

## Mechanisms Without Money: A Linear Programming Approach

**Faculty Member:** [Johannes Hörner](#)

### Proposal Description:

Much of the most recent literature on mechanism design without transfers rely on one of the oldest mathematical programming technique, namely, linear programming. Neither the relevant game-theoretic literature, nor the fundamental mathematical tools are well-understood by our students. Yet, they are both accessible to them, important for research, and exciting to learn.

The project involves two Ras that would help with three projects on mechanism design without money, whose solutions can be conjectured/guessed using linear programs involving fine enough discretizations. The projects are as follows:

1. Public goods without money: motivated by climate agreements, that amount to voluntary reductions in the amount of public bad –greenhouse gases, this project investigates the structure of optimal agreements. Because transfers are very limited in those negotiations, money is replaced by reciprocity: voluntary reduction by one country is incentivized by voluntary reduction by others. How these reciprocal reductions should be designed and implemented is a difficult mathematical problem with important economic implications.
2. Imagine a sequence of organs arriving at random times, to be assigned to people with heterogeneous, privately known needs (how critical is their condition, for instance?) Solving for the optimal assignment rule is a difficult dynamic problem: Everyone would like to get the good earlier, but to elicit truthful revelation of the need, it is then necessary to trade this expected time with another dimension of the assignment: the uncertainty regarding when this unit is given.

### Requisite Skills and Qualifications:

It is expected that the RA will help with simulations/calculations, and so basic knowledge of programming (Matlab or Mathematica) is expected. The student will learn how linear programming works, and techniques in mechanism design and game theory that are at the cutting edge of research.

**Award:** Jonathan Xu

**Tobin Application Link:** [Tobin Application](#)

**Project Type:** Tobin RA

**Project Year:** 2019

**Term:** Spring 2019

**Source URL:** <https://economics.yale.edu/undergraduate/tobin-ra/spring-2019/mechanisms-without-money-linear-programming-approach>