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The Macroeconomic Implications of CBDC: A Review of the Literature

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Appendix A: CBDC and the lessons from ON RRP

If a CBDC were account-based, interest-bearing, and intermediated, it would be much like the current reserve system in the United States, except that a CBDC would presumably allow nonbank counterparties to directly hold Fed liabilities in digital form.

The existing Overnight Reverse Repurchase Agreement (ON RRP) facility already provides nonbank financial firms direct access to the central bank in the form of Treasury-backed repos. Introduced in 2013, the ON RRP facility allows money market funds (MMFs) to deposit funds overnight with the Fed at an administered rate, which is below the rate on balances held at the Federal Reserve Banks (IORB).⁷² Operationally, take-up in the ON RRP facility transforms reserves held by the banking sector into Treasury reverse repos held by ON RRP counterparties, keeping the overall size of the System Open Market Account portfolio unchanged. By offering those institutions that are ineligible to earn IORB—a highly liquid risk-free investment—access to the ON RRP facility, the Fed provides a floor on money market rates in an environment of ample reserves, thereby supporting the implementation of monetary policy.

The main purpose behind the ON RRP’s introduction was not to create an alternative CBDC, but rather to support interest rate control. Even so, the similarities between the ON RRP facility and an account-based, interest-bearing, intermediated CBDC can help us understand how the introduction of a CBDC might affect the banking sector, the implementation and transmission of monetary policy, and financial stability. In this appendix we discuss how the design features of the ON RRP might relate to a theoretical CBDC, along with the main differences between the ON RRP and a CBDC.

Design features of the ON RRP and their implications

As with CBDCs, one concern with the ON RRP facility has been its potential to crowd out financial firms’ liabilities such as deposits. Two important design features of the ON RRP limit the scope of disintermediation and are thought to be stabilizing during times of market stress: an ON RRP rate that is below the monetary policy rate, and individual and aggregate caps on take-up.

In the current operating framework, the ON RRP rate is at (or just above) the bottom of the target range for the federal funds rate, while IORB is at (or just below) the top of the target range. Setting a relatively low ON RRP rate is consistent with much of the CBDC literature, which argues that low rates of remuneration reduce a CBDC’s ability to crowd out financial firms’ liabilities, limiting its direct effect to very safe funding instruments that offer interest near or below the floor of the target range for the federal funds rate. The ON RRP directly competes with private overnight repo backed by Treasuries and provides cash investors with an outside

⁷² Eligible ON RRP counterparties include banks, government-sponsored enterprises, and sufficiently large SEC-registered 2a-7 funds (that is, registered MMFs).

option that sets a lower bound on money market rates. And while research has shown that take-up in the ON RRP can crowd out private repo, and that the demand for safe assets can increase ON RRP take-up at the expense of private repo, the overall impact on the banking sector so far has not led to a significant contraction in bank deposits or bank lending.⁷³ That said, the effect on the banking sector could change as short-term interest rates increase and the Federal Reserve's balance sheet contracts.

The ON RRP facility also imposes individual counterparty and aggregate caps on take-up. While the specifics have changed since inception, the caps were designed, in part, to temper any surge in take-up in times of market stress and thereby limit individual firms' reliance on the facility as a stop gap.⁷⁴

Differences between ON RRP and CBDC

The similarities between CBDC and ON RRP notwithstanding, there are potential differences between how the ON RRP facility operates relative to a hypothetical CBDC that are important for drawing lessons from the ON RRP experience.

First, the ON RRP facility is not intended for counterparties to make payments. Even if the use of MMF shares for payments was commonplace, these payments would still rely on the banking-sector's existing payments system, in part because of the lack of direct convertibility between MMF, ON RRP take-up and reserves. Thus, the ON RRP facility does not provide the direct transaction services that are among the purported benefits of the introduction of a CBDC.

Second, MMFs that participate in the ON RRP facility hold other assets, and thus the take-up of ON RRP is an equilibrium choice by MMFs that depends on market rates and alternative investments. MMFs' broad set of investment opportunities allows for arbitrage between rates, contributing to the facility's role as an effective floor for short-term funding rates. It is not clear whether an account-based intermediated CBDC, similar to the ON RRP, would allow its intermediaries the same dynamic flexibility. Specifically, an intermediated CBDC that requires intermediaries to only hold central bank liabilities—that is, a “narrow CBDC,” akin to a narrow banking system—implies a tighter link between intermediaries' activities and the central bank's balance sheet, reducing overall flexibility. In addition, a narrow CBDC could make it harder to stabilize the price of reserves relative to CBDC, as it would depend either on CBDC holders' ability to convert CBDC into cash or reserves (*i.e.*, direct convertibility) or on arbitrage between reserves and CBDC intermediaries' liabilities. In contrast, a CBDC intermediary that is allowed to hold other classes of assets would be more flexible and could directly engage in arbitrage

⁷³ See [Anderson and Kandrach \(2017\)](#) for evidence on how the ON RRP facility crowds out private repo liabilities and [Infante \(2020\)](#) on how take-up at the ON RRP facility increases, and private repo decreases, as the demand for short-term money-like assets increases, which is also suggestive of substitutability between the two.

⁷⁴ The aggregate cap on the ON RRP was removed in December 2015 to support the increase in the target range of the federal funds rate. The individual counterparty cap has increased since the facility's inception and now stands at \$160 billion. To date, significant flight-to-quality concerns have not materialized.

between CBDC and those other assets, much in the same way MMFs invest in the ON RRP and other asset classes such as private repo, making the ON RRP rate an effective lower bound on money market rates. However, tight regulations may be required to reduce the maturity or credit transformation that would otherwise occur in CBDC intermediaries' asset holdings.