Xiaoyu Cheng

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Citizenship: China

Fields

Microeconomic Theory, Decision Theory, Information Economics

Education

Ph.D., Managerial Economics and Strategy, Northwestern University (anticipated) 2022
  Dissertation: *Essays on Dynamic Decisions Under Uncertainty*
  Committee: Peter Klibanoff (Co-Chair), Marciano Siniscalchi (Co-Chair), Eran Shmaya, Isaias N. Chaves

M.Sc., Managerial Economics and Strategy, Northwestern University 2017

B.Sc., Mathematics and Physics, Tsinghua University 2016

B.A., Economics, Tsinghua University 2016

Exchange Program, University of British Columbia 2015

Fellowships & Awards

Dissertation University Fellowship, Kellogg School of Management, Northwestern University 2021–2022

Graduate Fellowship, Kellogg School of Management, Northwestern University 2016–2021

Scholarship, Tsinghua University 2013–2015

Teaching Experience

Teaching Assistant, Northwestern University 2017-2021
  Decision Theory (PhD), Dynamic Optimization in Economics (PhD), Business Strategy (MBA), Pricing Strategies (MBA), Economics of Competition (EMBA)

Research Experience

Research Assistant, Peter Klibanoff, Northwestern University 2017-2018

Research Assistant, Bryony Reich, Northwestern University 2017

Research Assistant, Jin Li, Northwestern University 2015

Conferences

Transatlantic Theory Workshop 2021

China Meeting of the Econometric Society 2021

North American Meeting of the Econometric Society 2021

Risk, Uncertainty and Decision Conference 2020

Econometric Society World Congress 2020

Game Theory Society World Congress 2016

Econometric Society World Congress 2015

Refereeing

International Journal of Game Theory

Job Market Paper

"Robust Data-Driven Decisions Under Model Uncertainty" [link]

Abstract: This paper studies how to use sample data to make robust inferences and decisions when the data-generating process (DGP) is only known to belong to a set of independent but possibly non-identical distributions. It proposes two achievable notions of how decisions based on inference from data can robustly improve upon those based on initial knowledge alone. Modeling the decision-maker's concern for robustness using the maxmin expected-utility criterion, this paper shows that data improves

her decisions in either of these notions if and only if the updated set of DGPs accommodates (contains) the truth, i.e., the DGP that governs the data. In this environment, common inference methods (e.g., maximum likelihood and Bayesian updating) are shown to often fail this property. This paper proposes novel and tractable updating rules that are shown to accommodate the truth either asymptotically almost surely or in finite sample with a pre-specified probability. Finally, it explores implications for applications such as asset pricing under ambiguity.

Publications

"Relative Maximum Likelihood Updating of Ambiguous Beliefs" [link]

Forthcoming at Journal of Mathematical Economics

Abstract: This paper proposes and axiomatizes a new updating rule: Relative Maximum Likelihood (RML) updating for ambiguous beliefs represented by a set of priors (C). This rule takes the form of applying Bayes' rule to a subset of C. This subset is a linear contraction of C towards its subset ascribing the maximal probability to the observed event. The degree of contraction captures the extent of willingness to discard priors based on likelihood when updating. Two well-known updating rules of multiple priors, full Bayesian (FB) and Maximum Likelihood (ML), are included as special cases of RML. An axiomatic characterization of conditional preferences generated by RML updating is provided when the preferences admit Maxmin Expected Utility representations. The axiomatization relies on weakening the axioms characterizing FB and ML. The axiom characterizing ML is identified for the first time in this paper, addressing a long-standing open question in the literature.

Other Papers

"Ambiguous Persuasion Under Dynamic Consistency" [link]

Submitted

Abstract: In a persuasion game, if both the sender and receiver are ambiguity averse, can the sender benefit from sending ambiguous messages? This paper shows that the sender cannot benefit from introducing ambiguity if the receiver is dynamically consistent. This result is obtained when both players' preferences are represented by the Maxmin Expected Utility (MEU) criterion. However, if the sender is strictly less ambiguity averse than the receiver (in the sense of α-MEU), then she may benefit even when facing a dynamically consistent receiver. This gain comes from extracting an *ambiguity premium* by exploiting the differences in the ambiguity attitudes.

Research Notes

"A Concavification Approach to Ambiguous Persuasion" [link]

Abstract: This note shows that the value of ambiguous persuasion characterized in Beauchene, Li and Li(2019) can be given by a concavification program as in Bayesian persuasion (Kamenica and Gentzkow, 2011). In addition, it implies that an ambiguous persuasion game can be equivalently formalized as a Bayesian persuasion game by distorting the utility functions. This result is obtained under a novel construction of ambiguous persuasion.

"Extended Relative Maximum Likelihood Updating of Choquet Beliefs" [link]

Abstract: Cheng (2021) proposes and characterizes the Relative Maximum Likelihood (RML) updating rule when the ambiguous beliefs are represented by a set of priors. Relatedly, this note proposes and characterizes the Extended RML updating rule when the ambiguous beliefs are represented by a convex capacity. Two classical updating rules for convex capacities, Dempster-Shafer (Shafer, 1976) and Fagin-Halpern rules (Fagin and Halpern, 1990) are included as special cases of Extended RML.

Work in Progress

"Deliberate Randomization and Preference for Correlation" with Lorenzo Stanca

Abstract: We revisit the literature on stochastic choice based on a novel observation from the existing experimental evidence: A decision-maker (DM) often chooses differently from the same set of alternatives when asked to choose multiple times. The existing literature offers an interpretation that the DM has a convex preference over lotteries, i.e., strictly prefers a non-degenerate probability distribution over the alternatives to any degenerate ones. Because the experiments are often conducted in a dynamic setting, we observe that the subjects' choices also exhibit a form of negative correlation: if an alternative was chosen in the past, it is less likely that it will be chosen today. In other words, it shows a form of intertemporal preference for variety. In order to capture such a preference, we translate the convex preference over lotteries to a convex preference in an intertemporal setting. Specifically, we

introduce a dynamic extension of the Cautious Expected Utility model and show that it can generate this pattern of choice. In addition, we aim to show that the converse is true, i.e., any stochastic choice function that exhibits negative correlation over time is the product of the optimization of some dynamic convex preference.

"Ambiguous Persuasion: Synonyms and Dilation"

Abstract: In the ambiguous persuasion game studied by Beauchene, Li, and Li (2019), I find that the receiver may strictly prefer to ignore the ambiguous messages rather than follow the sender's recommendation. In this project, I aim to characterize the optimal ambiguous persuasion when the receiver is allowed to ignore any of the messages. I first focus on two features of the optimal ambiguous information structure, synonyms and dilation, that may be undesirable to the receiver: Synonyms do not give the receiver useful contingencies, dilation leads his belief to be even more ambiguous. I show the receiver strictly prefers to always ignore messages that are synonyms or lead to dilation if and only if the underlying state is binary. In other words, they are not always undesirable, contradicting the existing intuitions.

Languages   English (fluent), Chinese (native)

References

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