

# RESEARCH STATEMENT

Selçuk Özyurt

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My research agenda focuses on negotiation, conflict/dispute resolution, education, and development. Main tools that I utilize in my analyses are non-cooperative game theory (in particular, sequential games) with asymmetric information and mechanism design. I divide my projects into five categories regarding the main questions they tackle. Starting with the most recent ones, I briefly summarize my projects in each category below. The *first group* focus on fundamentals of game theory. The *second group* projects are themed around dispute and conflict resolution. The *third group* includes my works on education and development economics. The *fourth group* projects are themed around bargaining, reputation, and their impacts on market outcomes. The *fifth group* falls into category of social choice and implementation theories.

## Group 1

In this group of projects, I focus on the fundamentals of game theory. The following summary provides a brief objective and achievements of my ongoing projects in this group.

### **Wishful Players and Rationally Motivated Beliefs** (work in progress)

The main objective of this project is to formalize a descriptively intuitive and normatively appealing new solution concept for finite-horizon extensive-form games and apply this state-of-the-art solution concept in various applications of game theory. The project aims to achieve this objective by redefining the rational man paradigm, which does not diverge from the conventional paradigm, and the concept of strategy used in game theory. Three core premises that generate this new paradigm are as follow: (1) Players are wishful thinkers, (2) but not naive and seek to rationalize their beliefs, and (3) have the power to determine the path of the play.

In standard economic theory individuals choose their actions/strategies but not their beliefs. It makes perfect sense to take beliefs as given (or beyond control) in many environments where uncertainty is originating externally. However, uncertainty about one's opponents' moves in a strategic interaction is not 100% external: how my opponent will play depends on what she thinks I will play. Therefore, this project attacks the conventional approach in game theory that restricts rational actors' choice sets by enlarging this set.

In a strategic interaction, a rational individual is assumed to be aware that she is not 100% free to choose her beliefs like she is with her actions. Beliefs should, nevertheless,

reflect the uncertainty about the opponents' actions. Therefore, beliefs that players are allowed to choose must be disciplined/rationalized internally.

The third premise implies that an extensive-form game does not need to be strategically equivalent to its normal-form representation. It is a standard assumption in game theory that these two game forms are equivalent. However, this equivalence has been refuted by numerous experimental studies showing that outcomes of some sequential games favour the first movers even though the informational content in both sequential and normal-form versions of these games are identical. The new solution concept incorporates the order of moves into the analysis as a coordination device, which results effectively unique outcome in all games. For this purpose, I define a new concept, *agenda*, and construct the solution concept over agendas, rather than strategies. For this reason, the new solution concept does not aim to be an equilibrium refinement or a behaviorally motivated (dis)equilibrium concept. Nevertheless, I show that the solution of a game always corresponds to a sequential equilibrium of the game.

The formalization of the first two premises, that players are wishful thinkers and rationally motivate their beliefs, are inspired by the concept of wishful thinking of Yildiz (2007) and rationalizability of Bernheim (1984) and Pearce (1984). The new solution concept has a recursive and iterative structure. The formalization has been completed for finite horizon extensive form games with perfect and asymmetric information.

## Group 2

The second group of projects are themed around dispute and conflict resolution. In this category there are two separate projects.

### **1) Strategy-proof and Efficient Mediation: An Ordinal Market Design Approach** with Onur Kesten (working paper)

Mediation is an alternative dispute resolution method, which has gained increasing popularity over the last few decades and become a multi-billion-dollar industry. When two or more parties are in a disagreement, they can take the case to a court and let the judge make a binding final decision. Alternatively, the disputing parties can get assistance from an experienced, neutral third party, i.e., a mediator, who facilitates the negotiation and help them voluntarily reach an agreement short of litigation. The emphasis in mediation is not upon who is right or wrong, but rather on exploring mutually satisfactory solutions. Employment disputes, patent/copyright violations, construction disputes, and family disputes are some of the most common mediated disputes. The rising popularity of mediation is often attributed to the increasing workload of courts, its cost effectiveness and speed relative to litigation, and disputants' desire to have control over the final decision. Many traditional "cardinal" settings of bargaining and mechanism design, starting with the seminal work of Myerson and Satterhwaite (1983), have

shown the incompatibility between efficiency and incentives, even in Bayesian sense. This paper uses an “ordinal” market/mechanism design approach, where the mediator seeks a resolution over (at least) two issues in which negotiators have diametrically opposed rankings over the alternatives. Each negotiator has private information about her own ranking of the outside option, e.g., the point beyond which the negotiator would rather take the case to the court. We construct a simple theoretical framework that is rich and practical enough allowing for optimal mechanisms that the mediators can use for efficient resolution of disputes. We propose and characterize the class of strategy-proof, efficient, and individually rational mediation mechanisms. A central member of this class, the “constrained shortlisting” mechanism stands out as the unique strategy-proof, efficient, and individually rational mechanism that minimizes rank variance. We also provide analogous mechanisms when the issues consist of a continuum of alternatives.

