifically, what is called the natural real rate of interest has declined, suggesting that long-run factors are of importance to the developments. Some growth models predict that declining (but still positive) population growth may be an explanation, others predict that population growth is unlikely to influence the natural interest rate. Please name two models of each variety (four in total). Briefly explain why population growth matters/does not matter in each case.

Question 3.d

Which of the models discussed in the previous question would you trust when it comes to explaining the declining real interest rate? Explain. (This is an open question with no definitive answer. Your answer will be evaluated based on the quality of your arguments).

Figure 1: Global population growth

Natural population growth, World, 1950 to 2099

Natural population growth is the population increase determined by births and deaths. Migration flows are not taken into account. This is shown from 1950, with UN projections to 2100 based on its median scenario.

