Agenda

1. Introduction to “Market Design”
2. Course Overview
   – Goals of this course
   – Course schedule
   – Logistics
   – Quick Presentation of Papers
   – Details about “Projects”
   – Next Steps
   – Questions
From Theory to Practice

• Beautiful theoretical foundations:
  – Game Theory (Nobel Prize)
  – Auction Theory (Nobel Prize)
  – Mechanism Design (Nobel Prize 2007)

• Market Design (Nobel Prize, 2012):
  – Real marketplaces, where resources are allocated
  – Complicated details
  – New tools (e.g., experiments, computation,...)
  – Finding solutions that work in practice
Markets are magical!

• Consider “old-school” value creation
• And now:

  • Let’s do a 2nd-price auction
  • We just created “value” out of thin air!!
Markets are everywhere

• “Trading” used to be cumbersome...
• Roth (2002): “As marketplaces proliferate on the web, a great deal of market design is going to be done by computer programmers, among others, since they possess some of the essential expertise.”

• Just think about your everyday life:
  – When you drive a car on the road ([Markets for Road Use](#))
  – When you make a phone call with your cell phone
  – When you buy a ticket for a concert ([Eliminating the Rents of “Bob the Broker”](#))
  – When you want to go to a fancy restaurant ([Auctions for restaurant tickets](#))
  – When you want to get into a seminar (course allocation)
  – When you apply to the university ([ZVS in Germany](#))
  – When you need a job (future of work)
  – When you are sick, and need to go to the hospital
Goals of this Course

First steps towards becoming a “market designer”:
1. Understand that market design solutions for real-world problems require attention to detail.
2. Understand that there are many different market design techniques, and no one-size-fits-all solution.
3. Be able to distinguish bad from good market design proposals.
4. Be able to read advanced market design research papers.
5. Be able to critically reflect on and discuss a market design research paper.
6. Be able to work on a market design research project.
Course Schedule

- 20.2.2018: Introduction: Course Overview
- 27.2.2018: The Economist as an Engineer | [paper]
- 6.3.2018: Health Care Markets | [paper]
- 13.3.2018: Electricity Markets | [paper]
- 20.3.2018: High Frequency Trading | [paper]
- 27.3.2018: Combinatorial Spectrum Auctions | [paper]
- 10.4.2018: Incentive Auction | [paper1] [paper2]
- 17.4.2018: Project: Presentation of Proposal Ideas
- 24.4.2018: Repugnance as a Constraint on Markets | [paper]
- 8.5.2018: Food Banks Market | [paper]
- 15.5.2018: School Choice Optimization | [paper]
- 22.5.2018: Course Allocation | [paper]
- 29.5.2018: Project: Final Presentations
Grading

• Presentation of papers and leading class discussion: 20%
• Response essays and class participation: 30%
• Project: 50%
Weekly

• Every week:
  – Read the assigned paper at home, in detail (not necessarily the proofs)
  – Submit response essay (0.5 pages) via OLAT until Sundays, 23:59
  – Tips on how to “read” a paper and how to “write a response essay”:

• More tips on how to read a paper:
  • Focus questions to help identify the main contributions of a paper, a
  • Survival kit for reading the technical sections, and a
  • Three-pass approach to tie it all together.
Paper Presentations

• Paper presentation:
  – Present one paper to the class
  – Search for related literature
  – Note: do not just repeat the whole paper in slides. Prepare something that is complementary
    • Can summarize the main idea and/or technical contributions of the paper
    • Can provide background/related information
    • Can raise questions/challenges/limitations/extensions
    • Topics that start a discussion
    • Incorporate response essays, if this makes sense
  – Lead discussion

• How to give a talk:
  • These two articles have a number of good suggestions.
  • This video is pretty good as well.
Market Design Project

- You can do this project alone, or in teams of 2 or 3
- **Task #1:** Find a good “market design project” idea
  - Look around, in the world:
    - Where would a new market be useful?
    - Where is a market that could be fixed
    - Where is an interesting market that you could analyze/compare?
  - Listen to podcasts: Freakonomics, Econ Talk, Planet Money, etc.
  - Read blogs, e.g.: [http://marketdesigner.blogspot.ch/](http://marketdesigner.blogspot.ch/) ← this is very useful to get ideas!
- **Task #2:** Find a team: post your idea on the OLAT forum, or talk to your colleagues
- **Task #3:** Do the project!
  - Identify a new market design problem, formalize it, and study it (formally and/or computationally).
  - Or take an existing market design solution (from the literature or from the real-world) and extend or analyze it further (formally and/or computationally).
  - Main criterion: the project has to be interesting. The reader has to learn something new! (not just a literature review!!)
  - Ideal project: will lead to a workshop paper/conference paper!
Market Designers (whose webpages you can search for ideas)

- Eric Budish
- Peter Cramton
- Paul Milgrom
- Larry Ausubel
- Martin Bichler
- Jacob Goeree
- Axel Ockenfels
- Alvin Roth
- Tuomas Sandholm
- Ben Edelman
- Tayfun Sönmez
- Utku Ünver
- Parag Pathak
- Susan Athey
- Itai Ashlagi
Projects: Timeline

• Project Proposals:
  – Written proposal (1 page): due via OLAT, on Sunday, 15.4.2018, 23.59
  – Present project proposal in class (5-10 min): 17.4.2018

• Project report (10-20 pages, no hard constraints):
  – Deadline: May 29, 2018, 10:15am
  – Succinctness is good! Present what makes sense!

