

The Edgeworth Conjecture with Small Coalitions and Approximate Equilibria in Large Economies

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Competitive hypothesis

- ▶ Core convergence theorem (Aumann; Debreu-Scarff): in a large economy, where no agent is “unique,” bargaining power dissipates and the outcome of bargaining approximates a Walrasian equilibrium
- ▶ Competitive prices emerge as terms of trade in bargaining.
- ▶ Requires coalitions of *arbitrary* size.

Coalitions of size

$$\mathcal{O}\left(\frac{h^2 \ell}{\varepsilon^2}\right)$$

suffice, where:

- ▶ h is the heterogeneity of the economy
- ▶ ℓ is the number of goods
- ▶ $\varepsilon > 0$ approximation factor.
- ▶ We use the Debreu-Scarff replica model.

The same ideas give answers to a new algorithmic question.

Given an economy \mathcal{E} and an allocation x , are there prices p such that (x, p) is a Walrasian equilibrium?

We provide a poly time algorithm that (under certain sufficient conditions) decides the question. Context: existing hardness results for Walrasian equilibria.

Our contribution: *finding prices is easy even when finding a W-Eq. is hard*. Specifically:

- ▶ Leontief utilities
- ▶ Piecewise-linear concave utilities