Written Exam for the B.Sc. or M.Sc. in Economics Summer 2018

# Applied Econometric Policy Evaluation

Take-home exam

June 13, 2018

This exam consists of 7 pages in total.

Answers only in English.

**Be careful not to cheat at exams!**
Exam cheating is for example if you:

- Copy other people's texts without making use of quotation marks and source referencing, so that it may appear to be your own text
- 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
- Reuse parts of a written paper that you have previously submitted and for which you have received a pass grade without making use of quotation marks or source references (self-plagiarism)
- Receive help from others in contrary to the rules laid down in part 4.12 of the Faculty of Social Science's common part of the curriculum on cooperation/sparring

You can read more about the rules on exam cheating on your Study Site and in part 4.12 of the Faculty of Social Science's common part of the curriculum.

**Exam cheating is always sanctioned by a written warning and expulsion from the exam in question. In most cases, the student will also be expelled from the University for one semester.**

## Practical instructions for the take-home exam

Read the entire exam before you respond. Answer every question in each problem. The exam consists of four problems in total.

The exam can be answered in groups of a **maximum of 2 students**. Hand-in a single report for the entire group **and specify each group member's contribution to the report**.

You must submit a comprehensive report with relevant tables and figures. The front page of the report must use the template available at `https://eksamen.ku.dk/`. Fill in the exam numbers of all group members on the front page. The second page of the template must specify which paragraphs and/or sections of the report is answered by which group member. This page may not contain other information.

Prepare one STATA do-file generating all tables and figures that appear in your report. The program must produce tables and figures in the same order as they appear in the report. Comments should clearly indicate which table or figure appearing in the report is being produced. Make sure that the do-file can be executed without any errors. The do-file must include the exam numbers of all group members.

**The report must not exceed 12 (normal) pages**. This includes the main text, tables and figures in the report, but not the front page and the list summarizing each group member's contribution to the report.

For the exam in Applied Econometric Policy Evaluation, a normal page is defined as a text document with the following attributes[1]:

- A4 format
- Font size set to 12
- Line spacing set to 1.5
- Margins (left/right/top/bottom) of at least 2.5 cm

The exam ends **June 13 at 22.00 (10:00pm)**. The report and the STATA do-file must be uploaded electronically no later than 22.00 (10:00pm).

## Uploading your report

Each group must hand-in only one report in total. One student hands in the report by uploading it to University of Copenhagen's Digital Exam system and then adding the rest of the group members to the hand-in. Go to the website `https://eksamen.ku.dk/` and click on 'Log in as student'. Use your regular KU login and password to enter Digital Exam. Click on 'Applied Econometric Policy Evaluation' in your assignments. On the page 'Information about the hand-in', you must add the other group member to the handed-in answer (if you are in a group). Click on 'Add member' and follow the instructions on Digital Exam to invite your fellow group members. Group members will be added to the handed-in answer as soon as they **accept** your invitation.

[1]The Study Handbook for the Economics program defines a normal page as 2,400 characters, but for this exam, a normal page is instead defined in terms of format, font size, line spacing and margins.

Next, go to 'Upload hand-in' to upload your files. Each group must upload two files:

1. The report itself must be uploaded as a PDF file. The filename must start with the letter R followed by the exam numbers of all members of the group separated by _ ("underscore").
2. The STATA do-file must be uploaded as a file in plain text format (.txt). The filename must start with the letter P followed by the exam numbers of all members of the group separated by _ ("underscore").

Use the same combination of exam numbers for both files.

> Example: A group of two members with exam numbers 72 and 174 will submit the following files:
>
> 1. R_72_174.pdf
> 2. P_72_174.txt

If needed, a free PDF converter is available at `www.pdf995.com`.

If you have problems accessing the Digital Exam system at the deadline of the take-home exam or if you have difficulties with the upload function you must e-mail your answer to `samf-fak@samf.ku.dk` within 22:30 (10:30pm). Handing in your exam answer by e-mail requires that you describe the problems and provide screen dumps that document this.

## Access to data

For the take-home exam, there are several data sets available on the Digital Exam website (`https://eksamen.ku.dk/`). Follow the instructions below to pick the correct data set for your group:

1. Determine the **lowest** number among the exam numbers of the group members. Use the **last** digit of the **lowest** exam number as your "group number".

   > Example: A group of two members with exam numbers 72 and 174 will have "2" as the last digit of the lowest exam number.

2. Download the STATA file groupdataX.dta from the Digital Exam website, where X is equal to the group number.

   > Example: The group from before downloads groupdata2.dta from the Digital Exam website.

3. Download the data to your computer.
4. Open the data in STATA and execute the **describe** command to ensure the data appears operative.

If you have trouble selecting or opening the data, you can contact Søren Leth-Petersen on telephone 3532 3084 or Daniel le Maire on telephone 3532 3063 during the period 10.00am to 12.00pm (noon) on June 13.

After this, no additional help will be provided for the exam.

## Introduction to the assignment:

# "The effect of a job search course for unemployed workers"

With the view to reducing the cost of unemployment to society by shortening the length of time spent in unemployment, the government wants to offer unemployed a job search course. In order to assess the job search course, every unemployed born on the first 15 days of a month are eligible to participate in the job search course. For those born in the last half of each month, it is not possible to participate in the job search course. The eligible unemployed can take the job search course the first 8 months of unemployment. Hence, participation in the job search course is entirely voluntary. The unemployed also decides when to participate in the job search course within the first eight months. However, if an eligible worker finds a job, he/she will no longer be allowed to enter the job search course.

