

# Discussion of the paper “Private money creation and Equilibrium Liquidity” by P. Benigno e R. Robatto

Fabrizio Mattesini<sup>1</sup>

<sup>1</sup>Dipartimento di Economia e Finanza Università di Roma “Tor Vergata”

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# The paper

- Analyzes whether perfectly competitive issuers of inside money can satisfy the liquidity needs of the economy
- Old issue in monetary economics, very relevant in light of the recent financial crisis
- DSGE model useful to study policies such as capital requirements and liquidity regulation

$$\max E_0 \sum_{t=0}^{\infty} \beta [\ln C_t + X_t]$$

Budget constraint

$$\begin{aligned} & P_t X_t + Q^B B_t + Q^D D_t + Q^k K_t^H + N_t \\ & \leq I_t (1 - \chi_t) D_{t-1} + [B_{t-1} + (1 - I_t) D_{t-1} - P_t C_t] \\ & + Q_{t-1}^k K^H (1 + i_t^k) + N_{t-1} (1 + i_t^N) - P_t T_t \end{aligned}$$

Cash in advance constraint

$$P_t C_t \leq B_{t-1} + (1 - I_t) D_{t-1}$$

- What is the numeraire in this economy? Is it  $B_t$ ?
- The price  $P_t$  assumed to be the same in both subperiods. Very strong assumption, really necessary?
- Because of the constant price across subperiods

$$\begin{aligned}\lambda_t &= 1/P_t \\ C_t &= 1/(1 + \mu_t)\end{aligned}$$

- where  $\lambda$  and  $\mu_t$  are the Lagrange multipliers of the budget constraint and of the cash in advance constraint
- $\mu_t$  is the liquidity value of the assets used to buy the good

Both households and intermediaries acquire capital. They probably rent it to a firm that produces the consumption goods

$$Y_t = A_t K_{t-1}$$

$$A_t = \begin{cases} A_H & \text{w.p. } \pi \\ A_I & \text{w.p. } 1 - \pi \end{cases}$$

Return on capital

$$1 + i_t^k \equiv \frac{Q_t^k + P_t A_t}{Q_{t-1}^k}$$

Return on net worth

$$1 + i^N \equiv \frac{\Pi^D}{N_{t-1}}$$

- Bonds:

$$Q_t^B = E_t \left\{ \frac{P_t}{p_{t+1}} (1 + \mu_{t+1}) \right\}$$

- Deposits:

$$Q_t^D = \beta E_t \left\{ \frac{P_t}{p_{t+1}} [I_{t+1} (1 - \chi_{t+1}) + (1 - I_{t+1}) (1 + \mu_{t+1})] \right\}$$

- Basic assumption: deposits provide liquidity services only when they are not defaulted on, i.e.  $I_{t+1} = 0$

# Intermediaries

- Overlapping generations of two period lived intermediaries
- They sell a risky security to consumers (a zero coupon bond, called deposit) which is a claim to a unit of numeraire in period  $t+1$
- With proceeds from this sale and their net worth (what is it exactly?) intermediaries buy capital so so that
$$Q_t^k K_t^l = Q_t^D D_t + N_t$$
- At  $t+1$  they observe the return on capital whether they default or not. Profits given by



$$\Pi_{t+1} = \begin{cases} (1 + i_t^k) Q_t^k K_t^l - D_t & \text{if no default} \\ (1 + i_t^k) Q_t^k K_t^l - (1 - \chi_{t+1}) D_t & \text{if default} \end{cases}$$

- Amount intermediaries seize in case of default:

$$\chi_{t+1} = \max \left( 0, 1 - \left( 1 + i_t^k \right) \frac{Q_t^k K_t^l}{D_t} \right)$$

# Intermediaries

- Firms produce using capital
- Consumers use bonds and the fraction of deposits intermediaries did not default on, to buy the goods from firms
- Firms bring back the deposits to intermediaries who redeem them (not clear what is exchanged at this point. Maybe capital, but capital has been already used to produce the goods)



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- It includes the Treasury and the Central Bank
- Government budget constraint:

$$\frac{B_{t-1}}{P_t} = \frac{Q_t^B}{P_t} + T_t = E_t \left\{ \sum_{j=0}^{\infty} B^j + \left( Q_{t+j}^B - Q_{t+j}^f \right) \frac{B_{t+j}}{P_{t+j}} \right\}$$

- Tax rule

$$T_t = (1 - \beta) T - \left( Q_t^B - Q_t^f \right) \frac{B_t}{P_t}$$

- When  $B_t$  is constant for every  $t$ , these two equations imply

$$\frac{B}{P_t} = T$$

- Private liquidity coexist with public liquidity if public liquidity is scarce
- Suppose now public liquidity is scarce. Can liquidity provided by private agents achieve the first best?
- Bad equilibria characterized by a liquidity shortage.
- If there is no enough public liquidity consumers must use risky assets (deposits)
- When risk materializes, those who have defaulted assets can no longer buy and consumption goes down
- Government intervention may be beneficial

## A few observations

- The paper tries to achieve an ambitious goal: study the role of inside money in the economy.
- Difficult task.
- Inside money is a claim to something. Very different from fiat money which is a claim to nothing
- It requires a careful description of how money is introduced, circulates and then how it is redeemed.
- Not clear that a cash in advance constraint is the best way to go. It misses too many details of the exchange process

## A few observations

- The assumption that deposit on which intermediaries default do no longer circulate is not obvious.
- Not clear why intermediaries exist in this model. Are they better at screening projects? Are they better at providing liquidity to the economy? Are they able to provide liquidity insurance?
- In this paper intermediaries default only when their liabilities are greater than their assets
- But in reality, why don't they always default?
- There is no punishment and they cannot be excluded from future trade since they live only two periods

## A few observations

- It is not clear what the authors mean when they say that the safe asset is scarce.
- The price of this asset should adjust so that the safe asset could satisfy all the liquidity needs of the economy. (Gu, Mattesini Wright, Econometrica 2016)
- What exactly are the frictions that support this result?
- Does this model provide an empirically relevant model of a liquidity shortage?
- The crisis of 2007 tells us the fall in liquidity was caused not only by a few banks defaulting on their deposits, but by the fact that banks stopped lending at each other