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Curriculum Vitae

- CITIZENSHIP:**
- Turkish, F-1 Visa
- EDUCATION:**
- Ph.D., Economics, Penn State University, expected June 2007
 - MA, Social Science, California Institute of Technology, 2003
 - B.A., Industrial Engineering, Bilkent University, Turkey, 2001
- Ph.D. THESIS:**
- “Essays in Game Theory and Mechanism Design”
Thesis Advisor: Professor Vijay Krishna
- FIELDS:**
- **Primary:** Microeconomic Theory, Game Theory
 - **Secondary:** Industrial Organization, Political Economy
- PAPERS:**
- “Asymmetric Auctions with Resale,” with Vijay Krishna, October 2006
 - “Efficiency in Coalition Games with Externalities,” August 2006
 - “Stability of Marriage with Externalities,” June 2006
 - “Nonlinear Pricing with Resale,” October 2006 (in progress)
- HONORS & AWARDS:**
- 1997-2001: Fellow, Scientific and Technological Council of Turkey
 - 1997-2001: Bilkent University Fellowship
 - Bronze medal, 38th International Math Olympiads, Argentina, 1997
 - Silver medal, 14th Balkan Math Olympiads, Greece, 1997
- TEACHING EXPERIENCE:**
- Teaching Assistant at Penn State: Grad. Micro (3 semesters)
 - Teaching Assistant at Caltech: Macro (UG), Theory of Value (UG)
- RESEARCH EXPERIENCE:**
- Research Assistant for Vijay Krishna (Spring 2004-present)
 - Research Assistant for John Ledyard (Summer 2002)
 - Research Assistant for Matthew Jackson (Fall-Winter 2001)
- REFEREEING EXPERIENCE**
- Mathematics of Operations Research
 - Games and Economic Behavior
- PRESENTATIONS**
- 16th International Conference on Game Theory, Stony Brook, July 2005
 - Decentralization Conference, April 2006
 - Stony Brook Workshop on Externalities, Public Goods and Games, 2006
 - 8th Int’l Meeting for the Society for Social Choice and Welfare, July 2006
 - Conference of the Society for Economic Design, July 2006
 - Cornell-Penn State Macro Workshop, September 2006
 - Midwest Economic Theory Meeting, October 2006
 - INFORMS Annual Meeting, November 2006
- REFERENCES:**
- Professor Vijay Krishna vkrishna@psu.edu
 - Professor Kalyan Chatterjee kchatterjee@psu.edu
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THESIS ABSTRACT

Essay 1: *Asymmetric Auctions with Resale* (with Vijay Krishna) **Job Market Paper**

In a first-price auction, asymmetries among bidders typically result in inefficient allocations—that is, the winner of the object may not be the person who values it the most. This inefficiency creates a motive for post-auction resale and when bidders take resale possibilities into account, their bidding behavior is affected. In this paper, we study equilibria of first- and second-price auctions with resale in a model with independent private values. We examine the effects of post-auction resale in a model with two bidders whose values are asymmetrically distributed. In our basic model, resale takes place via monopoly pricing—the winner of the auction makes a take-it-or-leave-it offer to the loser.

We show that a first-price auction with resale has a unique monotonic equilibrium. We do this by first showing that despite the asymmetries, in equilibrium the distributions of bids of the two bidders are identical. The symmetry of the bid distributions is key—it is used both to construct an equilibrium and to show that it is unique. The possibility of resale also affects incentives in second-price auctions. It is no longer a dominant strategy to bid one's value. It is, nevertheless, a robust equilibrium—that is, the strategies are distribution free. In this equilibrium, of course, the auction allocates efficiently and so there is no resale.

Our main result is that with resale, the expected revenue from a first-price auction exceeds that from a second-price auction. We thus obtain a general revenue ranking of the two auction formats that is not available in the standard model of auctions without resale. The results reported above concern a particular resale institution—monopoly pricing—in which the winner of the auction has all the bargaining power. We show, however, that this is inessential by generalizing all the results to mechanisms in which bargaining power is shared, perhaps unequally.

Essay 2: *Efficiency in Coalition Games with Externalities* *Revised-Resubmitted to: Games and Economic Behavior*

In many situations, the worth of a coalition may depend on which other coalitions form. For instance, the worth of a coalition consisting of a firm and a group of workers with different skills may well depend on the composition of the work force employed by a rival firm. Such considerations are better captured by considering games in partition function form rather than the standard characteristic function form. I first show that a natural extension of superadditivity is not sufficient to imply that the grand coalition is efficient when externalities are present. I provide a condition, analogous to convexity, that is sufficient for the grand coalition to be efficient and show that this also implies that the (appropriately defined) core is nonempty. Moreover, I propose a mechanism which implements the most efficient partition for all coalition formation games and characterize the resulting payoff division.

Essay 3: *Stability of Marriage with Externalities* *Revised-Resubmitted to: International Journal of Game Theory*

In this paper I consider matching problems with externalities. In such environments, the set of stable matches depends on what agents believe will happen if they deviate. It is known that exogenous expectations are incompatible with the existence of a set of stable matchings (except when they are all inclusive). In this paper, I define the notion of sophisticated expectations that have the following features: (a) they are endogenously generated; (b) not all inclusive; and (c) lead to a nonempty set of stable matchings. I also identify a general condition on expectations that is sufficient to guarantee a nonempty set of stable matchings.

Essay 4: *Nonlinear Pricing with Resale* *Work-in-progress*

I consider the problem of a monopolist facing two consumers who can resell the goods to each other in a secondary market. The valuations of the consumers are drawn independently from a continuous distribution. The monopolist offers a menu of quantities and prices in the first stage after which the consumers, in the second stage, who know only the monopolist's menu, try to resell the goods to each other. I characterize the optimal direct mechanism and show that the monopolist can be better off or worse off as compared to the no-resale case, depending on the specifics of the economic environment. If the monopolist has constant marginal cost and the consumers have a concave utility function—a specification that implies quantity discounts—then the maximal revenue achievable with resale is less than the maximal revenue achievable without resale. If the monopolist has a convex cost function and the consumers have linear utility functions, then, surprisingly, the reverse is true.

