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CBDC Adoption as an Autonomous
Factor: Monetary Policy
Implementation Implications
Across Floor and Corridor
Operational Frameworks

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CBDC Adoption as an Autonomous Factor: Monetary Policy Implementation Implications Across Floor and Corridor Operational Frameworks

Abstract

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Central bank digital currencies (CBDCs) are typically analysed as instruments of financial inclusion, payment system modernisation, or monetary sovereignty. This paper argues that framing obscures their primary operational significance: a retail CBDC, once issued at scale, functions structurally as a new autonomous factor in the central bank's liquidity management framework — analogous to banknotes in circulation, but with adoption dynamics that are endogenous to the central bank's own design parameters rather than exogenous to monetary policy. This endogeneity is what makes CBDCs operationally distinct from any previous instrument in the history of monetary policy implementation.

The operational target of monetary policy in all four jurisdictions examined — the Eurosystem, the People's Bank of China, the Banco Central do Brasil, and the Bank of Russia — is the short-term interbank interest rate, implemented through a combination of open market operations, standing facilities, and reserve requirements. The structural position of each operational framework — whether a floor system with abundant excess reserves or a corridor system dependent on regular central bank refinancing — determines the sensitivity of that framework to CBDC-driven autonomous factor shocks. A retail CBDC that converts commercial bank deposits into central bank liabilities generates a reserve drain whose magnitude and timing depends on design parameters — notably the individual holding limit and remuneration policy — that the issuing central bank controls directly. This creates a novel class of problem for liquidity management: an autonomous factor whose volatility is partly self-determined.

Using the Eurosystem's current operational framework as the primary analytical case, this paper models the reserve drain implied by three retail digital euro adoption scenarios — conservative (5% of overnight deposits), moderate (15%), and stress (30%) — under varying holding limit assumptions. In a floor system operating with structural excess reserves currently in excess of €3.5 trillion, moderate adoption does not threaten €STR stability but materially complicates the ECB's liquidity forecasting, as the digital euro holding limit effectively caps the maximum autonomous factor drain the instrument can generate and therefore constitutes a monetary policy implementation parameter, not merely a financial stability one. The Eurosystem's explicit commitment to preserving the two-tier monetary system through holding limits is read in this paper not as a constraint on CBDC ambition but as a calibration of the autonomous factor problem — a design choice with direct implications for the structural liquidity position and the required scale of open market operations in any future normalisation of the balance sheet.

The comparative dimension of the paper draws on three further cases selected to span the retail-wholesale axis and the floor-corridor axis of operational framework design. China's e-CNY, deployed in a corridor system in which banks depend on regular PBoC refinancing operations, introduces a structural demand substitution effect absent in floor systems: digital yuan adoption compresses the banking system's demand for central bank reserves through the regular tender operations, effectively narrowing the OMO transmission channel at the margin. Brazil's DREX, designed as a wholesale tokenisation infrastructure layered beneath PIX — which already processes the majority of retail credit transfers — concentrates the autonomous factor impact at the interbank settlement layer rather than the retail deposit layer, limiting but not eliminating the liquidity management challenge. Russia's digital ruble, operating in a distorted rate environment with a key rate at 21% and a balance sheet heavily conditioned by sanctions-driven capital account closure, presents a case in which CBDC adoption is primarily driven by strategic financial architecture rather than domestic monetary policy optimisation, producing a regime in which the operational framework implications of CBDC are subordinated to geopolitical objectives — a configuration with its own distinct set of risks for the transmission mechanism.

The paper concludes that central banks designing or refining CBDC frameworks must specify their operational framework — specifically the target structural liquidity position, the width of the interest rate corridor, and the calibration of the standing facility rates — as a prior constraint on CBDC design, not as an afterthought. The holding limit, remuneration structure, and onboarding architecture of a retail CBDC are not merely product design choices; they determine the instrument's position on the autonomous factor spectrum and therefore its compatibility with the existing monetary policy implementation framework. The National Bank of Kazakhstan's Digital Tenge, issued and integrated into public procurement financing in a corridor-adjacent operational framework, illustrates this design sequencing in practice and provides a live comparator for the analytical framework developed here.

Keywords: monetary policy implementation, central bank operational framework, autonomous factors, CBDC, digital euro, liquidity management, standing facilities, open market operations, corridor system, floor system

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