What do we know about the demand for Bank of England reserves?

Bank Overground

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Published on 22 February 2023

Understanding the demand for reserves is important for designing the Bank of England's future balance sheet and monetary policy toolkit. This post explores the quantity of reserves needed by the financial system, and how it might evolve in the future. The minimum quantity of reserves needed by UK banks may be around £325 billion to £480 billion, or a bit less than half the current stock of reserves.

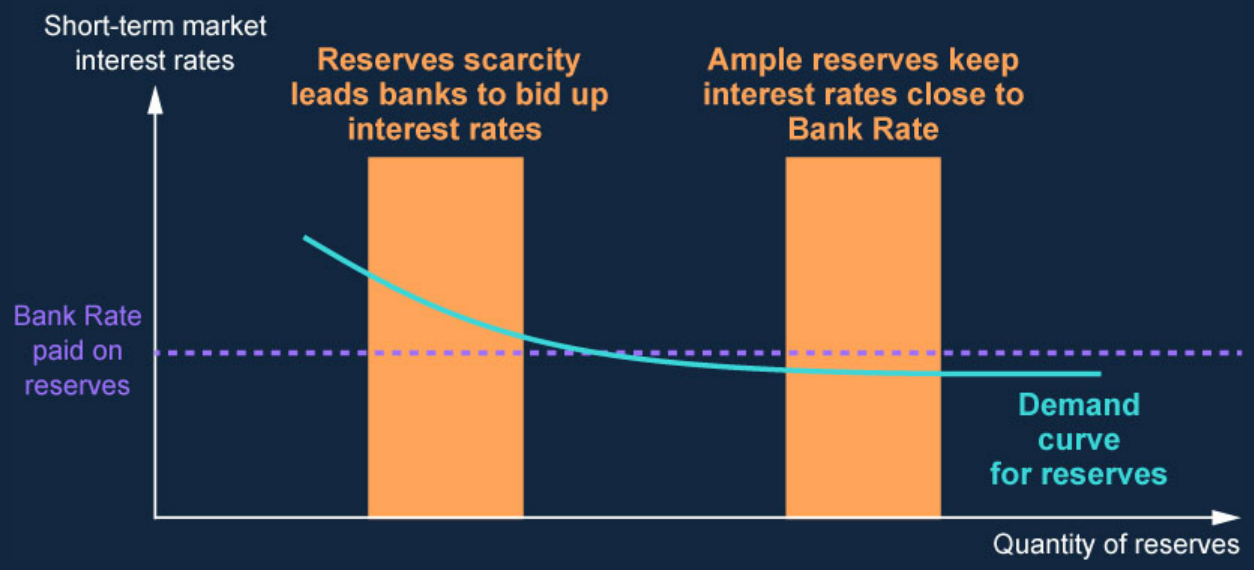
Why do reserves matter?

Reserves are deposits held by commercial banks at the central bank. Banks use reserves to settle payments with one another. They do not rely on other markets to be 'monetised', so unlike securities they do not need to be sold to get hold of cash first. Subsequently, reserves are a central part of banks' high-quality liquid assets (HQLA).

Reserves are therefore crucial for monetary policy implementation. The Monetary Policy Committee primarily meets its monetary stability objective by setting Bank Rate (BR), which is the interest rate the Bank currently applies to reserves. When banks have in aggregate more reserves than they require – as is currently the case – reserves are said to be 'ample'. In the UK, as explained in a **market notice**, the provision of ample reserves to banks and remuneration of reserves at BR together are the key features of the 'floor-system' that has kept market rates aligned with BR since 2009.

Over the coming years, quantitative tightening (QT) and the maturities of Term Funding Scheme with additional incentives for SMEs loans made to banks will reduce the total quantity of reserves in the UK. Eventually, reserves could become 'scarce'. During reserves scarcity, banks would bid up the price of reserves, leading to market interest rates rising above BR (Chart A). The Bank refers to the range on the reserve demand curve just above this point of scarcity as the **Preferred Minimum Range of Reserves (PMRR)**.

Chart A: The demand curve for reserves



As explained in a **market notice**, the Bank has set up the Short-Term Repo facility to ensure banks can borrow reserves against high-quality collateral, which should ensure the aggregate reserve level will stabilise around the PMRR. So understanding the level and drivers of the PMRR tells us about the future size and evolution of the Bank's balance sheet. This post summarises lessons from recent surveys of commercial banks and modelling of the demand for reserves.

What do firms tell us about their demand for reserves today?