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Curriculum Vitae

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- Turkey (F1)
- EDUCATION:
- Ph.D., Economics, Penn State University, expected June 2007
 - B.S., Industrial Engineering, Bilkent University, Turkey, 2001
- Ph.D. THESIS:
- “Essays on Time Inconsistency and Industrial Organization”
Thesis Advisor: Professor Kalyan Chatterjee
- FIELDS:
- **Primary:** Game Theory and Behavioral Economics, Applied Micro Theory
 - **Secondary:** Industrial Organization, International Trade
- PAPERS:
- “Credit Card Competition and Naïve Hyperbolic Consumers,” Job Market Paper, 2006.
 - “Time Inconsistency of Consumers and Excessive Upgrades in Software Market,” 2005.
 - “Time Inconsistency and Adverse Selection in the Credit Card Market: Evidence from the Survey of Consumer Finances,” (work in progress).
- TEACHING EXPERIENCE:
- Instructor:
 - Principles of Microeconomics (1 semester)
 - Intermediate Microeconomics (3 semesters)
 - Teaching Assistant:
 - Principles of Microeconomics (6 semesters)
 - Intermediate Microeconomics (2 semesters)
- RESEARCH EXPERIENCE:
- Research Assistant for Professor Kalyan Chatterjee, Summer 2002
- PRESENTATIONS:
- Consumer Behavior and Payment Choice Conference II, Federal Reserve Bank of Boston, July 2006
 - Society for Economic Design, July 2006
 - 8th Int’l Meeting of the Society for Social Choice and Welfare, July 2006
 - 16th International Conference on Game Theory at Stony Brook, July 2005
- REFERENCES:
- Professor Kalyan Chatterjee kchatterjee@psu.edu
 - Professor Susanna Esteban sesteban@eco.uc3m.es
 - Professor Edward Green edgreen@psu.edu

THESIS ABSTRACT

Essay 1: *Credit Card Competition and Naïve Hyperbolic Consumers (Job Market Paper)*

The credit card industry has evoked much interest in the last few years because of the conjunction of persistent high interest rates and what appears to be vigorous competition among credit card providers. The two questions that have been most puzzling are, first, why interest rates stay high despite the competition and, second, why consumers continue to borrow at these high rates.

This paper addresses these two questions by modeling credit card competition in an environment where consumers are time inconsistent. I therefore also contribute to the debate as to whether time inconsistent consumers are "money pumps" or whether competition effectively eliminates the disadvantage from this inconsistency.

My first result is that the consumer might be unresponsive to the interest rate and the credit limit of the credit card offers because of the combination of the consumer's time inconsistency and naiveté, credit card companies' grace period offer and one-period lag in using a new card. My second result is that the consumer's unresponsiveness may eliminate the competition on interest rate and credit limit among the companies. Therefore, positive expected profit equilibrium might be possible. I determine that in fact there are circumstances in which there would be both zero and positive expected profits possible.

Essay 2: *Time Inconsistency of Consumers and Excessive Upgrades in the Software Market*

In this paper, I provide an explanation for a common observation in the software market: firms offer upgrades that provide only marginal improvements, and they offer such upgrades frequently rather than making only occasional, more significant upgrades. While others have explained this phenomenon as due to network effects, I demonstrate, using the simplest possible model, that time inconsistency of consumers also provides an explanation.

In my model, there is a monopolist who offers infinitely durable upgrades with a certain frequency to a consumer who already has the base product on hand. There is a variable cost of creating an upgrade as well as a fixed cost which is incurred every time the upgrade is offered. The monopolist discounts the future exponentially, sells the upgrades at a constant price and gives the flexibility to the consumer to delay his payment. The consumer is an infinitely lived hyperbolic discounter and aims to maximize his lifetime utility.

First, I show that a naïve hyperbolic consumer's actual payment for an upgrade turns out to be higher than his expectation. Therefore, more frequent offers are optimal for the monopolist. Second, I demonstrate that a sophisticated hyperbolic consumer ends up paying more than an exponential consumer, although he correctly anticipates his actual payment, for an upgrade by delaying his payments. For this reason, it might be optimal for the monopolist to offer the upgrades more frequently to a sophisticated hyperbolic consumer than to an exponential one.

Essay 3: *Time Inconsistency and Adverse Selection in the Credit Card Market: Evidence from the Survey of Consumer Finances (work in progress)*

In this paper, I aim to determine whether hyperbolic discounting causes consumers to be less responsive to the interest rates on the credit card contracts. I plan to regress the credit card debt on interest rate, interaction of interest rate and some proxy for the hyperbolic discount factor, and other financial and demographic variables by using the Survey of Consumer Finances 2001. I expect to find a positive coefficient on the interaction term, which implies a reduced effect of the interest rate on the credit card debt.