## **2) Measuring the Impacts of Interpersonal Conflict Management and Dispute Resolution Skills Training on Academic Success: A Field Experiment** with Fulya Turk (work in progress)

This project implements a randomized controlled trial (RCT) experiment on 6th grade students in Gaziantep province of Turkey. Gaziantep hosts approximately half a million Syrian refugees, which constitute 25% of the student body in Gaziantep public school system. The purpose of the project is to explore the impacts of Interpersonal Conflict Management and Dispute Resolution (ICMDR) skills training on academic success. A dispute is a short-term disagreement, involving issues that are “negotiable”. Conflict is a long-term disagreement with deeply rooted issues that are perceived as “non-negotiable”. ICMDR skills would particularly be important for students’ academic success for two reasons: Opportunity costs and developmental impacts of disputes and conflicts. Inability to resolve disputes successfully would lead to inefficient use of valued resources, such as computers and lab equipment. Also, time and energy spent on escalation and rivalry would lead to inefficient use of nonmaterial resources, such as class time and attention. From the developmental perspective, managing conflicts is at the core of the quality of children’s interpersonal relationships, which are major determinants of their current and future psychosocial adjustment, as well as their social, cognitive, and moral development.

Heckman et al (2006) shows that non-cognitive skills are as important as—or even more important than—cognitive skills or IQ in determining academic success and better economic outcomes later in life. There is growing attention from policymakers on how non-cognitive skills can be developed in children and young people. However, which non-cognitive skills should be targeted, how best to measure them, and how to prepare teachers to nurture them, remain open questions. ICMDR skills are inter-linked, non-cognitive skills and their impacts on children’s academic success has not been established. This study will help us learn how these factors are correlated and guide us to inform policy

makers for better design of curriculum in schools.

The project has already achieved to attract some internal grants from York University, and ethics applications are submitted. The RCT experiment is postponed to be implemented in 2020-2021 academic year due to Covid-19 school closures.

### Group 3

**Upping the Ante: Equilibrium Effects of Unconditional School Grants** with Tahir Andrabi, Jishnu Das, Asim Khwaja and Niharika Singh (AER forthcoming)

This study experimentally allocates unconditional cash grants, Rs.50,000 or \$500 per school, among 855 private schools in 266 villages in the province of Punjab, Pakistan. We experimentally assign villages to a control group and one of two treatment arms. In the first treatment arm, which we call the “low-intensity design,” we randomly offer a single private school within the village (from an average of 3.3 such schools) the grant. In the second treatment arm, the “high-intensity design,” all schools in the village are offered a grant. The motivation for this experimental design is two-fold. First, we wish to assess the extent to which credit constraints limit private school quality and expansion. The second is to assess whether the nature of financing-in our case, the extent of market saturation with an unconditional grant-affects the equilibrium outcome.

The provision of the grant led to greater fixed expenditures in both treatment arms and there is no evidence that treated schools in either arms used the grant to substitute away from more expensive forms of capital, primarily in the form of informal loans to the school owner’s household. This demonstrates the presence of credit constraints. School responses differed across the two arms. In low-intensity villages, on average, treated schools enrolled an additional 19 children, but there is no average increase in test-scores or fees. In the high-intensity treatment, enrollments also increased but by 9 children per school. Interestingly, test scores improved by 0.22 standard-deviations for children in these villages. Along with the test score increases, tuition fees increased by Rs.19 for all children in the school. Revenue increases among schools in high-intensity villages therefore reflect both an increase in enrollment and in fees. For all outcome variables, we find no evidence of a response in any schooling outcome for untreated private schools in the low-intensity arm.

Our theoretical framework highlights why schools in low-intensity villages expanded capacity while those in high-intensity villages expanded capacity and improved test scores. We extend the canonical model of Bertrand competition with capacity constraints due to Kreps and Scheinkman (1983) to allow for vertically differentiated firms. We are able to prove that expanding financial access to both firms in the same market is more likely to lead to quality improvements. In this context, “more likely” implies that the parameter

space under which quality improvements occur as an equilibrium response is larger in the high than the low-intensity arm.