Periodically, the Bank asks a sample of reserve account holders about their demand for reserves. The 2022 Q3 survey asked around 40 commercial banks: 'In 2022 Q3, what is the lowest level of sterling reserves that your firm would be willing to hold on a sustained basis before taking mitigating action?'. One can interpret this as their minimum reserve demand and then extrapolate these responses to reserve holders not covered by the survey, assuming firms with similar size, regulatory requirements, and business models have similar reserve preferences. Lastly, a buffer is added on top as the liquidity needed by individual firms need not sum to the reserves needed by the financial system as it is improbable that all firms will be content to operate at their internal minima at all times.

On this basis, extrapolating 2022 Q3 survey data suggests the **PMRR lies between £325 billion to 480 billion**. The range of this estimate reflects differing assumptions around the conservativeness of the buffer and the extrapolation. **This is double the 2018 PMRR estimate of £150 billion to £250 billion**, which Bank staff estimated using the same approach.

In the 2022 Q3 survey, banks ranked internal risk appetite as the most important driver of their reserve minima. They typically want their reserve holdings to cover a period of potential outflows. This is to cover both expected outflows (eg regular intraday payments) and insuring against unexpected outflows (eg a liquidity stress). The magnitude of this liquidity insurance depends on their risk appetite.

This means that the PMRR is not a static number but a dynamic function of factors that evolve over time. This includes the level of outflows and firms' risk tolerance around them (eg how many days' worth of outflows to cover with reserves). Other factors may include relative return on other HQLA. Both reserve demand and aggregate retail deposits (a major source of possible liquidity outflows) in the UK have risen since 2018.

Can models help quantify the drivers of reserve demand in the future?

The quantity of deposits is a key driver of the level of outflows that a bank might want to cover with reserves. Recent work by **Lopez-Salido and Vissing-Jorgensen (LSVJ)** quantifies the impact of deposits on reserves demand in the US and presents a model for reserve demand with deposit levels as an explicit explanatory variable. I apply the LSVJ model to the Sterling Overnight Index Average (SONIA) – the benchmark unsecured rate administered by the Bank – to test how different aggregate levels of deposits could impact the demand for Bank of England reserves. The model suggests that reserve demand (Reserves$_t$) is a function of the spread between money market rates and Bank Rate (SONIA$_t$ – BR$_t$) and the amount of deposits held with banks (Deposits$_t$) (proxied using UK retail deposits). In doing so, I assume LSVJ's log-linear demand curve for reserves (with α, β and γ the parameters of the function):

$$\text{Reserves}_t = \alpha \cdot \text{Deposits}_t^{\beta} e^{\gamma(\text{SONIA}_t - \text{BR}_t)}$$

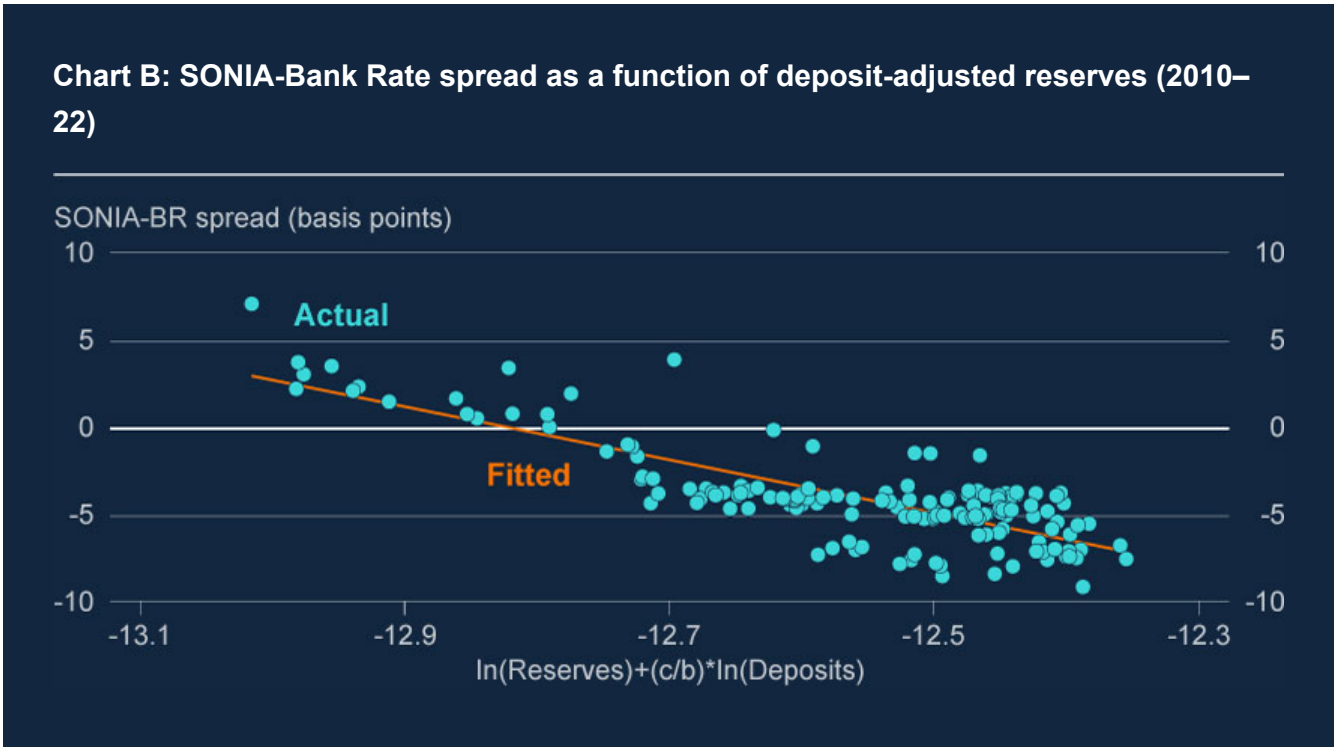
Taking natural logarithms and including an error term, this is estimated by OLS as:

$$\text{SONIA}_t - \text{BR}_t = a + b \cdot \ln(\text{Reserves}_t) + c \cdot \ln(\text{Deposits}_t) + u_t$$

I find a significant downward-sloping relationship between the SONIA-BR spread and reserves, adjusted for the aggregate amount of deposits (Chart B). At face value, they suggest that a 10% decrease in aggregate reserves increases SONIA by 1.5 basis points

relative to BR, all else equal.

Chart B: SONIA-Bank Rate spread as a function of deposit-adjusted reserves (2010–22)



LSVJ also rearrange the model to provide an estimate for the minimum demand for reserves. The relative price of borrowing reserves in markets is one indicator of the balance between demand for and supply of reserves in the system. So by specifying the money market rate consistent with being at the PMRR and a level of deposits (ie a key driver of the demand for reserves), the model can estimate the PMRR.

In the UK context, there are challenges to estimating both the money market rates and level of deposits consistent with the PMRR. Unlike in the US, the UK data does not include a period in which the system moved from ample reserves towards scarcity. Given that the structure of sterling money markets has changed in a prolonged period of ample reserves, and will continue to evolve during QT, we do not know the SONIA-BR spread that is consistent with the PMRR. One way to approximate it is to look at the highest spreads observed under ample reserves – 5 basis points is just above the 99th percentile of the observed rates between 2010 and 2022. But this may be too conservative and so for illustrative purposes, I will also model a PMRR spread of 10 basis points.

The level of deposits at the time reserves approach the PMRR is also very uncertain. While, depending on the end-buyer of a gilt, the QT sales process should mechanically reduce some bank deposits, the overall path of deposits will depend on the broader behavioural response and other developments in the economy. There is some evidence quantitative easing led to a creation of new bank deposits, but it is unclear whether deposits will fall significantly alongside QT (pushing the PMRR down) or whether QT could occur alongside with broadly stable or

even rising deposits (pushing the PMRR up). **Research on the US experience of Fed balance sheet tightening** where deposits did not fall during the last round of QT would point to relatively sticky PMRR, ie one that is not likely to fall during QT.

So Table A shows a range of different model-based PMRR estimates for deposit levels at their June 2018, January 2020 (pre-Covid), and June 2022 levels.

Table A: Model-based PMRR estimates (in £) varying assumptions about market spreads and deposit levels (rounded to the nearest 5 billion)

Deposit levels PMRR spread	2018	2020	2022
5 basis point spread	245 billion	275 billion	480 billion
10 basis point spread	175 billion	200 billion	350 billion
N.b. Survey estimate	150 billion to 250 billion	n.a.	325 billion to 480 billion

The model-based PMRR estimates for the 2018 and 2022 deposit levels, holding the SONIA-BR spread at 5 basis points, are almost identical with the upper ranges of the survey-based PMRR estimates. The model therefore suggests the increase in the survey estimates between 2018 and 2022 may be fully explained by the increase in retail deposits over that period. While the consistency with the survey results is reassuring, one should caveat any use of the model-based estimates with the uncertainty around the spread at the PMRR and potential concerns around endogeneity and functional form of the model.

The survey and modelling work described here suggests it is several years before the level of reserves falls close to the PMRR, and hence money market rates trade more tightly to – or even above – Bank Rate. Any estimate of the PMRR is of course uncertain and dynamic. But this work suggests the growth of deposits at commercial banks allows us to monitor changes in the underlying demand curve for reserves, and hence when that uncertain point may come.

This post was prepared with the help of Finn Meinecke.

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