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Curriculum Vitae

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• M.A., Economics, New Economic School, Russia, 2002
• M.S. (cum laude), Electrical Engineering, Tomsk University of Control Systems and Radio Electronics (TUCSR), Russia, 2000

Ph.D. THESIS: • “Essays on Theory of Information”
Thesis Advisors: Professors Kalyan Chatterjee and Vijay Krishna

FIELDS: • Primary: Microeconomics, Game Theory
• Secondary: Industrial Organization

PAPERS: • “Informational Control and Organizational Design”, 2006
• “Dynamic Information Revelation in Cheap Talk”, 2006
• “Strategic Information Disclosure in Competitive Markets”, 2006 (in progress)

TEACHING EXPERIENCE: • Instructor:
□ Intermediate Macroeconomics (3 semesters)
□ Money and Banking (1 semester)
• Teaching Assistant: Principles of Micro and Macroeconomics, International Finance and Open Economy Macroeconomics, Economics of Transition, Intermediate Macroeconomics

RESEARCH EXPERIENCE: • Research Assistant, Summer 2005, 2006 for Vijay Krishna

PRESENTATIONS & OTHER PROFESSIONAL ACTIVITIES: • North American Summer Meeting of the Econometric Society, Minneapolis, June 2006
• 17th International Conference on Game Theory, Stony Brook, July 2006
• Cornell-Penn State Workshop, Penn State University, April 2006
• Royal Economic Society Conference, Nottingham, April 2006

HONORS AND FELLOWSHIPS

- Dissertation Support Grant, Penn State University, 2006
- Full Scholarship, New Economic School, 2000-2002
- Full Scholarship, TUCSR, 1994-2000
- Research Support Award, TUCSR, 1998-1999

REFERENCES:

- Professor Kalyan Chatterjee, Penn State University
- Professor Edward Green, Penn State University
- Professor Vijay Krishna, Penn State University

Thesis Abstract

Essay 1: Informational Control and Organizational Design (*Job Market Paper*)

This paper focuses on organizational issues of allocating authority between an uninformed principal and an informed expert. We show that the standard result that delegation of authority to a perfectly informed expert is better than communication is reversed if the principal can restrict the precision of the expert's information (without learning its content).

In general, any conflict of interest between the two parties greatly reduces the benefits of communication. If the parties' preferences do not match exactly, the expert may want to misrepresent information in an attempt to manipulate the principal's decision. A potentially effective solution to this problem is to delegate authority to the expert herself and gain from her informational advantage. Then, as demonstrated by Dessein (2002), even though the expert would prefer a biased decision relative to the optimal decision for the principal, the trade-off between the loss of authority in delegation and the loss of information in communication often favors the former. However, despite the informational benefits of delegation, many companies today still centralize authority at the upper level of the hierarchy.

This paper analyzes the benefits of another instrument—control over the quality of the expert's information. As shown by Fischer and Stocken (2001) for some special cases, restricting the amount of information available to an expert can provide better performance than communication with a fully informed expert. It is natural to ask whether restricting the availability of information does better than full or partial delegation and how the two modes of modifying the communication game interact with each other. This paper addresses these questions. We demonstrate that informational control in communication is generally beneficial for the principal compared to both communication with a perfectly informed expert and optimal delegation. Moreover, restricting the expert's information is beneficial even when combining these instruments, that is, when the principal restricts the expert's information and delegates decision making afterwards. This finding is counterintuitive, because the expert's superior information is a major factor that benefits the principal in delegation.

Essay 2: Dynamic Information Revelation in Cheap Talk

In this paper, we investigate a multi-stage version of Crawford-Sobel's (1982) communication game in which the principal can affect the quality of the expert's private information at every stage (without knowing its content). We show how the principal can use these instruments—controlling the expert's information and dynamic interaction—to effectively extract all of the expert's information. In particular, dynamic updating of the

expert's information allows the principal to refine the information step-by-step, preserving truth-telling communication at every stage of communication. As a result, he is able to achieve (almost) full information revelation over a large interval of states. This implies that the performance of the multi-stage communication relative to the one-stage rises without a bound as the bias in preferences falls.

Essay 3: Strategic Information Disclosure in Competitive Markets

This paper investigates an imperfectly competitive market in which sellers can strategically reveal information about their products, for example, by offering a test drive to a potential car buyer. However, they cannot predict its impact on the buyers' willingness to purchase the product because of the non-homogeneous buyers' preferences over, say, the product's color, design, etc. The main result is that when the number of sellers reaches a certain critical number, it results in full disclosure of information. Also, we provide sufficient conditions that allow testing whether or not the competitive pressure is sufficiently high to provide full information revelation. These findings have potentially important implications for information disclosure policies in low-competitive markets. In contrast, it is not necessary to regulate highly competitive markets, since the full information revelation is an endogenously determined attribute of the market structure.

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Curriculum Vitae

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- Ph.D. THESIS:**
- “Essays in Game Theory and Political Economy”
Thesis Advisor: Professor James Jordan
- FIELDS:**
- **Primary:** Microeconomic Theory, Game Theory, Political Economy
 - **Secondary:** Industrial Organization
- PAPERS:**
- “Strategic Information Transmission through the Media,” November 2006
 - “Preference-based Cooperation in a Prisoner’s Dilemma Game,” November 2006
 - “Spatial Pillage Game,” March 2006
- TEACHING EXPERIENCE:**
- Teaching Assistant: Introductory Microeconomics (5 semesters), Introductory Macroeconomics (1 semester), Game Theory (2 semesters), Monetary Theory (1 semester)
- RESEARCH EXPERIENCE:**
- Research Assistant for James Jordan (Spring-Summer 2005, Summer 2006)
- PRESENTATION:**
- “Strategic Information Transmission through the Media” Midwest Economic Theory Meeting, October 2006
- REFERENCES:**
- Professor James Jordan jxj13@psu.edu
 - Professor Kalyan Chatterjee kchatterjee@psu.edu
 - Professor Sophie Bade sub18@psu.edu

THESIS ABSTRACT

Essay 1: *Strategic Information Transmission through the Media* < Job Market Paper >

This paper studies media manipulation in a situation of potential conflict. Through the News Media, senders report their information to two receivers, who then play an arms-race game similar to that of Baliga and Sjöström (2004). The two receivers choose simultaneously to build weapons (B) or not to build (N). Receiver 1 prefers to match the action of Receiver 2, and prefers the NN match to BB . Receiver 2 is the same with high probability, but also has a low-probability aggressive type for which B is a dominant strategy. The senders observe Receiver 2's type, and can report the information truthfully or untruthfully through the news media, which makes the report common knowledge. We first model a single Ministry of Propaganda that prefers the outcome BB to NN . In this case, as one would expect, receivers can play BB or NN in pure-strategy equilibrium outcomes. However, if the payoff to the Ministry of Propaganda involves a penalty for being verifiably untruthful, then the good equilibrium outcome for the receivers, in which they play NN , is eliminated. In the extended model, the senders might have imperfect information. Also, the news media preferring BB to NN are modeled as senders of public information. In the case of multiple media, if a media player receives a sufficiently high payoff for reporting truthfully when others do not, the good outcome for the receivers can be recovered.

