Written Exam at the Department of Economics summer 2020

Economics of Education

Final Exam

16 June 2020

(3-hour open book exam)

Answers only in English.

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

This exam question consists of 6 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 dispelling from the exam. In most cases, the student is also expelled from the university for one semester.

This is the final exam for Economics of Education, Spring 2020. You have three hours to answer the following 5 questions. The exam assignment is given in English and must be answered in English. According to the decision of the Board of Study due to the Corona-crisis, the exam is an online take-home exam. The exam is still individual and you may not communicate with others about the exam assignment or solutions in any circumstances.

Draft your responses with an eye to clarity of exposition and structure as well as to showing your understanding of the concepts learned in class. Link the problem at hand to economic theory. You are free to make any reasonable assumptions that help you in answering, as long as you are specific and explicit.

Make sure to *pace yourself*. Also, you may choose to work on the questions in a *different order*: All questions can be answered independently.

FIRST PART

Gifted education program in Italy

Programs for gifted students find their rationale in the public interest to promote individual self-fulfillment and in the positive returns in terms of economic and societal development ([Renzulli(2012)]). Since the late '80s, several special education programs targeting gifted students have been introduced in the US. These programs involve around 7% of the overall student population ([Card and Giuliano(2014)]). In Europe, many countries have introduced laws to match gifted students' needs for special intervention starting in 2000.

The share of Italian top performers (students who attained levels 5 or 6 in PISA tests) is only 9.5% compared to 11.4% in the entire OECD. In this context, gifted programs may be useful to improve performance at the top of the Italian distribution. Only recently, in 2019, the Ministry of Education acknowledged gifted students' needs for special attention (Law 562/2019) and decided to **invest in a gifted mathematics program for high school students.** The camp takes place once a year and lasts three days. It targets students of high ability from high schools, grades one to four (ages 14 to 18).

Questions

1. (1) Outline the classical Ben Porath human capital model (describing the variables involved) and use it to analyze the implications of the investment in the gifted mathematics program.

   (2) Where would the program enter in this model? (Which variable would you use?)

   (3) What are the effects of this program in terms of educational attainement?

   (4) How would the program impact inequality? Reflect on the target and the timing of the investment (secondary education).

   (5) Would the effect be homogenous (i.e., equal for all students)?

   (6) How would the impact of the program differ if the target of the gifted program were college students?

2. The establishment of gifted programs can be considered a policy put in place by governments and schools to improve students' performance.

   (1) What other policies that have this goal do you know from the literature? List and describe the impact of policies/interventions (at least those we saw in the lectures) that aim to improve students' academic performance. We expect that you are able to present a detailed overview of the existing literature on the topic.

(2) This policy has a specific target (i.e. high skills students): it is however possible that the Minister of Education expects an overall improvement in students' performance (i.e. an imporvement also in the academic performance of those not involved in the camp). How can this be possible? Explain and discuss other empirical evidence on the role of the average perfomance on the individual one.

SECOND PART

3. The Economist has published an online article on April 30th 2020 titled "Closing schools for Covid-19 does lifelong harm and widens inequality". The article describes that, at the time of its publication, roughly 1.5 billion schoolchildren across the world are not visiting school and points to likely consequences for social mobility. It contains the following paragraph:

   > "(. . .) You can make up for lost maths with summer school. But you can't easily do that with the stuff kids learn very young," says Matthias Doepke of Northwestern University. Social and emotional skills such as critical thinking, perseverance and self-control are predictors of many things, from academic success and employment to good health and the likelihood of going to jail.

   Regarding home schooling, the article makes the following observations:

   > Less well-off children everywhere are less likely to have well-educated parents who coax them to attend remote lessons and help them with their work. In Britain more than half of pupils in private schools are taking part in daily online classes, compared with just one in five of their peers in state schools, according to the Sutton Trust, a charity (private schools are more likely to offer such lessons). In the first weeks of the lockdown some American schools reported that over a third of their students had not even logged in to the school system, let alone attended classes. Meanwhile, elite schools report nearly full attendance and the rich have hired teachers as full-time tutors.

   (1) Please interpret the article's message in light of economic theory: Why and how will the current closure of schools influence social mobility?

   (2) Please explain the potential role of sensitive/critical periods in skill acquisition as well as the role of dynamic complementarities in exacerbating the effect of school lockdowns on social mobility.

   (3) Describe how the potential of later remediation of lost schooling time depends on the degree of dynamic complementarity between skills. (Feel free to use examples to explain the more general points you are making).

   (4) What kind of production function could you use to model an extremely high degree of dynamic complementarity? (a very short answer is totally fine)

4. Consider the Lochner (2004) model and specifically consider the simple case of "unskilled crime", i.e. the return from crime does not depend on the agent's human capital.
   Assume now there is a policy change and the prison sentence in case the agent is caught committing a crime increases (permanently) from J years to $J + x$ years. This question is about how the policy change affects the agent's trajectory in comparison to the counterfactual scenario where the prison sentence is still J years. Your answers do not have to be long, but it should be precise.

    (1) What would be the immediate (short-run) effect on a young agent's time allocation?

    (2) How would the short-run effects translate into the agent's longer-run career trajectory?

    (3) How does the policy change affect the probability that the agent eventually ends up in prison?

Here are some instructions for how to answer this question: You may refer to the simplified sketch of the model we have discussed in lecture 10 or the full-fledged model in Lochner (2004) Please make clear in your answer which one you are referring to, in case this makes a difference for your argument. You may make (reasonable) assumptions, if necessary. A perfect answer to this question requires that you describe the mechanisms of the Lochner (2004) model. This means that you refer to elements of specific equations, describe how these elements change in response to the policy change and how this change affects the agent's time allocation. Ideally, you would combine intuitive statements/sentences with references to the model. When referring to equations, you may either write down the equation, describe the equation ("the FOC for crime") or refer to the corresponding slide number ("slide 20"). In case you have difficulties with the equations, just providing the intuition of the model will also earn you points!

5. IV vs. Mincer

   In the literature on the "returns to education", college proximity is one commonly used instrumental variable for educational attainment.

    (1) Can you think of any problem/weakness of the "college proximity" instrument?

    (2) Some papers have used the school proximity instrument and found estimates of the returns to schooling that are 25-60% higher than conventional OLS estimates. What reasons can you think of? Please elaborate on each of them.

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