Research Statement

Nicolas Pastrian, Ph.D. Candidate in Economics, University of Pittsburgh

I am a microeconomic theorist studying problems of asymmetric information and bounded rationality. My research combines insights from computer science, mechanism design and behavioral economics to study problems in industrial organization and public economics. The main goal of my research is to understand the impact of complexity in the implementation of mechanisms in practice, identify their limitations, and explore avenues for improvement. My current research focuses on studying how the limitations that agents face when dealing with complexity impact the design problem of the principal.

In my job market paper, **"Product Line Design with Frictions",** I study how a monopolist firm will determine what type of products to offer in a market where consumers fail to recognize all the available alternatives the firm is offering, observing only some elements of the menu at random. I show that if consumers never observe more than a single product, then the optimal menu offered by the firm also contains a single product. That is, if frictions are extremely restrictive, then the firm prefers to remove all variety from the menu. If frictions are less severe and consumers can observe more than one product, I show that the optimal menu cannot have only two offers presented with the same proportion: the firm always has incentives to "bias" the sampling probabilities that the consumers face in favor of one of the two offers, making one of the offers more likely to be observed than the other. In turn, these distortions have consequences on the quality provided by the firm, either reinforcing or reducing the distortion in quality provided to low valuation consumers. The direction of this effect over the provision of quality to low valuation consumers will depend on how strong the incentives are to distort observability towards the low valuation versus the high valuation offers.

In my second project, **"Full Surplus Extraction and Consideration Sets"**, I revisit the classic problem in the mechanism design literature of surplus extraction in the presence of correlated information. I extend the traditional setting to a flexible behavioral environment with partial consideration, in which the agent has limitations on the deviations he considers feasible, i.e., his consideration sets. One key aspect of the model is that it recognizes the difference between the consideration sets- the set of potential deviations for a particular type- and the inverse considerations sets- the set of types that could deviate to a particular type-, showing that the latter is crucial in determining whether extracting all the surplus will be generally feasible or not. The condition required to guarantee full surplus extraction for any payoff vector in my setting involves separating the belief of each type with the beliefs of types in his inverse consideration set only. This relaxes the condition identified previously by Cremer and McLean (1985, 1988) by

considering only a subset of all the potential deviations. I also show that in my model of partial consideration, full surplus extraction could still be feasible beyond beliefs-determine-preferences environments: allowing different types to have the same beliefs, different valuations, and similar consideration sets does not rule out full extraction as it did in the standard setting. By recognizing the asymmetric contribution of the consideration sets and inverse consideration sets to the characterization of my main result, new intuitions could be drawn on how to design optimal mechanisms beyond the surplus extraction problem.

My broader research agenda aims to study other problems of mechanism design with complexity considerations and bounded rationality. In particular, I am interested in understating how complexity limitations and limited computational processing capacity determine the performance of different mechanisms in practice, and how our predictions of the performance of different mechanisms change if we include these limitations. I am also interested in exploring how some of those same behavioral characteristics could be exploited by the designer to either implement a larger family of allocations, or increase his revenue compared to the standard case. Along these lines, I am currently working on a model to study the impact that changes in the auction format could have on the outcomes of auction markets when bidders face frictions in the adjustment of their strategies to the newly implemented auction formats. This project integrates tools from mechanism design and information design.

I am also interested in examining the implications of model misspecifications in the success or failure of the implementation of different public policies. For example, a common problem in the implementation of policies targeted to vulnerable populations is that sometimes those who would benefit the most from these policies exclude themselves from participating due to the complexity embedded in the policy itself. Including these complexity considerations explicitly in the design process could be crucial to improve the impact of these type of policies. I think that formally studying these restricted mechanisms could help us identifying the main challenges faced in these environments and bringing new insights to search for better solutions.