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## 5c. Teaching Contract and Game Theory at three Chinese universities

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(Tun LIN)

With generous support from the OYCF Teaching Fellowship, I took a teaching trip to three Chinese universities--Hunan University, Fudan University, and Fuzhou University--from December 2003 to January 2004. I taught the applications of contract theory and game theory in contemporary development economics and environmental economics. More than three hundred students at these three universities, mainly graduate students, attended the course and the feedback was overwhelmingly positive.

### **The Course**

The courses I taught at three universities covered essentially the same topic of information problems in regulatory contract design and game playing, with course content and design varied to suit the scheduling requirements of each university. Below I will discuss the overall course and syllabus design using the Hunan University course as an example.

The course consisted of three parts. The first part introduced some fundamental models of contract theory and informational economics. I introduced the moral hazard, adverse selection, screening and signaling models in the information asymmetric context. I further extended the moral hazard model to a dynamic setting by introducing a reputation model and ratchet effect model. Through these models, students were exposed to the problems that concern us in the asymmetric information world and the approach to the search for second-best solutions.

The original goal of second part of the course was to discuss the information discovery process in a dynamic game context. It turned out, however, that students were less familiar with game theories than I expected. So I changed the topic of the course to introduce basic equilibrium concepts such as Nash Equilibrium, Bayesian Nash Equilibrium, Subgame Perfect Equilibrium, and Subgame Perfect Bayesian Equilibrium. All the concepts were illustrated with real life examples. I introduced the auction mechanism, especially first-price auction, in detail as a resource allocation mechanism and derived an equilibrium solution. Through this section students gained an appreciation of how economists study the equilibrium of the world where people interact with each other and each person's action is limited by his or her own information and incentives.

The third part of the course was to apply the concepts introduced in the first two parts to real research examples in development economics and environmental economics. At Hunan University, I only had the chance to talk about the environmental part. I started with the conventional economic approaches toward environmental problems (externality, pollution taxes, land takings, etc.), and then moved to contemporary topics such as voluntary agreements, tradable permits, and contracts between the government and firms/land owners. I used the analytical framework taught in the previous two parts, and demonstrated how to approach real world problems.

For the first two parts, I used Prof. Zhang Weiyong's book, *Game Theory and Informational Economics*, as the primary reference source. I also used handouts and journal article copies throughout the course, especially in the third part of the course. Parts of course materials were posted in the school's intranet for students to download, which proved to be a timesaving and efficient way of communication. At the end of the course, a final examination was given for assessment.

## The Teaching

I started my teaching trip on December 4, 2003, flying from London to Beijing, then to Shanghai, Changsha, and Fuzhou, before returning to London on January 13, 2004. I gave 5 hours of lectures at Fudan University, then 21 hours of lectures at Hunan University, and 14 hours at Fuzhou University.

The contact with Fudan was established during its president's visit to Cambridge University in November 2003. Prof. Chen, head of the Foreign Affairs Office, helped set up the connection between the economics school and me. During my three-day stay in Shanghai, the faculty members of the economics school treated me very well. They provided accommodation and banquet dinners with guests such as Prof. Zhang Shuguang from Tianze Economics Research Institute. Dr. Chen Zhao accompanied me throughout my stay and discussed the possibility of publishing the paper I presented at Fudan in the major Chinese economics journal *World Economic Perspectives*.

I lectured for five hours at Fudan in two sessions held on December 8 and December 10, 2003. Each session started with my lecture, which lasted for one and a half to two hours, followed by a Q&A session. The discussion went far beyond the lecture topic and left me with two general impressions: 1) students were very well prepared for the course and had a good understanding of the mathematical methods employed; and 2) the model-oriented method of teaching was new to many, but in general well received.

On December 11, I flew to Changsha, Hunan Province and started teaching at the Economics and Business School of Hunan University. I was picked up by university staff at the airport and transported to one of the best hotels in the city. Throughout my stay there, I was treated very hospitably by the university president, school deans, foreign affairs office directors, and the school faculty members. I have to say that I felt overwhelmingly welcomed at Changsha.

The teaching was intense. I was assigned a well-equipped office in the school, one specially reserved for their distinguished guest Prof. Yang Xiaokai. Every morning a university car picked me up from the hotel and transported me to the office, where I prepared the lecture, met with PhD students and faculty members, and discussed research projects with the faculty members. I had a total of more than 30 hours' office time during my stay.

The lectures were held in the afternoons, from 2pm-5pm. I had a total of seven sessions, with a total of 21 hours of teaching. Approximately 60 students and 10 faculty members attended, including the school dean. Based on a random sample of 110 class participants from the three universities, most participants in my class were students at the graduate level (42% master degree candidates and 33% Ph.D. candidates). Of the attendees, 14% were undergraduates and 11% teachers. Most of the students were from either economics-related subjects (68%) or business administration subjects (27%), and only a small number (5%) were from other fields.

The general atmosphere was relaxed and interactive. Those who attended asked very sensible questions even though most of them were being exposed to the subject matter for the first time. The final examination was set at the graduate introductory course level. About three quarters of the students achieved a score of more than eighty percent. Detailed results are shown in Table 1.

Score	<60	60-70	70-80	80-90	90-100
Percentage	0%	2%	26%	54%	18%

Table 1: Student Performance in Final Exam, Hunan University

I left for Fujian after the Hunan program. The original plan was to go to Xiamen University and teach a short-term course there. But when I arrived in Xiamen University, the students were taking their final exams earlier than scheduled because of a prolonged power cut for weeks, so I had to cancel the teaching. A few days later Fuzhou University invited me, so I taught a 10-day course there. The teaching in Fuzhou University was similar to the Hunan program. There were about 150 students attending the course including a good number of faculty members.

### Feedback

At the end of the teaching at each university, I asked what the institution's attitude towards future cooperation was, and the feedback I received was highly positive (see Table 2). Hunan University in particular was very interested in establishing long-term relations with the OYCF teaching program and indicated in writing that they would institute a formal graduate credit course if OYCF continues sending economics / game theory teaching fellows. Fudan University and Fuzhou University both expressed their interest in any potential collaboration with OYCF, in addition to the teaching program.

	Future Cooperation with OYCF's Teaching Program	Cooperation with OYCF other activities	Making The Course a for Credit Course
Fudan University	Yes	Interested	Possibly
Hunan University	Yes (promised to provide all necessary support for future OYCF teaching activities at Hunan University, including accommodation and meal subsidies)	Highly Interested	Certainly
Fuzhou University	Yes	Interested	Possibly

Table 2: Institution Feedback

A student evaluation form was distributed at Hunan University. The general result is summarized in Table 3 below. Ninety-nine percent of the audience evaluated the course as either "satisfactory" or "highly satisfactory".

	Unsatisfactory	Marginally Satisfactory	Satisfactory	Highly Satisfactory
Percentage	0%	1%	23%	76%

Table 3: Student Evaluation

### Conclusion

Throughout my forty-day long period of teaching at the three universities, I was constantly impressed by two things: the students' desire to learn about cutting-edge research, and the universities' hospitality towards OYCF teaching fellows. Both factors made my teaching trip to

China highly rewarding to both my students and myself. The subject taught is relatively new in China. Most students in the course were for the first time either being exposed to the subject matter or receiving a systematic introduction to the topic. I learned a great deal from the experience as well. As someone who might choose teaching as long-term career, I believe this teaching experience is particularly valuable. Moreover, this teaching trip started establishing the institutional ties between these three universities and OYCF for potential collaboration in the future. This fact alone has convinced me that the trip was productive.

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