

ME2720 Macroeconomics for Business

Lecture 1

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KTH Royal Institute of Technology

October 31, 2017

Outline

- 1 Contact Information & Registration
- 2 About the course
- 3 Course structure
- 4 Assignments, Term paper & Exam
 - Assignments
 - Term paper
 - Exam
- 5 Introduction to Assignment 1
- 6 Introduction to regression analysis

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Contact Information

- Course responsible & Teacher: Luis Perez, luis.perez@indek.kth.se
- Guest lecturer (Monetary Policy): Annukka Ristiniemi, [Sveriges Riksbank](#)
- Guest lecturer (Fiscal Policy): Jose-Elias Gallegos, [IIES, SU](#)
- Guest lecturer (Financial Markets): Gustav Martinsson, [KTH](#)

Registration

- “My Pages”
- October 23–November 2

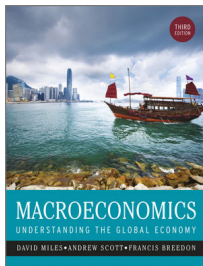
- Graduate from KTH (*MSc in Economics*)
- Lecturer & Researcher at *Indek*
- **Research Interests:** Innovation, inequality, econ. growth, political economy
- Personal website: neweconomicsandphilosophy.com
- **Office hours:** Fridays, 13-14
- Feel free to ask any questions connected to the program!

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About the course

A course in applied macroeconomics. . .

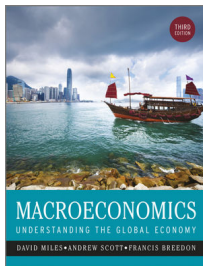
- . . . to help firms analyze their environment!
- Main focus on empirics, i.e. gather, analyze and present macro data
- **Book:** *Macroeconomics: Understanding the Global Economy (3rd Edition)* by David Miles, Andrew Scott, Francis Breedon



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Course structure

- 10 lectures
- 4 assignments
- Term paper

Lecture 1: October 31

- Ch. 1 – 2: Introduction to macroeconomics

Lecture 2: November 2

- Ch. 3 – 4: Economic growth

Lecture 3: November 6

- Ch. 5 – 6: Economic growth (cont.)

Lecture 4: November 8

- Ch. 11: Business cycles

Lecture 5: November 13

- Ch. 7: The labor market
- Presentation of Assignment 1, by students

Lecture 6: November 15

- Ch. 12 – 13: Monetary policy
- Guest lecturer: Annukka Ristiniemi

Lecture 7: November 21

- Ch. 10: Consumption and Investment
- Presentation of Assignment 2, by students

Lecture 8: November 23

- Ch. 14 – 15: Fiscal Policy
- Guest lecturer: Jose-Elias Gallegos

Lecture 9: November 30

- Ch. 16: Financial markets
- Guest lecturer: Gustav Martinsson

Lecture 10: December 5

- Presentation of Assignments 2 & 3, by students

Term paper presentation (I): December 12

Term paper presentation (II): December 14

Exam: January 8, 08:00–12:00

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Assignments

- 4 compulsory (group) assignments
 - ① Assignment 1: Economic growth
 - † Handed out: Thursday, November 2
 - † Deadline: Tuesday, November 12
 - ② Assignment 2: The labor market and business cycles
 - † Handed out: Tuesday, November 12
 - † Deadline: Tuesday, November 21
 - ③ Assignment 3: Consumption, prices and economic policy
 - † Handed out: Thursday, November 23
 - † Deadline: Tuesday, December 5
 - ④ Assignment 4: Financial markets
 - † Handed out: Thursday, November 30
 - † Deadline: Tuesday, December 5
- Each assignment comprises 5 exercises (do *at least* 3!)

Assignments (cont.)

- Assignments are *EMPIRICAL*, with economic interpretations:
 - † Data retrieval from Databases (PWT, WDI, Statistics Sweden, etc.)
 - † Regression analysis (Python, R, Stata, Eviews, Spss, Excel, etc.)
- **Purpose:** To develop skills in working with real data, writing reports and presenting macroeconomic analyses
- Groups of (maximum) 3 students¹
- **Grading:** Pass/Fail, but...
 - † ...demands are high ($\approx 50\%$ revises the assignment)
 - † You will receive feedback and, if failed, a chance to revise

¹Same group members all over the course.

Assignments (cont.)

Submission:

- Just 1 pdf document + code/excel file

Group presentations:

- Each group presents the solution to 1 exercise in class
- Compulsory attendance
- Approximately 10' presentation & 5' discussion, per exercise
- TO DO NOW! (5'): Form groups and report the members' names and personnummer ASAP!
- Exercises for presentation randomly distributed between groups

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- **Not** compulsory, but *highly recommended!*
- Add (a maximum of) 20 points to the exam score²
- Term papers are written individually or in groups of 2 students
- Length of the paper (including title page and references)
 - † 1 student: 7 – 9 pages
 - † 2 students: 13 – 15 pages
- Go for a *macroeconomic* topic of your choice, but check with me that the topic is okay!
- TNR, 12 pt., 1.5 spacing, 2.5 margins. Otherwise, L^AT_EX

²Just in the first exam opportunity!

