

## Research Statement

I am an applied microeconomic theorist interested in understanding strategic interactions and the role of information in Industrial Organization, Antitrust, Regulation and Public Policy issues. For that, I develop theoretical models to analyze the main trade-offs and predict the result of the strategic interaction on applied problems. I am mainly interested in multiple-principal and dynamic mechanism design problems. My research can be categorized into three broad areas: *i*) multiple-principal mechanism design, *ii*) antitrust and regulation *iii*) dynamic mechanisms and contracts.

### Multiple-Principal Mechanism Design

My primary research studies how multiple principals strategically interact with agents. In contrast to the usual contract theory, which assumes only one principal, I am interested in understanding the multiple-principal case. This research has applications to a range of interesting topics: sellers competition for buyers, manufacturers contracting with retailers and states delegation of regulations to international organizations.

In my job market paper, titled *Competing Auctions with Informed Sellers*, with my colleague Zizhen Ma, we study how privately informed sellers compete to attract buyers. Our primary purpose is to understand how adverse selection interacts with the competition for buyers. Sellers may have complex ways to trade with buyers, which endogenously affects the number of buyers each seller attracts. In this paper, we consider a multiple-seller multiple-buyer model where each seller has private information about the quality of his object and the only strategic choice is to choose the reserve price of a second-price auction. Buyers have private information about their taste for the sellers' objects, observe the reserve prices and decide which auction to participate in. In this simple environment, adverse selection produces a discontinuity in sellers expected payoffs, and consequently, the existence of equilibrium is not guaranteed. For a class of primitives, we show that a perfect Bayesian equilibrium exists for any finite market. In any such PBE, higher quality is signaled through higher reserve price at the expense of trade opportunities. However, there might be bunching regions causing inefficiencies. In fact, in the large-market limit characterized by a directed search model, the interaction of adverse selection and search frictions entail distortion at the bottom: when either the buyer-seller ratio is sufficiently large or a regularity condition is met, there is no separating PBE in which the lowest-quality seller sets reserve price equal to his opportunity cost. Thus, inefficiencies cannot be avoided. This finding carries over to large finite markets and is consistent with observed behavior in auctions for used cars in the UK.

In a different project, titled *Common Agency with Informed Principals: Revelation Principle*, I follow a general approach to the multiple-principal one-agent problem. Specifically,

this paper studies games where a group of privately informed principals design mechanisms to a common agent. First, each principal simultaneously chooses a mechanism, and the agent after observing the mechanisms communicates with each of them. The agent has private information (exogenous) and, after observing principals' mechanisms, may have information (endogenous) about feasible allocations and private information from each principal. Thus, each principal may be interested in designing a mechanism to screen all this information, for which a potentially complicated message space to convey this information might be needed. In this paper, I provide sufficient conditions on the agent's payoff such that any equilibrium in this setup has an output-equivalent equilibrium using only mechanisms with simple message spaces (direct mechanisms). Depending on the conditions, I propose two different notions of direct mechanisms. In the first one, principals only need the agent's type space as a message space. These mechanisms are called direct mechanism in the mechanism design literature and are the usual restriction when the agent has no endogenous information. The second one considers a more general class of mechanisms: principals can use as a message space the product between agent's type space and other principals' type spaces. The last mechanisms are the natural generalization of the usual direct mechanisms to the present context in the sense that the message space encapsulates all the exogenous information of the model from the perspective of one principal. I discuss the applicability of the second kind of direct mechanisms studying a contracting and a delegating problem.

In another paper of this research, in *Efficient Learning through International Delegation*, with my colleague Emiel Awad, we study the benefits for states to delegate policy decisions to an international organization from an informational perspective. States may reveal their private interests through actions they choose. Thus, in the case of delegation, an international organization can efficiently use this information in benefits of all the states. However, why would states do not prefer to choose policies individually? To study the potential benefits from delegation from an informational perspective, we develop a formal model where multiple principals take costly actions that may transmit their private information in the presence and absence of an uninformed agent. States face a trade-off in delegating: Moderate international organizations allow states to waste fewer resources in costly actions, but the higher stakes of centralized policies lead to stronger signaling incentives especially if little weight is placed on policies made by other states. In contrast to the one-principal one-agent delegation literature, which requires the agent being privately informed for the principal to have benefits for delegation, we provide an informational rationale for delegation when the agent is exogenously uninformed but may have endogenous information about other principals.

For the future, I am planning to continue exploring more applications of the multiple-principal multiple-agent model to real economic situations. Besides applications, it is

on my interest to study a general case where principals have information externalities among themselves and use the agents to learn about each other. This model could have exciting applications for collusion between firms and antitrust cases. Also, I would like to understand the connection of these strategic models to the commonly used direct search models.

### **Antitrust and Regulation**

In another area of my research, I am interested in understanding how to design markets and have regulations for the good of society. The focus is to identify relevant real-world problems and from there, develop the necessary techniques to expand the frontier in the mechanism design literature and give a satisfactory answer to the problem.

In *The Ineffectiveness of the Optimal Merger Regulation*, I study the design of horizontal merger regulation in a Cournot competition setting, where firms are privately informed about production technology. More specifically, a consumer-surplus-maximizer regulator designs a mechanism which determines whether the merger is blocked or accepted, and sets structural remedies (divestitures). This problem does not have the usual quasi-linear structure commonly assumed in the mechanism design literature, so new techniques are needed. I first characterize incentive-compatible mechanisms and then find the optimal one. I also study the complete information case, and I present it as a benchmark. In this paper, I identify what the distortions that asymmetric information induces in regulatory decisions are. First, every rejected merge would improve consumer surplus. Second, every merge that decreases consumer surplus would be approved. Lastly, every merge rightly approved would be asked fewer divestitures than the optimal one (under-fixing effect). These results seem consistent with recent empirical evidence on the ineffectiveness of the merger regulation.

### **Dynamic Mechanisms and Contracts**

Besides the above work, I am also interested in understanding the role of commitment to dynamic contracting problems. The dynamic nature of long-term relations between a principal and an agent give incentives to change the term of the contract in the future when the environment change. This feature is relevant to understand relations between firm and workers, regulator and firms, and government and procurement firms (contractors).

In an ongoing project, *Dynamic Contracting and Entry of Agents with Limited Commitment*, I study long-term relations between a principal and an agent with limited commitment and entry of new agents. Each agent has private information (fully-persistent over time) related to his characteristics. I focus on the principal's optimal perfect Bayesian

equilibrium. The possibility of future entrants helps the principal to learn agent's private information. Thus, even though the principal cannot commit to a contract (and learn agent's private information immediately), he can use the threat of exclusion in the future to do it. If the difference in characteristics is low enough, as both parties are more patient, principal's payoffs converge to his first-best, which is the payoff the seller would have in the case the agent's characteristics are common knowledge. Inspired by the government and procurement firms example, I study the incentives for firms to innovate. I show that the government may prefer to pay more to the incumbent to give incentives to outsider firms to innovate. This contract makes credible that in case an innovation arises, the government would replace the incumbent by the new entrant.

From a technical point of view, multiple-principal and no-commitment-dynamic mechanism design problems share that the revelation principle commonly used in mechanism design literature does not hold. It is on my interest to explore problems that face this challenge to expand the possible real-world problems that we can analyze.