Essay 2: *Preference-Based Cooperation in a Prisoner's Dilemma Game*

This paper studies the possibility of cooperation based on players' preferences. Consider the following infinitely repeated game, similar to Ghosh and Ray (1996). At each stage, uncountable numbers of players are randomly matched without information about their partners' past actions and play a prisoner's dilemma game. The players have the option to continue their relationship and have the same discount factors. Also, they have two possible types: high ability player (H) or low ability player (L). H can produce better outcomes for its partner as well as for itself than L can. I look for an equilibrium that is robust against both pair-wise deviation and individual deviation and call such equilibrium a social equilibrium. I show that in this setting, long term cooperative behavior can happen in a social equilibrium. H wants to match and to play only with another H because an HH match produces better outcomes for H than an HL match. So H would break the match with an L to increase the possibility of meeting another H , and thus H would not play any cooperative action with an L . L knows this intention of H and realizes that L can only cooperate with another L . Consequently, both HH matches and LL matches are endowed with a scarcity value. This scarcity value is utilized by players to sustain cooperative relationships. Therefore, in a social equilibrium, players can play long term cooperative actions because of their preferences for their partners' types.

Essay 3: *Spatial Pillage Game*

The *spatial pillage game* is an extended version of a *pillage game* developed by Jordan (2006). A pillage game is a coalitional game that is meant to be a model of *Hobbesian anarchy*. This paper introduces a *spatial feature* into the pillage game by assuming that players are located in regions. Players can travel from one region to another in one move and can form a coalition and combine their power only with players in the same region. And a coalition has power only within its region. Under this spatial restriction, some members of a coalition can pillage less powerful coalitions without any cost and can increase their wealth. The feasibility of pillages between coalitions determines the *dominance relation*. *Core*, *stable set*, and *farsighted core* are adopted as alternative solution concepts.

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Curriculum Vitae

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 - M.A., Economics, New Economic School, Moscow, 2002
 - Diploma, Mathematics and Applied Mathematics, Moscow State University, 1995. Major: Statistics
- Ph.D. THESIS:
- "Essays in Economic Theory"
Thesis Advisor: Professors Kalyan Chatterjee
- FIELDS:
- **Primary:** Microeconomic Theory, Game Theory
 - **Secondary:** Monetary Theory
- PAPERS:
- "Information Trading in Social Networks", 2006
 - "A Theory of Continuum Economies with Idiosyncratic Shocks and Random Meetings", 2006
 - Three papers in a leading Russian journal "Automation and Remote Control"
- GRANTS & FELLOWSHIPS:
- Bates White Graduate Fellowship, 2004-2005
 - Full Scholarship, New Economic School, 2000-2002
 - Full Scholarship, Moscow State University, 1990-1995

TEACHING
EXPERIENCE:

- Instructor: International Economics, PSU 2003
- Instructor: Probability Theory and Statistics, Volgograd State University, 1999-2000
- Instructor: Econometrics, Volgograd State University, 2000
- Instructor: Linear Algebra, Volgograd State University, 1999-2000
- Teaching Assistant: Advanced Micro (graduate), PSU 2003
- Teaching Assistant: Intermediate Macro, PSU 2002-2003
- Instructor: Intermediate Micro, PSU 2005
- Teaching Assistant: Intermediate Micro, PSU 2006

RESEARCH
EXPERIENCE:

- Research Assistant, "Auctions with Financial Constraints", 2001-2002
- Assistant, International Association (INTAS) project "Signs for "better future", 2000-2002
- Internship, Bates White, Washington, DC. Summer 2004
- Research Assistant for Kalyan Chatterjee, Summer 2005, 2006

PRESENTATIONS
& OTHER
PROFESSIONAL
ACTIVITIES:

- The Cornell-PSU Macro Workshop. Spring 2006.
- The International Conference on Game Theory at Stony Brook, Summer 2006.
- Midwest Economic Theory Meeting. Purdue University, Fall 2006.

REFERENCES:

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THESIS ABSTRACT

Essay 1. (Job Market Paper) *"Information Trading in Social Networks"*

This paper considers information trading in fixed special networks of infinitely lived economic agents who can only observe and trade only with their neighbors. The game proceeds as follows: Agents initially obtain i.i.d. realizations of a $\{0,1\}$ random variable. If an agent gets a realization of 1 (this happens with probability p), he is "informed", otherwise "uninformed". Informed agents observe whether their neighbors are informed or not and can offer to sell the information to them if they are uninformed. Anyone who obtains the information can freely resell it to her own neighbors. The agents benefit from both knowing the information and selling it to the neighbors. We allow agents to make only one price offer though this price can be accepted at any time. We study the nature of price competition for information in this environment.

The linear network example, when the agents are located at the integer points of the real line, is completely characterized in the paper. The sellers in the symmetric stationary equilibria of this network play one of three strategies. The first possibility is when the price is a mix of some value (with non-zero probability) and some continuous distribution; this happens only for low p . The second possibility is that the sellers choose only one price. The third possibility is when the price has continuous distribution; this happens only for high p . All the mass points of the price are above any individual's utility from the information, and the continuous part of the distribution is always below this value. In the first and second type of equilibria, any agent has a non-zero probability to stay uninformed forever, because he can get two simultaneous offers exceeding his valuation of the information. Although it might look as if this equilibrium is special, for small p it is a limit of equilibria of finite-horizon games.