The key intuition is as follows: When schools face capacity constraints, they make positive profits even when they provide the same quality. This is the familiar result that Bertrand competition with capacity constraints recovers the Cournot equilibrium (Kreps and Scheinkman, 1983). If only one school receives an additional grant, it behaves like a monopolist on the residual demand from the capacity constrained school. In essence, the capacity constrained school cannot react by increasing investments since these reactions require credit to which it does not have access. The treated school now faces a trade-off between increasing revenue by bringing in additional children or increasing quality. While the former brings in additional revenue only on the extensive margin, via children who were not in the school previously, the latter also increases revenues on the intensive margin as the schools can charge higher fees from all children including those who are already enrolled. To the extent that the school can increase market share without poaching from other private schools, it will choose to do so as enrollment can be increased without triggering a price war leading to a loss in profits.

If both schools receive the grant money, neither school can behave like the residual monopolist, and if both schools attempt to increase capacity equally, the resulting price war will push them back into a low-payoff equilibrium. The only way around this conundrum is to relax market competition through product differentiation via investments in school quality, allowing schools to retain some degree of market power in equilibrium.

## Group 4

In this group of projects, I focus on bargaining, reputation, and their impacts on market outcomes.

### **1) Audience Costs and Reputation in Crisis Bargaining (GEB 2014) and Building Reputation in a War of Attrition Game: Hawkish or Dovish Stance? (BEJTE 2016)**

A growing literature on crisis bargaining argues that the presence of domestic audiences is the major source of diplomatic success. The idea that some leaders have an easier time generating audience costs is advanced in the seminal paper of James Fearon (1994) as a plausible working hypothesis. In a world with audience costs, the risk of losing public support or even office, signaling incompetence, or losing international/national credibility could discourage leaders from making empty threats and promises. That is, audience costs may occur if the leader makes public threats or commitments but fails to carry through on them. They help because leaders that are more sensitive to audience costs are less likely to bluff, and thus, the threats they make are more likely to be genuine. As a result, the targets of their challenges should be less likely to resist.

It is conventional wisdom that the ability of generating higher audience costs is an advantage for a leader, and thus, making a firm public stand strengthens a country's position and gives it the upper hand in a crisis. This idea actually emerges from Fearon's original model of crisis bargaining. However, despite the sincere efforts that have been made to support the conjectures derived from the audience costs theory, empirical studies could not help but increase the skeptic views about the validity of this theoretically plausible mechanism. The works of Trachtenberg (2012) and Snyder and Borghard (2011), for example, discuss that leaders make use of this mechanism infrequently. For example, in 1990, prior to the Gulf War, President Bush made explicit foreign policy statements regarding Iraq's invasion of Kuwait and threatened Saddam Hussein. By comparison, U.S. policy toward Bosnia was less direct. Both presidents Bush and Clinton adopted vague, ambiguous policies toward the Bosnian crisis, and U.S. intervention was limited.

In light of analogous historical examples, it could be the case—as opposed to the common belief—that audience costs do not help leaders in all crises. This paper formally proves this point. In particular, I show that if the value of the prize in dispute is low or if war is not expected to go well, then having greater sensitivity to audience costs could be bad.

The second paper, which was initially a part of the first paper, separated and submitted as a note by the suggestions of the referees. It extends the workhorse war of attrition model of the first paper by adding an initial stage where the players can endogenously choose their escalation cost parameters. This extension allows the possibility of studying not only the optimal type (hawkish vs. dovish) but also the optimal intensity of regime choice in a dispute.

## **2) Searching for a Bargain: Power of Strategic Commitment** (AEJ-Micro, 2015)

A growing literature on bargaining and reputation focuses particularly on a specific commitment type, who stands firm and does not back down from the initial offer and analyzes its impacts on bilateral negotiations. This paper, on the other hand, highlights a new avenue through which reputations can tilt bargaining power when bargaining takes place in a multilateral setting. It constructs a simple market setup where the long side (the sellers) has virtually no market power. There are three defining features of the model: First, a single buyer negotiates with two sellers over the sale of one item. Second, the sellers make initial posted price offers in the Bertrand fashion. The buyer can accept one of these costlessly or try to bargain for a lower price. Third, each player believes that its opponents might have some kind of commitment forcing them to insist on their initial offers. That is, the players can be obstinate with small probabilities, which affects the rational players' negotiating tactics and provides incentives to build a reputation on their resolve. A commitment player always demands a particular share and accepts an

offer if and only if it weakly exceeds that share. Therefore, reputation of a player is the posterior probability (attached to this player) of being the obstinate type. The analysis of the model shows that even in the limit where the frictions vanish, a range of prices including the monopoly price and 0 are compatible with equilibrium. This conclusion is true because being deemed as a commitment type is bad for the competing players. This finding contrasts the standard conclusions of the bargaining and reputation literature, where the player who is believed to be a commitment type is immediately conceded by his rational opponent.

