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Undergraduate Studies:
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   Thesis Title: *"Essays on Uncertainty Aversion and Signaling"*
   Expected Completion Date: May 2021

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Decision Theory, Microeconomic Theory

Teaching Experience:
Spring 2017   Introduction to Macroeconomics, Teaching Assistant for Professor Luca Bossi
Fall 2016   Microeconomic Theory I (graduate), Teaching Assistant
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Spring 2016   Intermediate Macroeconomics, Teaching Assistant for Guillermo Ordonez
Fall 2015   Microeconomic Theory I (graduate), Teaching Assistant
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Research Experience:
2018-2020   Research Assistant for Professor Andrew Postlewaite and Professor George Mailath

Honors and Fellowships:
2018-2019   PIER RA Stipend Matching Grant, Penn Institute for Economic Research
2017-2018   Sidney Weintraub Memorial Fellowship in Economics, University of
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2014-2018   Scholarship, Kwanjeong Educational Foundation
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2013   Social Sciences Korea Research Scholarship, National Research Foundation of
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Research Paper:
"Uncertainty Aversion with Multiple Issues" (Job Market Paper)
We study a decision problem under uncertainty about multiple issues by explicitly imposing a product structure on the set of states in the Anscombe-Aumann framework. In this environment, a decision maker may exhibit a tendency to avoid uncertain acts that depend on many issues since it can be harder to form a belief about multiple issues jointly than about individual issues separately. We provide a novel behavioral property, *Multi-issue Uncertainty Aversion*, which captures this idea. The property blends two concepts of aversion to uncertainty. First, it requires that when there are pairwise indifferent acts that depend on distinct issues, a mixture of them must be less preferred to each individual act since the mixture demands multi-issue considerations. Second, the property imposes the Uncertainty Aversion axiom of Gilboa and Schmeidler (1989) among the alternatives that depend on a single issue. We characterize the set of utility functions consistent with Multi-issue Uncertainty Aversion within the broad class of invariant biseparable preferences. We show that exhibiting Multi-issue Uncertainty Aversion is equivalent to having a belief satisfying two conditions: *richness of the core* of the (joint) belief and *superadditivity* of the marginal beliefs. The richness condition provides a novel way of comparing a decision maker's degrees of uncertainty aversion about different sets of issues.

Research in Progress:
"Signaling with Multiple Senders"
We develop a signaling model to examine the idea that when there is more than one sender, a receiver may evaluate their signaling choices relatively. This idea is related to the question of whether students will choose their education levels competitively based on what others choose even if there is no

explicit competition between them. Our model extends Spence's (1973) job market signaling game so that there are two workers (senders) and each worker has a two-dimensional type. One component of their type is ability, and their education cost is decreasing in their ability as in Spence's game. Unlike the classic game, however, the exact mapping between ability and cost is each worker's private information, and it is the other component of their type. These mappings are positively correlated across workers, which means that their education costs are commonly affected by some factors is a society. The primary question of this paper is whether a firm (receiver) bases its wage offer to a worker on both workers' education choices in an equilibrium. Even though workers do not have incentives to send a signal about their ability-cost mapping, a worker's education choice may unwittingly convey to the firm some information about it. Since the mappings are correlated across workers, this can complicate the firm's inference problem of assessing each worker's ability from their education choices. In particular, one worker's education choice gives nontrivial information about the other worker's ability. The main results of this paper are two-fold. First, it is shown that a worker's wage necessarily depends on the other worker's education level in any non-babbling equilibrium. Second, we show the existence of an equilibrium in which a worker's wage is decreasing in the other's education level, which suggests competitive behavior in signaling.

"Understanding Pessimism with Choquet Expected Utility Models"
We provide novel axiomatizations of Choquet Expected Utility (CEU) functions with convex capacities and disjointly superadditive capacities, respectively. We first show that the two properties can be characterized in alternative ways by using the rank-dependent probabilities associated with a capacity. These new characterizations elucidate the tight connections between the properties and a decision maker's pessimism. Based on the alternative characterization of convexity, we provide a behavioral axiom called *Pessimism*. A decision maker satisfying this axiom behaves as if she assigns a higher likelihood to an event when the act being considered delivers relatively worse outcomes on the event. In the CEU model, this axiom is shown to be equivalent to the convexity of a capacity. Then, we present a parallel result regarding disjoint superadditivity which has been less explored in the literature. We find the equivalence between a weaker axiom, *Weak Pessimism*, and the disjoint superadditivity of a capacity. In addition, we discuss the relationship between two axioms, Pessimism and Uncertainty Aversion of Schmeidler (1989). It is shown that once transitivity and Comonotonic Independence are assumed, Uncertainty Aversion implies Pessimism.

"Decision Making under Unawareness"
We propose a utility function that reflects a decision maker's awareness of her unawareness and provide an axiomatic foundation of it. The utility function is a combination of two parts. The first part is a standard expected utility which is based on the decision maker's evaluation of the specified part of an act. The second part is a function of the set of outcomes that can be delivered by the act on specified events, and captures her speculation on what would happen on possibly unspecified events. Her final utility from the act is a convex combination of the two parts. The uniquely identified weight she assigns on the first part is interpreted as her confidence in her awareness. The axiomatization includes weakening of two axioms, Reversal of Order and Dominance that are proposed by Anscombe and Aumann (1963) in their axiomatization of Subjective Expected Utility (SEU). These axioms are weakened so that they hold only between the acts that share the same set of outcomes on specified events. If two acts do not share the set, the decision maker's speculation about the possibly unspecified part of each act may differ, which causes deviation from the standard SEU preferences.