The role of a transversality condition is emphasized in the paper, namely that the price in the transaction should not exceed the expected utility of all the agents (including non-neighbors) who will get the information due to the transaction.

Essay 2. "A Theory of Continuum Economies with Idiosyncratic Shocks and Random Meetings" (preliminary draft)

Many economic models use a continuum of agents to avoid considering one agent's effect on others. Along with continuum of agents, these models also incorporate independent shocks and random meetings over time. (Green, Zhou. "Dynamic Monetary Equilibrium in a Random Matching Economy". *Econometrica* 70 (2002).) Questions have been raised about the mathematical consistence of the assumptions used. In this paper we demonstrate that it is possible to construct a framework in which the desirable properties, including no aggregate uncertainty and mixing, hold. The main new idea is that the agents live in the probability space, and the probability distribution for each agent is replaced by the population distribution over the states. Although each agent knows his history of shocks and meetings, he does not know his "location" in this space.

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Curriculum Vitae

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- Ph.D., Economics, Penn State University, expected June 2007
 - B.A., Economics, Bogazici University (Istanbul, Turkey), 2001
- Ph.D. THESIS:
- “Taxation and the Household ”
Thesis Advisors: Professor Nezhil Guner,
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- FIELDS:
- **Primary:** Macroeconomics
 - **Secondary:** Public Economics, Labor Economics, International Trade
- PAPERS:
- “Social Security and Two-Earner Households”, 2006
 - “Taxes and Female Labor Supply”, 2006
 - “Taxation, Aggregates and the Household”
(with Nezhil Guner and Gustavo Ventura), 2006
- TEACHING EXPERIENCE:
- Instructor:
 - Principles of Microeconomics
 - Intermediate Macroeconomic Analysis
 - International Economics
 - Teaching Assistant: Advanced Macroeconomic Theory, Introduction to Mathematical Economics (graduate), Intermediate Macro
- RESEARCH EXPERIENCE:
- Research Assistant for Nezhil Guner, (Summer 2005, Summer 2004)
 - Research Assistant for Nezhil Guner and Gustavo Ventura (Summer 2006), supported by PSU Population Research Institute Grant
- PRESENTATIONS:
- Midwest Macroeconomics Meetings, May 2006
 - Cornell/Penn State Macro Conference, April 2005
- REFERENCES:
- Professor Nezhil Guner (nguner@eco.uc3m.es)
 - Professor Gustavo Ventura (cjv10@psu.edu)
 - Professor Edward Green (eug2@psu.edu)

THESIS ABSTRACT

Essay 1: *Social Security and Two-Earner Households*

Job Market Paper

The existing social security system in the U.S. has a special provision for married households: a spouse can choose between own benefits and half of the spouse's benefits. Another feature of the system is the progressive calculation of benefits: benefits are determined by a concave function of past mean earnings. I develop an equilibrium life-cycle model to quantify the aggregate, cross-sectional, and welfare implications of three alternatives: elimination of the spousal benefit, elimination of the progressivity of benefits, and the two combined.

Agents start out as permanently married or single and with education levels and wage profiles, where the latter depend both on education and gender. The household is the decision maker and decides on the labor supply of its member(s) and saving. The aggregate production function has as inputs capital and labor aggregated by efficiency. The model is calibrated so that the steady state equilibrium of the model economy is consistent with observations on wage premia across schooling and gender groups, labor force participation, and the structure of marital sorting under a structure of taxation that closely resembles the structure currently prevailing in the U.S.

The model implies that eliminating the spousal benefit provision has substantial effects. The labor force participation of married women increases by 2.3% and households composed of men with relatively high education and women with relatively low education experience significant welfare losses. When only progressivity is eliminated, there is a decline in labor force participation of married females and households composed of men with relatively high education and women with relatively low education experience significant welfare gains. When both are eliminated, the labor force participation of married women increases and households composed of two members with high education gain most.

Essay 2: *Taxes and Female Labor Supply*

The Economic Recovery Act of 1981 and the Tax Reform Act of 1986 changed the U.S. income tax structure in a dramatic fashion. These acts dramatically reduced the marginal tax rates for married households. This paper quantifies the contribution of the changes in taxes to the rise in labor force participation of married females. Answering this question requires models of households with two working members and an explicit role for the participation margin. I build a partial equilibrium model with heterogeneous individuals and households with two potential earners, where households with two earners incur utility costs. Labor supply decisions of households involve labor force participation decisions for the females. I select parameter values so that the model economy is consistent with the 1980 U.S. economy. To find the contribution of taxes, I simulate an economy with taxes of 1980, and wages (skill premium and gender gap) and marital sorting of 1990. I show that about 28% of the rise in married female labor force participation (from 59% to 70%) between 1980 and 1990 can be accounted for by the changes in the income tax structure.

Essay 3: *Taxation, Aggregates and the Household* (with Nezih Guner and Gustavo Ventura)

We study tax reforms in a dynamic setup with heterogeneous married and single households and with an operative extensive margin in labor supply. We restrict parameter values so the model is consistent with observations on gender and skill premia across schooling groups, labor force participation, and the structure of marital sorting and marital transitions under a structure of taxation that resembles the structure currently prevailing in the United States. We then use this framework to evaluate hypothetical changes to the U.S. tax system. Our preliminary findings indicate that tax changes can lead to large effects across steady states on aggregate capital and labor, and that the labor supply behavior of different groups is key. An alteration that replaces current income tax schedules by a flat consumption tax results in an increase in aggregate output by about 14.9%. This output increase is accompanied by differential effects on labor supply: while total hours work increase by 8.1%, the labor force participation of secondary earners increases by 8.9% and married females increase total hours by 12.4%. Married females account for about 43.1% of the total increase in labor hours. When current income taxes are replaced by a progressive consumption tax, married females account for a much larger (73.8%) share of the total increase in labor hours.