Undercutting in this framework involves mimicking a less-greedy commitment type than one's opponent. The seller's incentive to undercut his rival is eliminated not because undercutting reveals rationality or reduces the seller's reputation. In fact, if a seller undercuts, then the buyer fully believes that this seller is a commitment type. Undercutting is unattractive precisely because the buyer believes that the undercutting seller is obstinate and that a better deal is possible by bargaining with the undercutting seller's rival. In particular, the buyer bargains with the seller's rival, uses the more advantageous term offered by the undercutting seller as a threat point against the rival, and arrives at an agreement with a rational rival at the buyer's most preferred terms. Thus, the seller who undercuts does not steal the buyer from his rival and hence does not gain from undercutting.

The formalization I propose in this article has three major benefits: First, the model facilitates the investigation of the roles of strategic commitment and reputation that are elements missing in existing formal models of search and multilateral bargaining. Second, the model's predictions and the equilibrium dynamics are robust in many aspects. Third, given the sellers' initial offers, the equilibrium strategies in the multilateral bargaining game are essentially unique. This finding differs from the standard conclusion in non-cooperative bargaining games that informational asymmetries give rise to multiplicities. This makes the model a fruitful ground to answer further questions regarding the impacts of reputation on market outcomes and market microstructure.

### **3) Bargaining, Reputation, and Competition** (JEBO 2015)

This paper complements the analysis started in Özyurt (2015). The key difference of this paper with Özyurt (2015) is that the probability of obstinacy is independent of the chosen prices. There are two different approaches to commitments in the bargaining literature. One way is to model commitments through behavioral types: types that are born with their non-negotiable demands. Given this interpretation, if a negotiator is rational and demands a fixed surplus, then this is his strategic choice. If he is an obstinate type, then he merely declares the demand corresponding to his type. Therefore, conditional on a particular demand announcement, a posterior probability that an agent is obstinate is calculated by the rational agent's strategy and the probability distribution

of the obstinate types. However, in the second category, in which the current paper falls, commitments are strategic actions that rational negotiators take by their own will. This approach is widely accepted in international relations literature. The essential idea seems to involve making a demand and “burning one’s bridges,” or taking actions during the negotiation process that increase the future cost of backing down from one’s demand.

The main result shows that playing the tough bargainer will not help the rational players of the long side of the market as opposed to Özyurt (2015). That is, the unique equilibrium outcome is the Walrasian outcome, where the short side of the market gets the entire rent and leaves no surplus to the long side.

#### **4) Deception, Exploitation and Lifespan of Buyer-Seller Relationship in Experience Goods Markets** (working paper)

Many forms of consulting and advisory, medical, or repair services are prime examples of what is known as a credence or an experience good in the economics literature. Generally speaking, these goods have the characteristics that customers can observe the utility they derive from the good *ex post*, i.e., upon consumption, but cannot be sure about the extent of the good they actually need *ex ante*. Therefore, sellers act as experts who determine the customers’ needs by performing a diagnosis. They can then provide the right quality and charge for it or exploit the information asymmetry by deceiving the customer.

I consider the following scenario to illustrate the motivation of the paper. Sam has recently bought an old house, requiring multiple projects that can be spread over time. Sam has neither the experience nor time for construction, home repair and maintenance, and so, she is very much dependent on a handyman or a professional contractor. In addition, her limited budget makes her extremely anxious about potential rip-off. Sam always had terrific experience shopping online. She has a dilemma whether she should follow the conventional wisdom, find a “reputable” handyman and develop a long-run relationship with him or go with her gut and go online (e.g., Yelp) to find a handyman every time she needs one.

Sam’s concern is well-founded because deception and mistreatment of experts are confirmed by numerous empirical studies in experience and credence goods markets. The literature provides valuable insights regarding how market characteristics influence the level of misconduct in these markets. However, the literature is quiet about the potential impacts of lifespan of buyer-seller relationships. The conventional wisdom is that long-run relationships are less prone to deception. One legitimate reason for this belief is possibly our general insight from the repeated games literature: that is, repeated interactions support cooperation, and so hinder deception. However, it is fair to say that we empirically and theoretically lack full-fledged understanding for the Sam’s dilemma.

