

# Separately Convex and Separately Continuous Preferences\*

Aniruddha Ghosh<sup>†</sup>   M. Ali Khan<sup>‡</sup>   Metin Uyanik<sup>§</sup>

April 14, 2025

**Abstract:** The fact that a function of several variables may satisfy a property for one variable and not necessarily for any other has been understood and appreciated at least since Debreu’s 1952 reformulation of Nash’s theorem as a ‘social existence theorem.’ In this paper, we provide a systematic investigation of this kind of *separate convexity* property for preferences and correspondences, and explore its interplay with the continuity postulate. We present three equivalence theorems on preferences, and apply them to obtain representations of both cardinal and ordinal utilities in the formulation of  $n$ -person games. Moreover, we provide characterizations of the open graph property for correspondences with separately convex sections that substantially generalize the results of Bergstrom-Parks-Rader, Schmeidler, and Shafer on the continuity of correspondences. (119 words)

*Key Words:* Separate convexity, separate continuity, cardinal and ordinal representation, open graph

*JEL Classification:* C60, D01

---

\*This paper was previously circulated under the title *Separately Convex and Separately Continuous Preferences: On Results of Schmeidler, Shafer and Bergstrom-Parks-Rader*. A subsequent version was presented at the *Midwest Economic Theory and International Trade Meetings* held at the University of Rochester, October 20, 2024. The authors thank Paulo Barelli, Eric Fisher, Hari Govindan, Davide Carpentiere, Alfio Giarlotta, Jason Lepore, Jerry Green, Yingfei Mu, Ema Nakayama, Han Ozyolev, Angelo Petralia, Kevin Reffett, Nobusumi Sagara, Ed Scheinerman, Eddie Schlee, Akira Yamazaki, and Nicholas Yannelis for conversation and correspondence.

<sup>†</sup>Orfalea College of Business, Cal Poly, San Luis Obispo, CA 93401. **E-mail** aghosh10@calpoly.edu.

<sup>‡</sup>Department of Economics, Johns Hopkins University, Baltimore, MD 21218. **E-mail** akhan@jhu.edu

<sup>§</sup>School of Economics, University of Queensland, Brisbane, QLD 4072. **E-mail** m.uyanik@uq.edu.au.