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Curriculum Vitae

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 - “Multi-product Plants in the Taiwanese Electronics Sector, 2006”
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- Research Assistant for Susanna Esteban, Summer 2003
 - Research Assistant for Bee-Yan Aw, Summer 2004 and Fall 2004
- REFERENCES:
- Professor Bee-Yan Aw
 - Professor Susanna Esteban
 - Professor Mark J. Roberts
 - Professor Andrés Rodríguez-Clare

THESIS ABSTRACT

Essay 1: *Firm Heterogeneity and Location Choice for Taiwanese Multinationals*

This paper examines the extent to which the location decisions of Taiwanese multinationals reflect underlying patterns of firm productivity. In our theoretical model, heterogeneous firms in a middle-income country decide on the optimal production locations for serving three geographically separate markets: domestic, foreign high-income and foreign low-income. The model shows that the equilibrium decision of a firm depends on its fixed investment cost of establishing foreign subsidiaries, production costs, transportation costs, market size and its own productivity level.

The empirical work in this paper is based on firm-level data in the Taiwanese electronics industry in 2000. Firms are decomposed into four different categories: non-FDI, investors in China only, investors in the USA only, investors in both China and the USA. We use a multinomial logit model to link firms' location choices with their productivity controlling for country, industry and other firm characteristics. Our findings indicate that more productive firms engage in outward FDI, with the most productive ones investing in both China and the USA. Due to smaller fixed investment costs in China relative to the USA, Taiwanese multinationals investing only in the USA are more productive than those investing only in China.

Essay 2: *Multi-product Plants in the Taiwanese Electronics Sector*

This paper examines the diversification strategies of multi-product plants in the Taiwanese electronics sector during the 1990s. Using plant-level and product-level data, we first examine if multi-product plants benefit from scope economies arising from joint production. Next, we introduce a dissimilarity index to capture the technological gaps between each pair of products within a multi-product plant. This index is used to analyze how multi-product plants choose their product mix in the face of increased competition. We find no evidence of scope economies. Our findings suggest that multi-product plants whose products have bigger technological gaps are more likely to give up some product lines. Moreover, multi-product plants are shown to exit markets where production technologies are farthest away from their primary products.

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 - B.A., Economics, Keio University, Japan, 1998
- Ph.D. THESIS:
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- PAPERS:
- “Dynamic Sequential Coalition Formation for Provision of a Public Good” (Job Market Paper)
 - “Coalition Formation with Environmental Externality”
 - “Dynamic Sequential Coalition Formation for Provision of a Public Good with Incomplete Information” (in progress)
- GRANTS & FELLOWSHIPS:
- Graduate Scholarship, Keio University, Japan, 1999-2000
 - Scholarship for Graduate Studies, Nihon Ikuei Kai foundation, Japan, 2000-2003
- TEACHING EXPERIENCE:
- Instructor: Intermediate Microeconomic Analysis (7 semesters)
 - Teaching Assistant: Intermediate Microeconomic Analysis, Introductory Microeconomics
- RESEARCH EXPERIENCE:
- Research Assistant for Professor Kala Krishna, Summer 2003
 - Research Assistant for Professor Kalyan Chatterjee, Summer 2006
- AWARDS:
- Graduate Assistant Outstanding Teaching Award, Penn State University, 2006 (University-wide award)
- REFERENCES:
- Professor Kalyan Chatterjee
 - Professor James Jordan
 - Professor Vijay Krishna
 - Professor David Shapiro

THESIS ABSTRACT

Essay 1. *Dynamic Sequential Coalition Formation for Provision of Public Good*

We analyze a dynamic coalition formation for the provision of a public good, which will be provided only when certain numbers of contributions are made. In each period, one player is chosen as a proposer and he asks a set of players to contribute (form a coalition). Players in the proposed coalition make responses sequentially in the order exogenously given.

In finite horizon games, we specify the exact period in which the public good will be provided under subgame-perfect equilibria and we show that there will be a delay of provision for some costs. There will be a non-monotonicity such that the public good will be provided earlier for higher costs than for lower costs. In infinite horizon games, we show that the immediate provision of a public good can be achieved in some subgame-perfect equilibria, and there may be a delay under certain equilibria.

We also introduce the partial public good, which has smaller value but requires smaller contributions to be provided. We show that for some costs, introducing the partial public good eliminates the possibility of provision of any kind of public good in both finite and infinite horizon games. For other costs, introducing the partial public good may improve social welfare, the summation of players' payoffs.

Essay 2. *Coalition Formation with Environmental Externalities*

If there are environmental externalities among players, for example international pollution, it is crucial to have a self-enforcing agreement to avoid excessive pollution. In this paper we introduce a two-stage game with a coalition formation stage and a Cournot oligopoly stage to show how coalition formation takes place and affects the environmental level.

In different settings of memberships, the resulting coalitions are different in terms of coalition size, which affects the environmental level significantly. In open membership games with symmetric players, the coalition formation process fails so that the players act independently. In coalition unanimity games with symmetric players, the resulting coalition is the grand coalition, which maximizes the environmental level, and improves the social welfare compared to the case in which players act independently.

In games with asymmetric players, we analyze the coalition formation with and without endogenous transfer scheme. In a game with a transfer scheme, we show that it is possible to achieve a bigger coalition than in a game without transfers. We explicitly characterize the transfers and their effects on coalition size for a simple case.