To provide some insights on how lifespan of buyer-seller relationship affects sellers’

deception in credence goods markets, I consider two simple reduced-form models and compare the customers' worst equilibrium payoffs in each. A customer's trade decision relies solely on seller's advice and "reputation," which is endogenously created either by (1) imperfect experiences of her fellow customers or (2) her own experience. More formally, I consider two long-lived (monopolist) experts, denoted by L and S. Seller L has long-run relationship with his customer, and so repeatedly trades with the same customer indefinitely. On the other hand, Seller S has short-run relationship with his customers, and so trades with the same customer only once and draws a new one from a pool of infinitely many customers at each stage. Then I compare the customers' worst average equilibrium payoffs against seller S and L, which also correspond to payoffs of equilibria with the highest amount of exploitation.

Results show that lifespan of a buyer-seller relationship does not necessarily make sellers more honest. In fact, contrary to the popular belief, Seller S whose customers are one-time shoppers can be much more honest. Clearly, the last argument is not always true. It is true when there is a (monitoring) technology where customers can transfer their experience to other customers very much in the spirit of the feedback technologies in online feedback/shopping websites, such as Yelp, TripAdvisor, Amazon, eBay, or Alibaba. Seller S can exploit his customers more as the quality of the monitoring technology worsens, yet he is less exploitative than Seller L in the sense that maximum occurrence of "exploitation" by Seller S in any equilibrium is less than that of Seller L. Therefore, on seller-optimal equilibria, where the sellers' payoffs are maximized, Seller S offers a greater surplus to his customers on average.

## **5) "Take It or Leave It" Offers: Obstinance and Endogenous Deadlines in Negotiations** (working paper)

A bargainer uses "take it or leave it" offers to signal that he is not willing to make further concessions (commitment threat) and that he will leave the bargaining table unless his demand is accepted (exit threat). This paper investigates the impact of these threats on rational negotiators' equilibrium shares and behavior in a bilateral negotiation. The threats are credible because the negotiators are assumed to have the opportunity of mimicking obstinate types—who, for some reason, are constrained to implement their threats—and building reputation on their obstinance. The existence of the endogenous deadline option for one of the players has two main effects: (1) it renders the deal unique and efficient, and (2) shifts the bargaining power towards the player who can influence the deadline.

## Group 5

This group summarizes my earlier papers on social choice and implementation theory.

**A General Impossibility Result on Strategy-Proof Social Choice Hyperfunctions** with M. Remzi Sanver (GEB 2009) and **An Impossibility for Strategy-Proof Resolute Social Choice Correspondences** with M. Remzi Sanver (SCW 2008)

The seminal impossibility result of Gibbard (1973) and Satterthwaite (1975) show that every non-manipulable social choice (or voting) rule which is defined over the unrestricted domain of preference profiles is dictatorial if its range contains at least three alternatives. Here manipulable choice rule implies that there exist situations where a sincere ballot does not defend a voter's preferences best. This result is fairly robust.

Özyurt and Sanver (2009) carry this analysis further in a framework where manipulability is analysed via hyperfunctions, i.e. functions that pick a non-empty set of alternatives at each admissible preference profile over sets of alternatives. This approach has the advantage of being part of a more general framework which, when compared to the classical one, allows to use finer information about individual preferences over sets. We identify a lexicographic domain of preferences over sets which exhibits a similar impossibility: Every unanimous and strategy-proof social choice hyperfunction defined over the lexicographic domain of preferences is either dictatorial or bi-dictatorial (where two voters possess the power to always determine the outcome). Furthermore, we show that the lexicographic domain extracts the essential structure that leads to the impossibility of the Gibbard-Satterthwaite type, and thus establish that the impossibility over lexicographic domain is inherited by all of its well-known super domains. Our second paper employs another interpretation of a non-singleton set; a list of mutually compatible alternatives which are altogether chosen, as it may be the case for a department of economics recruiting more than one assistant professor. We refer to such sets as “committees”. We restrict the possible outcomes through the committee size and consider social choice rules that assign a committee to every preference profile over committees. We refer to these social choice rules as resolute social choice correspondences. We show that in the framework of resolute social choice correspondences, very weak axioms to connect preferences over committees to preferences over the basic set of alternatives lead to “linked” domains (in the sense of Aswal, Chatterji and Sen 2003), thus ending up in Gibbard-Satterthwaite type of impossibilities.

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