CBDC Policy Rules and Welfare
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[1]The views expressed in this paper are those of the authors and not necessarily the views of the Bank of Canada.

Motivation

- The paper:
    - develops and calibrates a 2-country DSGE model with financial frictions, and
    - analyzes the state state and transitional dynamics following introduction of a CBDC.
    - compares welfare gains of different policy rules

- The model is very rich and flexible to address many questions.

Overview of the Model

- 2 countries, 2 goods, 2 currencies, 2 banking sectors.
- Production side as in standard NK models.
- Financial sector, not so standard: wholesale, retail deposit, retail lending banks and financial investors
- Monetary policy: Taylor rule + CBDC rule.
- Fiscal policy
- Key frictions and adjustment costs:
  - cash in advance constraints
  - sticky wages
  - sticky prices
  - investment adjustment costs
  - transaction costs
  - bank monitoring costs
  - distortionary taxes

Highlights of the Model

- HHs are subject to CIA constraints (thus endogenous liquidity premium; cash could be added though):
  - consumption & investment:

$$\varkappa^{ci} A_{ci,t} \geq 4 S_t^{\mathrm{mon}} \left(P_t c_t \left(1 + \tau_{c,t} \right) + P_{H,t} I_t \right)$$

  - input purchases:

$$\varkappa^{y} A_{y,t} \geq 4 S_t^{\mathrm{mon}} \left(W_t^{pr} H_t + R_{k,t} K_t \right)$$

  where S_t^{mon} is AR(1) with mean 1, and where

$$A_{ci,t} = \left[(b^o S_t^{ccy})^{1/\theta_o} \left(O_{H,t}^h \right)^{\frac{\theta_o-1}{\theta_o}} + (1 - b^o S_t^{ccy})^{1/\theta_o} \left(O_{F,t}^h \right)^{\frac{\theta_o-1}{\theta_o}} \right]^{\frac{\theta_o}{\theta_o-1}}$$

$$O_{H,t}^h = \left[\left(b_{ci}^H \right)^{1/\theta_d} \left(D_{H,ci,t}^h \right)^{\frac{\theta_d-1}{\theta_d}} + \left(1 - b_{ci}^H \right)^{1/\theta_d} \left(\vartheta M_{H,ci,t}^h \right)^{\frac{\theta_d-1}{\theta_d}} \right]^{\frac{\theta_d}{\theta_d-1}}$$

- $\vartheta > 1$: technological superiority of CBDC over deposits
- S_t^{ccy} Currency demand shock

Highlights of the Model

- Fiscal rule:

$$gd_t^{rat} = gd_{ss}^{rat} - 100d^{gdp}\ln\left(\frac{g\check{d}p_t}{gdp_{ss}}\right)$$

- The last expression is output gap, which represents automatic stabilizers.

Overview of the Results

- Introducing a CBDC (which is a retail, interest-bearing, CBDC accessible by both domestic and foreign HHs, issued against government bonds, in the amonut of 30% of GDP) leads to:
    1. SS welfare gains: 2%
    2. Optimized counter-cyclical CBDC policy rules increases welfare by 1%
    3. The paper speaks to/revisits many issues such as: should the CB target interest rate or quantity?

Long Run Effects of a CBDC

- Issue 30% of GDP of CBDC against government debt
- Expansionary effects on GDP: 2% immediately, 6% long-run,
    - Lower real interest rates
    - Lower distortionary taxes
- Effects on banking:
    - **Total deposits** grow strongly in long run.
    - **Deposit composition**: wholesale deposits rise from 32.3% → 62.3% on impact, and → 88% in long run.
    - **Bank loans** increase by > 15% of GDP
    - These results are similar to the **GE channel** in Chiu and Davoodalhosseini (2023), which is in addition to market power, perhaps more important quantitatively (**Comment: nice to check**)
- More/cheaper liquidity: standard Friedman-type argument

Welfare: Optimized Simple Rules

- The paper studies different policy rules (Reserves Taylor rule plus CBDC rate/quantity) and conducts welfare analysis compared against pre-CBDC economy

  - Monetary Policy for CBDC

  $$i_{m,t} = \frac{i_t}{\mathfrak{sp}} \left(\frac{\pi_{t+1}^p}{\bar{\pi}}\right)^{-m_\pi} \left(\frac{\ell_{H,t}^h}{\bar{\ell}_H^h}\right)^{-0.05*m_{\text{cred}}}$$

  - Countercyclical policies $m_{\text{cred}} > 0$ or $m_\pi > 0$ (note the sign!) makes CBDC less attractive in a boom and reduces output and inflation through lower money balances. Total gains: ≈ 1.5
  - Key (liquidity channel): A lower interest rate on money is contractionary, not expansionary
  - Special case: Cash-like CBDC, $i_{m,t} = 1$. Gains: ≈ 0.4
  - **Comment:** It is nice to allow the **reserves rule** to depend on financial conditions and then add CBDC to calculate the pure contribution of CBDC.

General Comments

- General framework with a very rich setting to understand the channels through which CBDC affects the economy, allowing to conduct various exercises regarding both the SS or transitory effects of CBDC.

- Emphasizes the frictions in financial intermediation

- I am completely on board with a key message of the paper: "CBDC can produce very significant macroeconomic efficiency and stability gains, both domestically and in an open economy context. The key ... is a well-designed CBDC policy."

General Comments

- On the quantitative side:
    - would the results make sense, quantitatively? For the US, the long run effects would be: $6\% \approx \$1.38$ T/year $\approx \$35T$ lifetime with 4% interest rate.
    - should not we see more sensitivity analysis? Example: $\theta_d = 2$ (the higher, the more substitutes deposits and CBDC are):

- On the theoretic side:
    - the channels through which CBDC affects should be separated as much as possible (e.g., effects on banking due to enhanced competition or GE?)
    - various features of the model (e.g., the financial intermediation) should be justified.

- Why two countries not one?
    - is it intended to make the model more realistic?
    - if both countries do the same, how would the results change? How much of the gains are coming from the open macro aspect?

Interest Rate Spreads

- Interest rate on reserves = interest rate on wholesale
  - zero spread
  - after CBDC introduction, this could change significantly, beucase wholesale funding becomes more important, and
  - the spread could depend on the CBDC design and interest rate

Does the model really capture financial stability implications of CBDC?

- The financial stability implications of CBDC are modeled through "**an exogenous shock to preferences toward CBDC**".

- This is useful for scenario analysis, but it does not really speak to the issue of whether we have a run or not, or how large the run would be.

Role of financial investors

- The role of financial investors not clear.
- They buy government bonds and also invest in wholesale deposits. Where do they get their resources? Do they work or they get funding from HHs, or they borrow from banks or international markets? I could not find it in the paper.
- Why do we have them in the model in the first place?

NICE PAPER.
READ IT!

THANKS