Term paper (cont.)

- Examples of top-marked term papers on Canvas
- Send the term paper no later than December 4 (will be *checked for plagiarism*)
- Send the presentation of the term paper no later than December 8
- **Presentations:**
 - 1 Tuesday, December 12 (13:00–17:00)
 - 2 Thursday, December 14 (13:00–17:00)
 - * 20' presentation and 10' discussion
 - * Another group acts (*actively!*) as discussant
 - * Assistance is mandatory in the two 4-hours seminars

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- Written exam on Monday, January 8, 2018, 08:00–12:00 (classrooms M31–M33)
- Multiple choice questions based on the course book and lecture notes
 - † 25 questions, 4 points each
 - † Book chapters: 1 – 7 and 10 – 16 (372 pages approx.)
- Bonus points from the term paper will be added (just in the first exam!) on top of your score.

Exam (cont.)

- Only allowed aid: pen, pencil, eraser, calculator, ruler and language lexicon kept at the supervisor's desk
- Grading
 - A 92 – 100 points
 - B 84 – 91 points
 - C 76 – 83 points
 - D 68 – 75 points
 - E 60 – 67 points
 - FX 57 – 59 points
 - F 0 – 56 points
- Registration for the exam on “My pages” in the window 4 to 2 weeks prior to the exam

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Introduction to Assignment 1

Exercise 1. Growth accounting and TFP growth

- Select (randomly) 5 OECD- & 5 African- countries
- Use $Y = AK^{2/3}L^{1/3}$ to assess avg. annual growth coming from TFP, capital and labor in time periods: 1970-1990 and 1990-2010
- Graph your results as in Figure 1 in Assignment 1
- Comment your results
- Differences between groups of countries?
- Differences between time periods?

Introduction to Assignment 1

Exercise 2. Convergence

- Select (randomly) 25 rich- & 25 poor- countries
- Graph (scatter plot) the data as in Figure 2 in Assignment 1
- Do you detect convergence?
- Re-do separating between rich- and poor-countries, i.e. 2 graphs and answer the same question
- Regression analysis: β_1 sign, descriptive statistics, coefficient estimates, significance, convergence?

Introduction to Assignment 1

Exercise 3. Income League and GDP Growth

- Collect PPP-adjusted real GDP for (random) 20 countries from 1980 to 2014.
- Create an income league and comment the results
- Position of the 1980-richest country in 2014 if their average annual growth rate is 1% point slower?
- Position of the 1980-poorest country in 2014 if their average annual growth rate is 1% point faster?

Introduction to Assignment 1

Exercise 4. The Income Distribution

- Explain Gini coefficient, Lorenz curve and their utility on measuring inequality
- Collect data on GDP pc and population for 30 (random) rich countries in 1950, 1970, 1990, 2010
- Draw one Lorenz curve per year and comment the results (also the evolution over time)
- Position of the 1980-poorest country in 2014 if their average annual growth rate is 1% point faster?

Introduction to Assignment 1

Exercise 5. Your choice

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Regression analysis

- Statistical method to quantify general patterns in data
- Put simple, a method of measuring the link between two or more phenomena
- Used in all sectors of the economy (private, public and academic)
- Can be extremely complicated theoretically but easy practical implementation!

Regression analysis (cont.)

Suppose we have data on two variables, X and Y , and we want to assess the general linear relationship between them

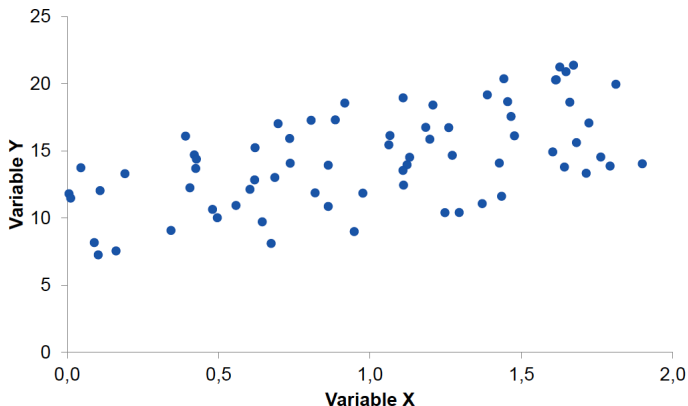


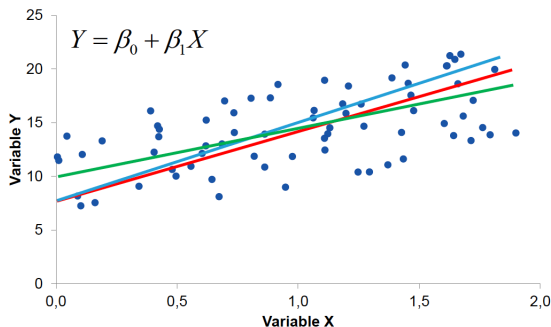
Figure: Scatter plot of X and Y

Regression analysis (cont.)

