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The theory of fiat money and private money as alternative media of exchange

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ABSTRACT

A random-matching model with a clearinghouse is constructed to investigate the impact of private money on economic efficiency and social welfare in three monetary regimes. A subset of agents, called bankers, whose credit histories are recorded by the clearinghouse, are allowed to issue private banknotes in order to consume. Those private liabilities may serve as media of exchange, either by themselves, or alongside a stock of fiat money. Under certain conditions, welfare in a monetary steady state with private money is strictly higher than that attained in a steady state where private money is prohibited.

1. Introduction

One of the ongoing controversies in monetary economics is whether the private sector should be allowed to create money. The primary debates were between what were called the banking and the currency schools, with the former (Hayek, 1976) advocating laissez-faire in intermediation and the latter (Friedman, 1960) advocating a complete government monopoly over currency issuance. Somewhere between these views lies the real bills doctrine, which favors the coexistence of publicly and privately-issued circulating liabilities. These three points of view form the core of the most received theory on private money.

In the past seventy years, implicit restrictions, such as prohibitively high tax on banknotes have prevented the private issue of money in the United States. Recent legislative developments, however, have removed those impediments. At the same time, a variety of "e-cash", the electronic equivalents of private banknotes have appeared due to advances in communication and transaction technologies. Therefore, we can plausibly expect to see a return to a situation where fiat money and private notes circulate alongside each other. This fact suggests that studying the above three viewpoints is relevant and important.

The last decade has witnessed dramatic developments in the theoretical understanding of private money. Related work includes Kiyotaki and Wright (1993), Aiyagari et al. (1996), Smith and Weber (1999), Azariadis et al. (2001), Temzelides and Williamson (2001), Bullard and Smith (2003) and so on. Particularly, Cavalcanti and Wallace (1999a,b) formulate a random-matching model to investigate private note issue and redemption. By examining two exclusive cases, "fiat money only" and "private money only", they show that the set of implementable allocations using fiat money is a strict subset of the set using private money. Cavalcanti, Erosa, and Temzelides (1999) build a model to understand private note exchange, where banking is made possible by the introduction of a clearinghouse. Focusing on monetary stability, they find conditions under which note redemptions can discipline note issue by the banking sector. Our paper is greatly inspired by the former two models. In contrast to previous work, our model goes further by characterizing equilibria

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and investigating the welfare implications of private notes. Particularly, we incorporate into our framework the monetary regime where fiat money and private banknotes coexist. In this paper, a random-matching model with a clearinghouse is set out to study the performance of economies, where three monetary regimes are considered. An arrangement that resembles private banknote issue can be compared with arrangements that resemble government monopoly on money issue and a mix of government and private money issue, respectively. Then we try to examine which monetary regime is most preferable in welfare terms, "fiat money only", "private money only", or "coexistence of fiat money and private money".

Martin and Schreft (2006) establish the existence of equilibria with competitive issue of fiat money in both a search and an OG framework. However, it is ambiguous whether the equilibria with competitive issuers have more desirable welfare properties. Our analysis shows that the welfare obtained in the monetary regime with private money (competitively issued medium of exchange) is generally higher than what is achieved in a regime where private money is not allowed.

Our attention is confined to steady states throughout the paper. First, we study a case with no banking sector and with an exogenous amount of indivisible fiat money, where each agent's trading history is assumed to be private information. Therefore, fiat money must be used to overcome the incentive problem in bilateral transactions. Fiat money is then valued as a means of payment in the unique monetary equilibrium. Then we get rid of fiat money and introduce a banking sector with a clearinghouse. A subset of agents, called bankers, are allowed to keep reserves in the clearinghouse. The treatment of reserves here acts as a gathering of trading history. Banks are able to issue indivisible banknotes for consumption. These privately-issued notes circulate as potential media of exchange and can be returned to banks for redemption. Our results show that under certain conditions, a unique stationary equilibrium exists in this regime. Next, we consider a situation where fiat money and private notes coexist. In this case, fiat money not only serves as a medium of exchange but also can be directly used to meet the reserve rule, while private notes function the same way as before. Due to a strategic complementarity, there exist two monetary steady states, which can be welfare-ranked. Finally, numerical examples are employed to demonstrate the corresponding welfare across three regimes.

The model also implies that the introduction of fiat money sometimes might be harmful to the economy. For example, in the regime of "fiat money only", money cannot be returned to the (single) issuer for redemption. This "inconvertibility" is likely to induce the government to increase the stock of money at will and a higher price results. Also, the circulation of fiat money in the regime of "coexistence" leads to multiple equilibria which dominate each other in terms of welfare and therefore, represents a coordination problem.

The remainder of the paper is organized as follows. In Section 2, the basic model is built. In Section 4, we give a simple introduction to the clearinghouse. In Sections 3, 5 and 6, we explore the economic implications of three different monetary regimes, which vary according to the asset circulating in the economy. Section 7 is a conclusion.

2. The basic model

Time is discrete and there is a continuum of infinite-lived agents with unit mass. Following Williamson (1999), we assume each agent has preferences given by

$$E_0 \sum_{t=0}^{\infty} \beta^t [\theta_t u(c_t) - x_t] \tag{1}$$

where E_0 is the expectation operator, conditional on information available to the agent at date 0, $\beta>0$ is the discount rate, c_t is the consumption in period t, x_t is production of the consumption good. Let r denote the rate of time preference, where $\beta = \frac{1}{1+r}$. As well, $\theta_t \in \{0,1\}$ is an i.i.d. preference shock over time and across agents, with $\Pr[\theta_t = 1] = \frac{1}{2}$. We assume that $u(\cdot)$ is strictly increasing and strictly concave with $u(0)=0$ and $u'(0)=\infty$. There is some $\hat{q}>0$ such that $u(\hat{q})-\hat{q}=0$. An agent's own output can only be consumed by other agents. These goods are otherwise perishable and thus they cannot be used as commodity money.

In every period, there is no central market place to exchange and agents are randomly assigned to meet bilaterally. Trade can only occur between an agent who wishes to consume ($\theta_t=1$) and an agent who doesn't want to consume ($\theta_t=0$), which rules out double-coincidence-of-wants matches. This generates a role for media of exchange. Each agent has only one chance to trade during each period. In this model, there will be three relevant cases to consider, which differ according to the monetary asset circulating in the economy.

3. Fiat money only

There exists in the economy one intrinsically useless, indivisible and durable object called fiat money. For tractability, an upper bound on money inventory is imposed: Individuals can hold no more than 1 unit of monetary assets. We assume that a fraction μ_m ($0<\mu_m<1$) of the agents start their lives each with one unit of fiat money, which can not be returned to the issuer (government) for redemption. In all random pairwise meetings, an agent does not have access to the histories of the other agent. That is, the private trading history of each agent helps preclude any form of credit in this economy. Money is essential in facilitating bilateral trades.

Now, suppose that two agents match and there exists a single coincidence. In this case, the seller supplies q_m units of goods in exchange for 1 unit of money from the buyer. To determine q_m, we assume that buyers make take-it-or-leave-it offers to sellers, so that sellers get zero surplus from the trading while buyers get all the surplus. That is

$$-q_m + V_m^n - V_0^n = 0 \tag{2}$$

$$u(q_m) + V_0^n - V_m^n \geq 0 \tag{3}$$