Essay 3. *Dynamic Sequential Coalition Formation for Provision of Public Good with Incomplete Information*

In this paper, we analyze a dynamic coalition formation for provision of a public good, which will be provided only when certain numbers of contributions are made. In each period, one

player is chosen as a proposer and he asks a set of players to contribute (form a coalition).
Players in the proposed coalition make responses sequentially in the order exogenously given.

We assume that the benefit from the public good is the same for all players, but the costs differ across players and are private information. We use perfect Bayesian equilibrium as a solution concept to analyze players' behavior in equilibrium.

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- EMPLOYMENT
- Economist at Bank of Korea , 2000.1 – 2002.8
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- Ph.D. THESIS:
- “Essays on Nonparametric Identification, and Semi-nonparametric Estimation of First-Price Auctions”
Thesis Advisor: Prof. **Herman Bierens** and Prof. **Quang Vuong**
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- **Primary:** Econometric Theory, Empirical Auctions
 - **Secondary:** Applied Econometrics, Industrial Organization
- PAPERS:
- Nonparametric Identification of First-Price Auction Models with Unbounded Values and Observed Auction-Specific Heterogeneity (with Herman Bierens) **Job Market Paper 1**
 - Semi-nonparametric Estimation of Independently and Identically Repeated First-Price Auctions using Simulated Method of Moments (with Herman Bierens) **Job Market Paper 2**
 - Semi-nonparametric Estimation of First-Price Auctions with Auction-Specific Heterogeneity using Simulated Method of Moments (with Herman Bierens)
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- Research Assistantship, Pennsylvania State University, 2005-06
 - Graduate Teaching Assistantship, Pennsylvania State University, 2003-2006
 - Award in Annual Paper Competition, Bank of Korea, May 2002
 - Scholarship, Seoul National University (1992 ,1993,1995, 1998, 1999)

TEACHING
EXPERIENCE:

- Teaching Assistant
- 1. Graduate: Time series econometrics (2 semesters for Prof. Herman Bierens, Prof. Joris Pinkse)
- 2. Undergraduate: Introduction to Econometrics (3 semesters for Prof. Joris Pinkse, Prof. Edward Coulson, Prof. Mark Roberts), Statistical Foundations for Econometrics, Industrial Organization, Intermediate Microeconomic Analysis, Introductory Microeconomic Analysis and Policy

RESEARCH
EXPERIENCE:

- Research Assistant for Prof. Herman Bierens, Pennsylvania State University, Spring 2005, Summer 2005, Summer 2006
- Economist at Research Department of Bank of Korea, January 2000 - August 2002

PRESENTATION &
OTHER
PROFESSIONAL
ACTIVITIES:

- Internal Econometrics Workshop, Department of Economics, Pennsylvania State University, March 2006
- Midwest Econometrics Group, University of Cincinnati, October 2006

REFERENCES:

- Professor Herman J. Bierens
- Professor Quang H. Vuong
- Professor Joris Pinkse

THESIS ABSTRACT

1. Nonparametric Identification of First-Price Auction Models with Unbounded Values and Observed Auction-Specific Heterogeneity (with Herman Bierens, 2006a), Job Market Paper 1

In most cases in the nonparametric auction literature, the support of bidders' values is assumed to be bounded. We show via an alternative nonparametric identification proof that the boundedness assumption is superfluous, provided that the value distribution has a finite expectation. In first instance we show this for the case of independent and identical first-price auctions, and then we extend the proof to the case of first-price auctions with observed auction-specific heterogeneity. Also, we consider the case where the log of the values is modeled as a median regression model, and the case where the bidders know ex-ante the actual number of bidders rather than the number of potential bidders.

2. Semi-nonparametric Estimation of Independently and Identically Repeated First-Price Auctions using Simulated Method of Moments (with Herman Bierens, 2006b), Job Market Paper 2

In this paper we propose to estimate the value distribution of independently repeated identical first-price auctions via a Semi-Nonparametric Sieve Simulated Method of Moments (SNP-SSMM) approach. First, we construct an increasing sequence of compact metric spaces of distribution functions (the sieve), based on the approach in Bierens (2006). Given a distribution function in the sieve, we simulate bids according to the equilibrium bid function involved.

Motivated by the well-known fact that distributions are equal if and only if their characteristic functions are identical, we take the difference of the empirical characteristic functions of the actual and simulated bids as the moment function. The objective function is then the integral of the squared moment function over an interval. Minimizing this objective function to the distribution functions in the sieve then yields a uniformly consistent SNP estimator of the actual value distribution. Moreover, we propose a consistent integrated conditional moment test for the validity of the first-price auction model. Finally, we conduct a few Monte-Carlo experiments to check the performance of our SNP-SSMM approach.

3. Semi-nonparametric Estimation of First-Price Auctions with Auction-Specific Heterogeneity using Simulated Method of Moments (with Herman Bierens, 2006c)

In this paper we propose a semi-nonparametric sieve simulated method of moments estimation for first-price auctions with observed auction-specific heterogeneity. We consider auction models where the log value takes the form of a median regression model conditional on covariates with unknown error distribution. The latter distribution will be modeled semi-nonparametrically. Given a functional specification of the log-value median, the error distribution and the median parameters can be estimated by simulated method of moments. Similar to Bierens and Song (2006b), the underlying value distribution can be estimated by finding SNP distribution which minimizes the integrated conditional moment function which is a measure of the distance between the empirical characteristic function of bids and the empirical characteristic function of simulated bids conditional on auction-specific heterogeneity.

