Discussion of the article by C. Parlour, U. Rajan and J.Walden Payment System Externalities

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Motivation of the paper

- Interbank payments have become huge: roughly 50 times GDP in advanced countries.

- These payments generate interbank obligations.

- The main insight provided by this paper is

«a bank may restrict its own lending because it needs to hold liquidity against claims issued by another bank".

What the paper does

- Studies the consequences of this “liquidity externality”, which seems to have been overlooked so far.
- Builds a simple model where banks have a dual role:

1. Lend to entrepreneurs who need inputs produced in other regions;
2. Provide payment services to households and entrepreneurs.

The latter consists in settling the inter-regional payments between entrepreneurs and their «foreign» suppliers.

The Model

- Central bank issues (exogenous) currency volume *C* to each household, which is deposited in a bank.
- N regions consisting each in two geographical «zones» *i=l,h* with different outsourcing propensities $\alpha_l < \alpha_h$.
- Each zone has mass one continuum of competitive entrepreneurs and households but only one bank who grabs all the surplus.
- Each bank issues «fountain pen» money by lending to entrepreneurs, which they use to buy inputs from domestic and foreign households.

The Model (2)

Fraction λ of households withdraw early: banks have to keep liquid reserves, which can be traded on an interbank market.

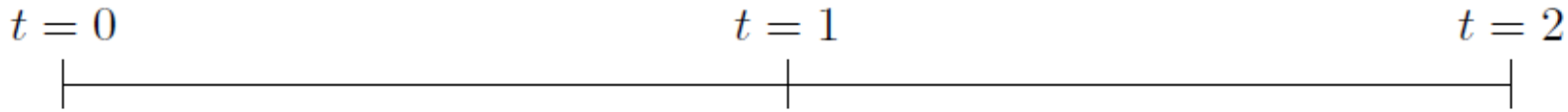
Credit multiplier in autarky:

ASSETS	LIABILITIES
Cash Reserves C	**Initial deposits C**
Loans b	New deposits b

Liquidity constraint: $C \geq \lambda(b + C)$

Thus $b \leq I = \frac{1-\lambda}{\lambda} C$

Timing



1. Households deposit cash C in banks
2. Each bank i lends claims b_i to entrepreneurs
3. Entrepreneurs buy inputs from households

1. Interbank borrowing and lending occurs
2. Households deposit claims into own bank; a fraction λ of households withdraw cash

1. Output is produced
2. Interbank settlement occurs
3. Fraction $1 - \lambda$ of households withdraw cash
4. Depositors are repaid
5. Bank profits are paid out to households

The decisions of the banks

Two kinds of interbank flows:

- payments related to interbank loans : zero cost (WHY?).
- payments related to the settlement of «foreign» transactions of their customers: unit cost τ (fees, collateral) paid by sender.

Profits of the banks

$$\pi_i = f(b_i) - b_i - rz_i - \tau \max\{\alpha_i b_i - \alpha_{-i} b_{-i}, 0\}.$$

Liquidity constraint:

$$z_i \geq \lambda((1-\alpha_i)b_i + \alpha_{-i} b_{-i} - I)$$

z_i : borrowing/lending on interbank market.

Efficient outcome (second best)

Planner maximizes total output, net of transaction costs

$$\max_{\{b_h, b_\ell, z_h, z_\ell\}} f(b_h) + f(b_\ell) - b_h - b_\ell - \tau|\alpha_h b_h - \alpha_\ell b_\ell|.$$

Under equilibrium and liquidity constraints:

$$z_h + z_\ell = 0$$

$$z_h \geq \lambda\Big((1-\alpha_h)b_h + \alpha_\ell b_\ell - I\Big)$$

$$z_\ell \geq \lambda\Big((1-\alpha_\ell)b_\ell + \alpha_h b_h - I\Big)$$

Adding up these liquidity constraints gives the resource constraint:

$$0 \geq \lambda(b_h + b_l - 2I)$$

When τ =0 (no transaction costs)

- Optimum allocation (first best): maximizes output under resource constraint

$$b_h = b_l = I$$

- Market equilibrium: Each bank maximizes its profit

$$\pi_i = f(b_i) - b_i \; - \mathrm{r}\lambda[(1-\alpha_i)b_i - \alpha_{-i}b_{-i} - \mathrm{I}]$$

First order condition: $f'(b_i) = 1 + b_i + \mathrm{r}\lambda(1-\alpha_i)$

Since $\alpha_l < \alpha_h$ this implies $b_l < I < b_h$.

- Externality implies that market equilibrium is **skewed towards the high outsourcing zone h.**

Efficient outcome when τ>0 (second best)

- The second best allocation of lending is **skewed toward the low outsourcing zone** l: $b_h^S < I < b_l^S$.

- When τ is high: no net transfers; total investment allocated in inverse proportion to outsourcing propensities (e.g. if $\alpha_l = 0$, zone *l* gets all the funds).

- When τ is small, there are costly transfers: the low outsourcing zone gets more than the high outsourcing one

Market equilibrium

- Central bank sets interbank rate *r.*
- Each bank chooses loans to firms and lending/borrowing on interbank markets to maximize profit under liquidity constraint (Nash Equilibrium).

Proposition 3:

- **There is a unique interest rate at which the interbank market is balanced.**
- **At this rate, bank h lends too much (w.r.t. the second best) and bank l lends too little.**

Comparative Statics

The authors focus on the case where α_h is large.

Proposition 4:

When τ decreases:

- **In the second best allocation, the lending gap between the two regions decreases.**
- **In the equilibrium allocation, the lending gap increases.**

Policy implication: if the central bank reduces τ (CBDC?) this will increase the inequality between regions.

Comments/Suggestions

- Very interesting problem, very elegant model, very neat results.
- Pigou: The central bank could tax or subsidize payments so that the externality is internalized. Is that possible?
- Would CBDC be a win-win solution in this case ?
- Monetary policy: instead of requiring that the interbank market is balanced, the central could inject/withdraw reserves and set the interest rate that maximizes welfare.
- What is the intuition behind the increasing gap result in the market equilibrium? What happens when τ vanishes?

Question

- I do not see why transaction costs are zero on interbank loans.
- The observation that they represent a small fraction of interbank payments is not an argument because costs are proportional.
- It is true that consumer payments are larger, more dispersed and volatile but isn’t the cost passed through to consumers?
- What would happen if τ was incurred on all payments?