# KNOW YOUR (HOLDING) LIMITS: CBDC, FINANCIAL STABILITY AND CENTRAL BANK RELIANCE

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### The policy-relevant research question

- Many central banks are considering a retail central bank digital currency (CBDC).
- A retail CBDC is a digital form of money, issued by the central bank and accessible to everyone, that can be used as a means of payment and a store of value.
- Concern: a retail CBDC can lead to a shift of funds away from commercial banks to the central bank, possibly leading to liquidity risks, less lending, and lower profitability.
- Holding limits are among the proposed solutions in the euro area.
- **Research question**: What is the impact of a retail CBDC on the balance sheets of banks and the central bank and how does it depend on the holding limit?

#### Methodology

- Detailed bank-level constraint optimisation model:
  - Banks choose the profit maximizing response to deposit outflows. They can:
    - 1. deplete their own excess reserves
  - 2. use new reserves obtained on the interbank market (redistribution of reserves)
  - 3. use new reserves obtained via central bank lending to banks
  - subject to reserve, collateral, and liquidity constraints.



- Highlights of the model:
  - Banks endogenously opt for their preferred mix of up to 14 different balance sheet adjustment options (maturity, (un)secured, interbank, central bank).
  - 2. Liquidity regulation-driven reaction: each funding option has a distinct impact on the Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR).
  - 3. Interbank market redistributes reserves, including market clearing conditions and the balance sheet impact for the borrower and the lender.
- Well-suited for scenario analysis and policy considerations
  - 1. The model can consider many scenarios (see the paper for a preview!):
    - Low vs high CBDC demand
    - High vs low preference for liquidity buffers
    - High vs low excess liquidity or collateral availability
    - Perfect vs imperfect interbank market
    - Crisis vs non-crisis
  - 2. **Results are no black-box**: impact on each bank can be easily understood in terms of its initial balance sheet, its deposit outflow, and the scenario under consideration.

## Barbara Meller and Oscar Soons



### **Application to the euro area**

- Detailed bank-level supervisory data (>2000 banks) for Q3 2021
- Assume a range of overnight household deposit outflows and no firm deposit outflows.
- Assume the central banks accepts non-HQLA collateral (credit claims).
- Assume a constant spread between prices at system-level (absolute prices can vary across banks), where
  - 1. the deposit facility rate provides a floor to interbank market prices
- 2. short term funding is cheaper than long term funding
- 3. secured funding is cheaper than unsecured funding of equal maturity
- 4. short term central bank funding is cheaper than bond issuance
- Assume three liquidity preference scenarios:
- A: banks sustain no liquidity buffer (crisis scenario)
- B: banks sustain 50% of current voluntary buffer (baseline scenario)
- C: banks sustain 100% of current voluntary buffer ("prudent" scenario)
- In baseline scenario B, most banks first rely on their own excess re**serves** rather than tapping the interbank market or central bank funding. On aggregate, 82% of the maximum outflows with a €3,000 holding limit are replaced by depleting own excess reserves (not shown here).
- Reserves are redistributed on the interbank market.



- Medium term unsecured funding is most popular, since it is the cheapest source of interbank funding with a positive LCR and NSFR impact.
- The central bank may need to provide additional reserves



- At high outflows or with more risk-averse liquidity preferences, banks:
  - request predominately non-HQLA secured long-term central bank funding due to their LCR and NSFR constraints, respectively.
  - run out of unencumbered eligible collateral



### Heterogeneous effects



#### • A digital euro may have heterogeneous implications across banks.



- LSIs are first to run out of unencumbered eligible collateral and experience the largest increase in central bank and wholesale funding dependence....but these results do not yet include IPS-links.
- G-SIBs and certain LSIs are the largest borrowers on the interbank market, while other LSIs, investment banks and wholesale banks are large lenders.

#### **Policy implications**

- Our methodology can be used to investigate whether the timing of a potential CBDC issuance and its envisaged holding limits are prudent.
- For the potential issuance of a digital euro, our results show that in Q3 2021 with a  $\in$  3,000 individual holding limit and zero firm holding limit, the changes to banks funding structures and their liquidity risks would have been benign and no additional central bank funding would likely have been required.

### **Frequently Asked Questions**

Q: Would banks also be able to deleverage?

A: Banks could obtain reserves by selling assets to another bank or nonbank. We are working on including these options, which substitute for interbank lending.

Q: Do you need to calibrate the model using market prices?

A: The spread between the prices of the funding options matters for the bank's choice. The model can include a range of (bank-level) calibrations.

Q: Could the bank increase deposit rates to persuade depositors to stay?

A: Yes! We only simulate bank balance sheet responses to a given outflow, not expected deposit outflows, which would also depend on the deposit rate.

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