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Curriculum Vitae

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- “A Structural Empirical Model of R&D Investment, Firm Heterogeneity and Industry Dynamics”, October, 2006.
 - “Entry and Exit in Geographic Markets”, with Timothy Dunne, Shawn Klimek, and Mark Roberts, July, 2006.
 - “Macroeconomic Implications of Size-dependent Policies”, with Nezhir Guner and Gustavo Ventura, October, 2006, submitted.
 - “How Costly are Restrictions on Size”, with Nezhir Guner and Gustavo Ventura, *Japan and the World Economy*, 2006, 18, 302-320.
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PRESENTATIONS
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- Entry and Exit in Geographic Markets.
 - U.S. Census Bureau (Center for Economic Studies), March, 2006.
 - International Industrial Organization Conference, April, 2006.
 - Productivity Workshop, IIS/CEPR, April, 2006.
 - Bates White Annual Antitrust Conference, Washington, D.C., June, 2006.
 - NBER Summer Institute IO Group Meeting, July, 2006.
- Macroeconomic Implications of Size-dependent Policies
 - Midwest Macroeconomic Meetings, May, 2005.
- Referee: International Journal of Industrial Organization

HONORS AND
AWARDS

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- Liberal Arts College Dissertation Support Grant, Fall 2006

REFERENCES:

- Professor Neizh Guner (Committee Co-chair)
- Professor Mark Roberts (Committee Co-chair)
- Professor James Tybout
- Professor Gustavo Ventura

THESIS ABSTRACT

Essay 1: *A Structural Empirical Model of R&D Investment, Firm Heterogeneity, and Industry Dynamics (Job Market Paper)*

This paper develops and estimates a structural model of R&D investment and productivity evolution of manufacturing plants in the Korean electric motor industry from 1991 to 1996. Plant-level decisions for R&D investment, physical capital investment, entry, and exit are developed using a dynamic industry evolution model. Estimates of the structural parameters are used to quantify how a plant's productivity is affected by its own R&D and by spillovers from the R&D of its competitors. In contrast to previous R&D studies, which usually investigate a collection of producers from various industries, this paper characterizes how the full set of dynamic decisions by each plant in a single industry interact with its own and its competitor's productivity change. This allows the model to provide a detailed set of pathways connecting the

plant-level R&D investment, productivity, physical investment, and turnover patterns observed in the data.

The empirical model is estimated in two steps. In the first step, a model of static market competition is used to estimate the demand elasticity, returns to scale in production, and the process of plant level productivity. The initial productivity distribution for new entrants is also recovered. In the second step, a Simulated Method of Moments estimator is used to estimate the cost of R&D, the magnitude of the R&D spill-over, adjustment costs of physical investment, and the distribution of plant scrap values. To circumvent the computational burden of solving the industry equilibrium with a large number of plants in the second stage estimation, I apply the recent approximation method of Weintraub, Benkard and Van Roy (2005).

The structural parameter estimates show that a plant's own R&D expenditure has a positive effect on its future productivity. There is also a spillover effect with one dollar of competitor's R&D expenditure substituting for 0.6 cents of own R&D input. Since the total R&D spillover pool is much larger than any producer's own spending and the R&D spill-over is a public good affecting the knowledge capital improvement of every producer, the spillover effect is important. A narrow difference between the entry cost and the mean scrap value explains the high turnover rate in this industry. Finally, the industry equilibrium model provides a natural link from individual plant R&D decisions to aggregate industry productivity and output. Two counterfactual experiments of two pro-competitive policies implemented. Increasing the elasticity of substitution between products increases plant innovation incentives but slows plant turnover. In the long run, a 5% drop in the price-cost margin improves industry productivity by 1.9%. In contrast, a lower entry cost, which increases total entry by 50%, does not change industry productivity. Although the market selection effect is strengthened by higher firm turnover, the plant's incentives to invest in R&D are reduced.

Essay 2: *Entry and Exit in Geographic Markets* (with Timothy Dunne, Shawn Klimek, and Mark Roberts)

In this paper we estimate a structural model of firm entry and exit developed by Pakes, Ostrovsky, and Berry (2004) that can identify three separate components of the competitive process: the effect of an increase in the number of firms on the average profits of firms in a market, and the magnitudes of entry costs and firm scrap values that are key determinants of the degree of firm turnover.

The empirical model is used to analyze the entry and exit patterns of establishments in two medical-related service industries, dentists and chiropractors. Using micro data collected as part of the Census of Service Industries, we measure the number of establishments, the flows of entering and exiting establishments, the average revenue and average profits for 754 small geographic markets in the U.S. at five-year intervals over the 1977-2002 periods. We use a three-step estimation procedure. In the first stage, the profit function parameters are estimated. In the second stage, we estimate the continuation and entry values directly by computing the average of the discounted values of future cash flows that establishments actually earned in the data up to the parameter of the scrap value distribution. Finally, the scrap value and entry cost distributions are estimated by maximizing the probability of observing the flows of entering and exiting establishments in the data.

The estimates of the structural model parameters indicate that the direct effect of an increase in the number of establishments on average profits is negative and statistically significant in the dentist industry and not significant in the chiropractor industry. The entry cost and scrap value parameters are statistically significant for both industries with both being substantially larger for the dentists. Overall, the model provides evidence that, as a result of lower entry costs, competition from potential entrants is more substantial in the chiropractor industry than for dental practices. In contrast, higher entry costs weaken the effect of potential entry on profits in the dental industry and, alternatively, declines in average profits are driven by an increase in the actual number of competitors.

Essay 3: *Macroeconomic Implications of Size-dependent Policies* (with Nezih Guner and Gustavo Ventura)

Government policies that impose restrictions on the size of large establishments or firms, or promote small ones, are widespread across countries. In this paper, we develop a framework to systematically study policies of this type. We analyze a simple growth model with an endogenous size distribution of production units. We parameterize this model to account for the size distribution of establishments and for the (observed) large share of employment in large establishments. We then measure the cost of policies that distort the size of production units including their impact on productivity measures, the equilibrium number of establishments and their size distribution. We find that these effects are potentially large: policies that reduce the average size of establishments by 20% lead to reductions in output and output per establishment up to 8.1% and 25.6% respectively, as well as large increases in the number of establishments (23.5%).