The macroeconomics of central bank issued digital currencies

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Overview

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- Model: essentially a (much) more sophisticated version of Goodfriend and McCallum (2007)
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  - Deposit (loan) creation is costly via BGG-type credit risk, and capital regulation
- Main results:
  - Swap of 30% gov. bonds with CBDC increases GDP by 3%
  - CBDC control is additional central bank tool to stabilize business cycle
  - CBDC price (i.s.o. quantity) rule more desirable in face of liquidity shocks

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- In the following, some discussion and comments on:
  1. Key channels and parameters for GDP gains
  2. CBDC and financial stability

Key channels and parameters 1/2

3 main drivers of positive GDP effects from CBDC introduction

1. Lower bank funding costs
2. Lower monetary transaction costs
3. Lower distortionary taxes

Key channels and parameters 2/2

Channel 2: lower monetary transaction cost

- Agents pay monetary transaction costs for consumption, investment, production inputs and land $(x) \rightarrow$ liquidity taxes:

$$s_t^x = A_x \underbrace{\frac{e_t^x}{f_t^x}}_{\equiv v_t^x} + B_x \frac{f_t^x}{e_t^x} - 2\sqrt{A_x B_x} \tag{1}$$

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- Assumption: CBDC offer more liquidity services than deposits in liquidity generating function: $f_t^x = T_t^{1-\theta}[(d_t^x)^\theta + (T^{fintec} m_t^x)^\theta]$:

$$\frac{\partial f_t^x}{\partial m_t^x} > \frac{\partial f_t^x}{\partial d_t^x} \tag{2}$$

Key channels and parameters 3/3

Channel 3: lower distortionary taxes

- Gov. can cut distortionary taxes due to 2 effects:
  1. **Real bond rates fall:** since agents pay financial asset transaction costs (for all x)

$$\mathbb{C}_t^x = (d_t^x + m_t^x)\phi_b(b_t^{rat} - b^{rat}) \tag{3}$$

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- Comments:
  - ϕ_b conservatively calibrated, but does relationship continue to hold in CBDC world?
  - T^{fintec} important for 2 channels: justification for its calibration? Robustness analysis?

CBDC and financial stability 1/2

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- Crisis: agents collectively want to increase their holdings of medium of account (MoA)
  - In pre-CBDC world, have to withdraw deposits for cash
  - Coordination failure: 1:1 exchange rate with MoA breaks down (Diamond and Dybvig (1983), DD83)
  - Asset fire sales would put pressure on banks even absent panic-based run (Rochet and Vives (2004), RV04)
  - LoLR can provide liquidity to banks after the fact, but not unproblematic: stigma, moral hazard

CBDC and financial stability 2/2

- CBDC offer direct way to address crisis origin
  - Can elastically provide MoA to agents *directly*, w/o need to withdraw from banks
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- However, difficult to model. Maybe (if into DD83-type panic runs) á la Gertler and Kiyotaki (2015)?
  - Liquidity shock forces banks to fire-sale assets upon deposit withdrawals
  - Once asset price drops below critical threshold, run equilibrium exists where *all* depositors withdraw
  - Provision of CBDC can rule out run equilibrium?

Conclusion

- Considerably rich model, carefully calibrated (although perhaps more sensitivity w.r.t. key parameters, say T^{fintec}?)
- Much more realistic role of bank financing than in (common) ILF models
- Financial stability opportunities of CBDC?

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