

To Demand or Not to Demand: On Quantifying the Future Appetite for CBDC

Marco Gross and Elisa Letizia

WP/23/9

IMF Working Papers describe research in progress by the author(s) and are published to elicit comments and to encourage debate.

The views expressed in IMF Working Papers are those of the author(s) and do not necessarily represent the views of the IMF, its Executive Board, or IMF management.

**2023
JAN**



IMF Working Paper
Monetary and Capital Markets

To Demand or Not to Demand: On Quantifying the Future Appetite for CBDC

Authorized for distribution by Hiroko Oura
January 2023

IMF Working Papers describe research in progress by the author(s) and are published to elicit comments and to encourage debate. The views expressed in IMF Working Papers are those of the author(s) and do not necessarily represent the views of the IMF, its Executive Board, or IMF management.

ABSTRACT: We set up a model of banks, the central bank, the payment system, and the surrounding private sector economic environment. It is a structural, choice-theoretic model which is deeply rooted in data. We use the model to conduct a structural counterfactual that introduces a Central Bank Digital Currency (CBDC) which is optionally interest-bearing. The model can be used to provide estimates of the emerging CBDC-in-total-money shares, the drop of deposit rate spreads to policy rates, the impact on reserve needs, the implied rotation of profits away from banks toward central banks, and the extent to which monetary policy pass-through may become stronger. We obtain *upper bound* estimates for the CBDC-in-money shares of about 25 percent and 20 percent, respectively for the U.S. and euro area, when CBDC would be remunerated at the policy rates and be perceived as “deposit-like” by the public. Actual take-up may likely be below such upper bound estimates. The model codes—to replicate all results and to apply them to other countries—are made available along with the paper.

RECOMMENDED CITATION: Gross, M., and E. Letizia. 2023. “To Demand or Not to Demand: On Quantifying the Future Appetite for CBDC.” Working Paper WP/23/9, International Monetary Fund, Washington DC.

JEL Classification Numbers:	C63, C73, E4, E5
Keywords:	Central bank digital currency; bank funding costs; central bank seigniorage; monetary policy pass-through
Authorss E-Mail Addresses:	mgross@imf.org, eletizia@imf.org

WORKING PAPERS

To Demand or Not to Demand: On Quantifying the Future Appetite for CBDC

Prepared by Marco Gross and Elisa Letizia¹

¹ The paper has benefitted from valuable comments and suggestions from the participants of seminars at the IMF, with the European Central Bank, Bank of England, Bank of Canada, Reserve Bank of Australia, Board of Governors of the Federal Reserve System, Central Bank of Brazil, Bank of Korea, and Bank of Japan. For valuable discussions and comments, we thank Atai Agur, Christoph Bertsch, Martin Čihák, Shafiq Ghawi, Reimo Juks, Argyris Kahros, Inutu Lukonga, Sahra Sakha, Manmohan Singh, and Gabriel Soderberg. The views expressed in this paper are those of the authors and do not necessarily represent those of the International Monetary Fund (IMF).

Contents

1. Introduction	5
2. Literature	6
3. The Model	8
3.1 The Stock-Flow Consistent Grounding for the Model	8
3.2 Sequence of Agent (Inter-) Actions in the Model	9
4. Model Parameterization and Estimation	15
5. Counterfactual Simulations: Introducing a CBDC	17
6. Discussion and Conclusions	23
 <u>Annex I:</u> Thompson Sampling-Based Reinforcement Learning of Nash Equilibrium Deposit Rates	26
<u>Annex II:</u> Sampling Choice Signals from Nested Conditional Logit Models	31
<u>Annex III:</u> Dependence of Model Dynamics on Model Parameters	32
<u>Annex IV:</u> Empirical Estimation and Model Calibration	34
<u>Annex V:</u> Detailed Counterfactual Simulation Results for the U.S. and the Euro Area	38
 References	50