



Stockholm
University

Department of Economics

Course name: Empirical Methods in Economics 2
Course code: EC2404
Examiner: Björn Tyrefors Hinnerich
Number of credits: 7,5 credits
Date of exam: Sunday December 14, 2014
Examination time: 3 hours [9.00-12.00]

Write your identification number on each paper and cover sheet (the number stated in the upper right hand corner on your exam cover).

Use one cover sheet per question. Explain notions/concepts and symbols. If you think that a question is vaguely formulated, specify the conditions used for solving it. Only legible exams will be marked. **No aids are allowed.**

The exam consists of 6 questions: 4 short questions worth 10 points each and 2 long questions worth 30 points each - 100 points in total. For the grade E 45 points are required, for D 50 points, C 60 points, B 75 points and A 90 points.

Your results will be made available on your "My Studies" account (www.mitt.su.se), on Friday 2 January 2015 at the latest.

Good luck!

Part 1: Short questions (40 points)

On separate sheets of paper, answer the following four questions. Answer each question clearly and concisely. Only legible answers will be considered. If you think the question is vaguely formulated, specify the conditions used for solving it. Each question is worth 10 points. Good Luck!

1. Non-linear models (10 points)

A researcher is interested in estimating the effect of class size (X) on test scores (Y). She/he has found an experiment that randomizes class size (number of students per teacher). Both variables are continuous.

- (a) A log-linear specification gives an estimate of $\hat{\beta} = -0.01$. Interpret the estimate
- (b) A log-log specification gives an estimate of $\hat{\beta} = -0.2$. Interpret the estimate
- (c) A Linear-log specification gives an estimate of $\hat{\beta} = -20$. Interpret the estimate

2. Regression Control (10 points)

- (a) State the conditional mean independence assumption. What does it mean in words?
- (b) What is the difference of conditional mean independence and the assumption of conditional mean of the error term. Discuss shortly.

3. Panel data models (10 points)

- (a) Formulate a general fixed effects model.
- (b) State the assumptions for a fixed effects model and discuss shortly the intuition of them.

4. Standard errors (10 points)

- (a) Why do we use robust standard errors?
- (b) Why do we use clustered standard errors?
- (c) If we instead of normal standard errors calculated either robust or clustered standard in a regression, would you expect your standards errors to rise or fall.

Part 2: Discussion questions (60 points)

On separate sheets of paper, answer the following four questions. Answer each question clearly and concisely. Only legible answers will be considered. If you think the question is vaguely formulated, specify the conditions used for solving it. Each question is worth 30 points.

1. Measurement error, Errors-in-variables bias

Formalize in a regression model the problem of measurement error in an explanatory variable X . Define and discuss classical measurement error and its implications for causal analysis. How can this problem be solved? What happens if we have classical measurement error in the outcome, Y ?

2. Instrumental variables (30 points)

Discuss the IV-approach and assumptions for a valid instrument. Discuss the IV-approach in terms of reduced form and first stage. Intuitively, discuss the differences of LATE and ATE and give examples of when the $\widehat{\beta}_{TSLs}$ is an ATE. Where do credible instruments come from?