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Essential interest-bearing money

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Abstract

I examine optimal monetary policy in a Lagos and Wright [R. Lagos, R. Wright, A unified framework for monetary theory and policy analysis, J. Polit. Economy 113 (2005) 463–484] model where trade is centralized and all exchange is voluntary. I identify a class of incentive-feasible policies that improve welfare beyond what is achievable with zero intervention. Any policy in this class necessarily entails a non-negative inflation rate and a strictly positive nominal interest rate. Despite the absence of a lump-sum tax instrument, there exists an incentive-feasible policy that implements the first-best allocation.
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1. Introduction

I examine optimal monetary policy in a version of the Lagos–Wright [6] model where trade among individuals is competitive; see also Rocheteau and Wright [7]. Absent policy intervention, the competitive monetary equilibrium is inefficient. That is, the real rate of return on money is too low; so that individuals are motivated to economize excessively (from a social perspective) on their real money balances. Efficiency is restored when the real rate of return on money is equated to the rate of time-preference (the Friedman rule).

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It is common practice in this literature to assume that the government has the ability to levy lump-sum taxes. Because money is generally superneutral when it is introduced by way of interest, the Friedman rule may be implemented with virtually any inflation rate when a lump-sum tax instrument is available. This may be accomplished, for example, with zero inflation and a positive nominal interest rate; where interest payments are financed by a lump-sum tax. Alternatively, it may be accomplished with deflation and a zero nominal interest rate; where the deflation financed by a lump-sum tax that is used to contract the money supply. That is, interest-bearing money is not essential when a lump-sum tax instrument is available.[1]

In environments where *all* trade is restricted to be voluntary–including those involving people and their government–lump-sum taxation is unavailable as a policy instrument. The question of interest here is what this restriction implies in terms of efficient implementation. A reasonable conjecture is that the constrained-efficient policy entails zero intervention (at least, this was my own prior). But I demonstrate below that this in fact not the case; i.e., there exist policies that can strictly improve on the allocation associated with zero intervention. Indeed, I demonstrate that the Friedman rule remains implementable under a suitably designed policy.

Naturally, voluntary trade imposes restrictions on the design of an optimal policy. In particular, policies are constrained to be incentive-feasible in that lump-sum payments, if they are to be made, must respect individual rationality. I demonstrate that the standard prescription of deflating at the rate of time-preference is not an incentive-feasible policy. In particular, in the class of incentive-feasible policies I study, a welfare-improving policy necessarily entails a non-negative inflation rate and a strictly positive nominal interest rate. It is in this sense then that interest-bearing money (and inflation) is essential; at least, in the version of the Lagos–Wright model that I study below.

2. Environment

There is a continuum of infinitely-lived individuals, distributed uniformly on the unit interval; let $i \in [0, 1]$ denote an individual. Time is discrete; $t = 0, 1, 2, \ldots, \infty$ and, following Lagos and Wright [6], there are two subperiods at each date labeled *day* and *night*. A distinct nonstorable output is produced and consumed in each subperiod and people meet in a central location at every point in time.[2]

Let $x_t(i) \in \mathbb{R}$ denote the consumption of output during the day in period t by individual i (a negative quantity is interpreted as production). As this output is nonstorable, an aggregate resource constraint implies

$$\int x_t(i)\, di \leqslant 0 \tag{1}$$

for all $t \geqslant 0$. Let $\{c_t(i), y_t(i)\} \in \mathbb{R}^2_+$ denote consumption and production, respectively, of output at night in period t by individual i. As this output too is nonstorable, an aggregate resource constraint implies

[1] Nor, one might add, is a *fiat* money instrument essential. The ability to lump-sum tax implies that the government has ownership and control over a real asset. The government could, in this case, issue paper that is fully-backed by the (lump-sum tax) revenue stream generated by this asset.

[2] This is in contrast to the original Lagos and Wright [6] formulation where trade is "centralized" in one subperiod and "decentralized" in the other.