The objective here is to estimate the effect of the job search course on the chances of obtaining a job. You have access to a data set, which has information about all workers becoming unemployed in the period March 1 to May 30, 2014. All individuals are followed from the point where they become unemployed and for 24 months forward. The data set has been set-up as balanced panel data set with 24 observations for each individual. In each month we record whether the person has previously participated in the job search course and whether the person is employed in a given month.

The variables available are summarized in Table 1 below.[2]

**Table 1: List of variables**

| Variable name | Description |
|---|---|
| pnr | Social security number (anonymized) |
| month | month after start of unemployment |
| age | Age by end of 2013 |
| yob | Year of birth |
| mob | Month of birth |
| dob | Day of birth |
| educ | Completed further education (no=1, short=2, medium=3, long=4) |
| jobcourse | Dummy taking the value 1 if individual is or has been enrolled in job course |
| employed | Dummy taking the value 1 if individual is employed |

[2]The data used for this exam are simulated

## Problem 1 (10%):

1. Provide a descriptive analysis of the variables in your data set using relevant summary statistics. Examples of relevant aspects to include are number of observations, number of observations per individual, eligibility, course enrolment, and age. Note that these may not be the only aspects of the data that are relevant to describe. The descriptive analysis may include both table(s) and relevant graphical illustration(s) of the data

2. Construct a figure with two diagrams to examine the share of employed workers as a function of the elapsed time since entering unemployment.

   (a) In the first diagram, include a graph for persons who have participated in the job search course and a graph for persons who have not yet participated in the job search course. Does the evidence from this diagram suggest that there is any effect of the course on the chance of returning to work?

   (b) In the second diagram, include a graph for persons who were eligible to take the job search course when entering unemployment and a graph for persons who were ineligible to take the job search course when entering unemployment. Does the evidence in this diagram lead you to change the conclusion?

## Problem 2 (25%):

1. Regress the employment variable on the dummy for job search course participation controlling for age, age squared, education dummies and dummies for the elapsed time since the start of the unemployment spell. If we suppose we can give the regression a causal interpretation, how should we interpret the parameter for participation in the job search course?

2. Regress the employment variable on a dummy variable for being eligible for the job search course while controlling for age, age squared, education dummies and dummies for the elapsed time since the start of the unemployment spell. Enter the estimation results into a table and comment on the results. How do you interpret the parameter estimate on the eligibility dummy?

3. Regress the dummy for participation in the job search course on the eligibility dummy while controlling for age, age squared, education dummies and dummies for the elapsed time since the start of the unemployment spell. Enter the estimation results into a table and comment on the results. How do you interpret the parameter on eligibility dummy?

4. Based on your estimation results in the previous three questions, would you say that the job search has a positive, a negative, or no effect on the probability of finding a job?

## Problem 3 (20%):

1. Argue why we can use a dummy for eligibility for the job search course as an instrument for participation in the job search course.

2. Make a binned scatterplot around the 16th day of the month and examine whether the age variable and/ or the education dummies vary around the cutoff.

3. Use $2SLS$ to estimate the effect of participation in the job search course on the probability of being employed. Include the usual covariates in the $2SLS$ regression: age, age squared, education dummies and dummies for the elapsed time since the start of the unemployment spell. Enter the estimation results into a table and interpret the results.

4. Calculate

   (a) $\hat{E}[employment|eligible = 1]$
   $\hat{E}[employment|eligible = 0]$
   $\hat{E}[jobcourse|eligible = 1]$
   $\hat{E}[jobcourse|eligible = 0]$

   (b) $\hat{LATE}$ and give an account for what $LATE$ identifies.

## Problem 4 (20%):

1. Examine if the effect of the job search course is different after different length of time since the start of unemployment. To estimate the effect at a given month after the beginning of the unemployment spell, you should only include observations for this particular month. Therefore, estimate the job search course using $2SLS$ at, respectively, 2 months, 4 months, 6 months, 8 months, 10 months, and 12 months after the start of unemployment. Discuss the selection into treatment and whether this proposed strategy of estimating the effect at each month is a useful way to examine the selection into treatment.

2. Count the compliers. Do compliers differ in terms of education?

## Problem 5 (25%):

Danish residents can qualify for a tax subsidy by saving for retirement in three types of pension savings accounts: capital pension accounts, annuity accounts, and life annuity accounts. The first results in a one-off payment (typically) at retirement, the annuity account gives rise to annual payments over a fixed horizon, while life annuities give regular annual payments until death.

Data are available for the entire population and includes information about contributions to capital pension accounts, annuity accounts, and life annuity accounts for the period 2005-2014. The data also includes information about income, which is useful as savings is known to be increasing with the level of income.

In December 2011, the government announced that as of January 1, 2012, a cap on annual

contributions to annuity accounts at 50,000 DKK would be introduced. The change was announced in December 2011. The government is interested in analysing the effect of this cap on the extent to which savers substitute to other types of pension savings, i.e. either of the two alternative types of pension savings accounts.

Propose a research design that can be used to examine the degree to which savings in annuity accounts is reduced and shifted towards either of the two alternative types of pension savings accounts. Write up the equation(s) of interest and discuss the critical assumptions underlying the proposed design and describe how to potentially assess their validity.