- A linear relationship between variable X and Y can be expressed as a straight line

$$Y = \beta_0 + \beta_1 X$$

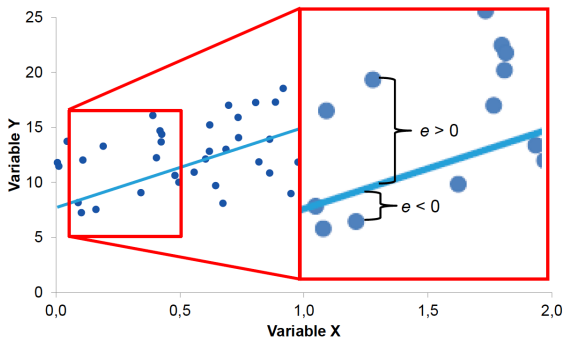
- Problem: To find β_0 , β_1 s.t. the corresponding line is the best (estimated) representation of the relationship between X and Y , conditional on our data



Regression analysis (cont.)

- Ordinary least squares (OLS) is a statistical method to obtain the “unknown” parameters by minimizing the sum of squared residuals
- A residual, ϵ , is the vertical difference between the actual value of Y and the straight line

$$\epsilon = Y - \hat{Y} = Y - (\beta_0 + \beta_1 X)$$



Regression analysis (cont.)

- Best fit obtained by minimizing the **sum of squared errors of prediction**³ (SSE)

$$SSE = \sum_{i=1}^N \epsilon_i^2 = \sum_{i=1}^N (y_i - \hat{y}_i)^2 = \sum_{i=1}^N (y_i - (\beta_0 + \beta_1 x_i))^2$$

- Using calculus...

$$\beta_1 = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sum (x_i - \bar{x})^2}$$

$$\beta_0 = \bar{y} - \beta_1 \bar{x}$$

- Let's put this knowledge into use!

³Also referred as *residuals sum of squares* (RSS) or *sum of squared residuals* (SSR).

Exercise: Consumption—Investment

Assume that your 7 closest friends make $\$x_i$ and spend $\$y_i$ a month, e.g.

Table: Friends' income and consumption

x_i (= income)	y_i (= consumption)
1000	900
1300	1100
2000	1500
1500	2400
4000	2500
2700	2000
3100	2200

- 1 Find and interpret β_0 and β_1
- 2 Specify and draw the fitting regression line

Solution: Consumption—Investment

Table: Friends' income and consumption

x_i	y_i	$x_i - \bar{x}$	$y_i - \bar{y}$	$(x_i - \bar{x})(y_i - \bar{y})$	$(x_i - \bar{x})^2$
1000	900	-1228.57	-900	1105713	1509384.25
1300	1100	-928.57	-700	649999	862242.25
2000	1500	-228.57	-300	68571	52244.25
1500	2400	-728.57	600	437142	530814.25
4000	2500	1771.43	700	1240001	3137964.25
2700	2000	471.43	200	94286	222246.25
3100	2200	871.43	400	348572	759390.25

$\bar{x} \approx 2228.57$ $\bar{y} = 1800$ $\sum(\cdot) = 0$ $\sum(\cdot) = 0$ $\sum(\cdot) = 3944284$ $\sum(\cdot) \approx 7074285.75$

1

$$\beta_1 = \frac{\sum(x_i - \bar{x})(y_i - \bar{y})}{\sum(x_i - \bar{x})^2} = \frac{3944284}{7074285.75} \approx 0.558$$

$$\beta_1 = \bar{y} - \beta_1 \bar{x} = 1800 - 0.558 \cdot 1657.14 \approx 875.32$$

2

$$Y = 875.32 + 0.558X$$

Regression analysis (cont.)

- Thus far, simplest case, i.e. bivariate regression
- General case: K independent variables and N observations

$$\mathbf{Y} = \mathbf{X}\beta + \mathbf{e}$$

$$\begin{pmatrix} y_1 \\ \vdots \\ y_n \end{pmatrix} = \begin{pmatrix} x_{1,1} & \dots & x_{1,k} \\ \vdots & \ddots & \vdots \\ x_{n,1} & \dots & x_{n,k} \end{pmatrix} \begin{pmatrix} \beta_1 \\ \vdots \\ \beta_k \end{pmatrix} + \begin{pmatrix} \epsilon_1 \\ \vdots \\ \epsilon_n \end{pmatrix}$$

- *More of this in Econometrics!*

Thank you for your attention!