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Notes

Monetary mechanisms ☆

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Abstract

We provide a series of results for a standard model where exchange is facilitated by liquid assets. Compared to past work, minimal structure is imposed on the mechanism determining the terms of trade. Four simple axioms lead to a class of mechanisms encompassing common bargaining theories, competitive price taking and other solution concepts. Using only the axioms, we establish existence and (perhaps more surprisingly) uniqueness of stationary monetary equilibrium. We also show how to support desirable outcomes using creatively designed mechanisms. Special cases include pure currency economies, but we also consider extensions to incorporate real assets and credit.

JEL classification: E42; E51

Keywords: Money; Mechanisms; Bargaining; Liquidity; Credit

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1. Introduction

This paper provides a series of useful results for the model in Lagos and Wright (2005) where exchange is facilitated by liquid assets. A novelty is that we impose minimal structure on the mechanism determining the terms of trade. Instead of, e.g., Nash bargaining or Walrasian pricing, we show how four simple axioms lead to a class of mechanisms that encompass common bargaining theories, competitive price taking, and other solution concepts. Using only properties implied by the axioms, we establish existence under certain conditions (as is standard) and generic uniqueness (as is perhaps more surprising) of the nondegenerate steady state, i.e., of stationary monetary equilibrium. The argument is related to one used in Wright (2010) for Nash bargaining, but some problems there are corrected, and, moreover, we establish results for *any* mechanism in the class under consideration. We also show how to support desirable outcomes using a variant of Hu et al. (2009). While pure-currency economies are a special case, we also consider real assets and credit.

These results extend much previous work. The model in Lagos and Wright (2005) has bilateral random matching and Nash bargaining. Extensions by Lagos and Rocheteau (2005), Rocheteau and Wright (2005) and others use price taking and price posting with directed search. Alternative axiomatic and strategic bargaining solutions are studied by Aruoba et al. (2007), Zhu (2015) and others. Hu et al. (2009) use pure mechanism design, Galenianos and Kircher (2008) and Dutu et al. (2012) use auctions, and Silva (2015) considers monopolistic competition. See Nosal and Rocheteau (2011) or Lagos et al. (in press) for surveys of the literature – suffice it to say here that the framework has become a workhorse in monetary economics. The relevance of this is that the model is being used extensively in theory and applied work. Hence, while our analysis is motivated by technical rather than substantive issues, the results should be of interest to many people working on applications.[1]

2. Environment

Each period in discrete time has two markets: first, a decentralized market, or DM, with frictions detailed below; second, a frictionless centralized market, or CM. There are two types of agents, buyers b, and sellers s. Types are permanent, but the results also apply when types are determined randomly each period. The DM involves bilateral trade: a buyer meets a seller with probability α, while a seller meets a buyer with probability αn, where n is buyer/seller ratio. In the DM sellers can produce but do not consume, while buyers want to consume but cannot produce, to preclude barter. In the baseline model there is no record keeping of DM activity, to preclude credit. This generates an essential role for a payment instrument (Kocherlakota, 1998), a role played here by cash. In the CM all agents work, consume, adjust portfolios and settle debts, depending on the version of the model.

Preferences between the CM and DM are separable, and linear in CM labor. Thus, the period utility functions of buyers and sellers are

$$\mathcal{U}^b(q,x,\ell) = u(q) + U(x) - \ell \text{ and } \mathcal{U}^s(q,x,\ell) = -c(q) + U(x) - \ell,$$

[1] This is not to say the approach has been universally adopted in monetary economics, since for some issues, heterogeneity based on history is crucial (e.g., Molico, 2006; Menzio et al., 2013; Wallace, 2014; Lippi et al., 2015 and Rocheteau et al., 2015). In the model studied here, by design, money demand is history independent, allowing us to focus on other issues, and to derive analytic rather than numerical results.