

# Ordinal Efficiency, Fairness, and Incentives in Large Markets\*

Qingmin Liu<sup>†</sup> and Marek Pycia<sup>‡</sup>

June 18, 2012

## Abstract

Efficiency and symmetric treatment of agents are the primary goals of resource allocation in environments without transfers. Focusing on ordinal mechanisms in which no small group of agents can substantially change the allocation of others, we first show that uniform randomizations over deterministic efficient mechanisms are asymptotically ordinally efficient, that is, efficient *ex ante*. This implies that ordinal efficiency and *ex-post* Pareto efficiency become equivalent in large markets, and that many standard mechanisms are asymptotically ordinally efficient. Second, we show that all asymptotically ordinally efficient, symmetric, and asymptotically strategy-proof mechanisms lead to the same allocations in large markets.

---

\*First draft: February 2011. The paper subsumes Pycia (2011b; 2011c). We thank Andrew Atkeson, Simon Board, Yeon-Koo Che, Federico Echenique, Hugo Hopenhayn, SangMok Lee, Moritz Meyer-ter-Vehn, George Mailath, Ichiro Obara, Joseph Ostroy, Mallesh Pai, Andy Postlewaite, Utku Ünver, Kyle Woodward, Leeat Yariv, William Zame, and seminar audiences at Northwestern Matching Workshop, UCLA, UPenn, SWET, and Caltech-UCLA Theory Conference for valuable comments. Keywords: ordinal efficiency, asymptotic ordinal efficiency, asymptotic strategy-proofness, symmetry, envy-freeness, *ex-post* Pareto efficiency, Random Priority, Probabilistic Serial, Randomized Hierarchical Exchange, Randomized Trading Cycles.

<sup>†</sup>Department of Economics, Columbia University, 1022 International Affairs Building, 420 West 118th Street New York, NY 10027; ql2177 (at) columbia.edu

<sup>‡</sup>Department of Economics, UCLA, 8283 Bunche, Los Angeles, CA 90095; pycia (at) ucla.edu; <http://pycia.bol.ucla.edu>