• Project Presentations:
  – In class (10min): May 29, 2018
Pre-requisites

- Successful completion of one of the following courses:
  - Economics and Computation (Seuken)
  - Algorithmic Game Theory (Penna/Dütting/Widmayer)
  - Introduction to Market Design (Pycia)

- Or research experience in auction theory/mechanism design

- If you have not successfully completed one of these courses and do not have any research experience in those areas, but believe to have the necessary knowledge (in auction theory, mechanism design, etc.), please talk to me after class to get explicit permission!
MSc/PhD Level + Auditors

• **MSc students:**
  – The course is listed as an MSc course in the UZH catalogue → straightforward
  – MSc students from ETH → I am happy to sign any forms at the end of the semester

• **PhD students:**
  – UZH: if you want ECTS credits, take the course, and at the end of the semester, ask Barbara for a particular form which I will sign
  – ETH: I am happy to sign any form that you need if you take the course

• **Auditors:**
  – you are welcome, but I expect that you at least read the papers each week and participate in the discussions (you do not need to present a paper or do the project)
Teaching Staff

• Lecturer: Prof. Sven Seuken

• Teaching Assistants:
  – Ludwig Dierks (Head TA)
  – Steffen Schuldenzucker

• Questions? → ask on OLAT; alternatively, email TA: Ludwig Dierks!
• No fixed office hours; email Ludwig for appointments

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OLAT

• Please “register for the course” now, so that you automatically get enrolled into the OLAT Campus course
• Alternatively, manually request access to the OLAT course. If you have trouble, please email: dierks@ifi.uzh.ch
• What you will find on OLAT:
  – All required readings/papers (to prepare for class)
  – All lecture slides (from myself, and from students when they present)
  – Upload link for response essays
  – Forum to discuss project ideas
  – Optional reading material
  – Opportunity to ask questions (in the forum)

• Let’s take a look...
Optional Text Books

Collaboration Policy

- **Single-person response essays:** Submit your own response essay, without sharing it with someone else!

- **Penalties:** Copying/plagiarism will not be accepted (from other students, from the Internet, or from other sources). We carefully check for this and if detected will take appropriate steps including severe penalties (-100% per homework) and we will inform the University.

- **Discussions with class mates:** You are free to and encouraged to discuss the papers with your fellow students, before and/or after writing your response essay!
Course Advice (MSc)

For MSc students who select "Computing and Economics" as their major/minor, we recommend the following courses:

- **Seminar: Advanced Topics in Economics and Computation**
- Market Design: Theory & Practice
- Empirical Methods
- Advanced Microeconomics I
- Advanced Microeconomics II
- Combinatorial and Approximation Algorithms (Spring 2019)
- **Randomized and Online Algorithms (Spring 2018)**
- Practical AI
- Big Data Analytics / Big Data and Business Analytics
- Introduction to Operations Research
Workload Estimates...

• ~4 h/week: reading (the paper)
• 0.5 h/week: writing response essay
• 2 h/week: lecture
• ~15 hours to prepare paper presentation
• Project: ~60 hours
Next Steps (1/2): Assigning Papers

• We will put these slides online on my teaching website within next 2 hours: http://www.ifi.uzh.ch/ce/teaching/spring2018/marketdesign.html

• Until Thursday (22.2.2018), 23:59, send an email to Ludwig Dierks (dierks@ifi.uzh.ch) containing the following information:
  – Name
  – Matrikelnummer (ETH/UZH)
  – Completion of AGT/E&C course (when?) or explicit consent of instructor?
  – Ordinal preferences for topics, with indifferences (e.g., 3a, 3b, 3c):
    • 1) Number of Topic A
    • 2) Number of Topic B
    • 3a) Number of Topic C
    • 3b) Number of Topic D
    • 3c) Number of Topic E
    • 4) Number of Topic F

• See next page for numbers!! (from 1 to 9!)

• On Friday, we will use the Random Serial Dictatorship (RSD) Mechanism to assign papers to students

• We will then send you your assigned paper via email
List of Papers/Topics

1. 6.3.2018: Health Care Markets | [paper]
2. 13.3.2018: Electricity Markets | [paper]
3. 20.3.2018: High Frequency Trading | [paper]
4. 27.3.2018: Combinatorial Spectrum Auctions | [paper]
5. 10.4.2018: Incentive Auction | [paper1] [paper2]
6. 24.4.2018: Repugnance as a Constraint on Markets | [paper]
7. 8.5.2018: Food Banks Market | [paper]
8. 15.5.2018: School Choice Optimization | [paper]
9. 22.5.2018: Course Allocation | [paper]
Next Steps (2/2):
Read Paper + Write Response Essay

• Read first paper until next week, i.e:

• Write response essay (0.5 pages):
  – Deadline: Sunday, 23:59
  – Submit via OLAT
Questions

• More information: http://www.ifi.uzh.ch/ce/teaching/spring2018/marketdesign.html

• More questions? ➔ email: dierks@ifi.uzh.ch